

THE EMERGENCE OF GLOBAL DISEASE CONTROL PRIORITIES

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Paper Summary

How do global disease control priorities emerge? This paper examines the post-World War Two histories of efforts to control three diseases - polio, malaria and tuberculosis - to investigate this issue. The paper draws from the policy studies literature to evaluate three models of the priority generation process. A rational model postulates logical selection based on global burden and the availability of cost-effective interventions. An incremental model suggests a drawn out process in which health priorities emerge gradually and interventions reach affected populations through slow diffusion. A punctuated equilibrium model postulates a more complex pattern: long periods of stability during which interventions are available only to select populations, punctuated by bursts of attention as these interventions spread across the globe in concentrated periods of time.

The paper finds that the punctuated equilibrium model corresponds most closely to efforts to control these three diseases. Bursts are associated with the convergence of three conditions: the widespread acceptance of the disease as a threat; a perception that human interventions can control disease transmission; and the formation of a transnational coalition of health actors concerned with fighting the disease. The generation of each condition requires considerable groundwork, the reason for long periods of stability. Initiatives take off rapidly when the conditions couple, the reason for bursts. The paper aims to spark additional research on the subject of global disease control agenda setting, a neglected issue in the health policy literature.

Introduction

Since World War Two organizations concerned with international health have selected a number of diseases as priorities for control. In the 1950s malaria was a focus. In the 1970s smallpox received significant attention. In the 1990s target diseases have included AIDS, tuberculosis, malaria and a set of children's vaccine-preventable diseases. Over the past five decades a continuous stream of diseases have risen on to and fallen off the global disease agenda.

How do diseases come to occupy places of high priority? One explanation is through rational selection. Global health organizations give attention to a disease when its burden becomes high relative to others and when researchers develop cost-effective means of interrupting transmission. A competing explanation is through incremental change. A disease captures the attention of more and more health leaders and interventions diffuse gradually to reach afflicted populations. A third answer presumes a more complex dynamic. Little change takes place over extended periods and efforts to fight the disease are confined to select populations. At certain junctures bursts of priority emerge and interventions spread in concentrated periods of time to reach people across the globe.

The subject of how global disease control priorities emerge has received little attention in the literature on health policy. The aim of this paper is to raise this issue, to evaluate which model best portrays the process and to suggest factors that may shape priority patterns. We analyze the post-World War Two histories of efforts to control three diseases - poliomyelitis, malaria and tuberculosis - to investigate these questions. These three diseases make interesting case studies since each has been the target of global control efforts and has risen on to and fallen off the international policy agenda at various junctures.

In the following section we lay out the three models in greater detail. We then turn to the case histories, focusing on the actors, discoveries and events that shaped the emergence of disease control priorities. In the conclusion we draw from these case studies to assess which model best portrays the process, and to point to the factors that may be shaping patterns of change in priority for individual diseases.

Background

The three models each have a tradition in the public policy field. The rationality model is employed by many economics-oriented policy analyses that use cost-benefit calculations to select among competing alternatives. It is founded on a presumption that policy-makers define carefully the nature of the problems they face, propose alternative solutions, evaluate these solutions on the basis of a set of uniform and objective criteria, and select and implement the best solutions. In health policy the desire to inject rationality into resource allocation decisions in developing countries is the impetus behind the development of the disability-adjusted life-year, or DALY, a measure of the number of healthy life-years lost in a population due to a particular disease (Jamison, Mosley, Measham and Bobadilla 1993). Proponents of the indicator hope that policy-makers will use it to direct resources toward interventions that maximize the total reduction in DALYs.

Many scholars who have studied the political dynamics of policy-making believe that the model does not capture how policy is formulated in practice, questioning the presumption that actors deliberate in a logical, linear fashion (Kingdon 1984; March and Simon 1958; Lindblom 1959). Among the points they raise are that actors have limited information, are not able to imagine all the alternatives, even if cognizant of multiple alternatives are not likely to consider each systematically, hold ambiguous goals, and change these goals as they act. An alternative understanding of the agenda setting

process, termed incrementalism, has emerged that takes into account a number of these critiques (Kingdon 1984: 83-84). Drawing in part from research on public budgetary processes, scholars have postulated that policy-makers are inclined to take the status quo as given and carry out only small changes at a time, making the policy-making process less complex and more manageable than a comprehensive rational deliberative process would entail (Lindblom 1959; Wildavsky 1979).

Baumgartner and Jones (1993) challenge the adequacy of both the rationality and the incrementalist models, drawing on research that models policy agenda-setting in far more anarchic terms (Cohen, March and Olsen 1972; Kingdon 1984). Their punctuated equilibrium model postulates periods of stability with minimal or incremental change, disrupted by bursts of rapid transformation. Central to their model are the concepts of the *policy image* and the *policy venue*. The policy image is the way in which a given problem and set of solutions are conceptualized. One image may predominate over a long period of time, but may be challenged at particular moments as new understandings of the problem and alternatives come to the fore. The policy venue is the set of actors or institutions that make decisions concerning a particular set of issues. These actors may hold monopoly power but will eventually face competition as new actors with alternative policy images gain prominence. When a particular policy venue and image hold sway over an extended period of time, the policy process will be stable and incremental. When new actors and images emerge, rapid bursts of change are possible. Thus, the policy process is constituted both by *stability* and *change*, rather than one or the other alone, and cannot be characterized exclusively in terms of incrementalism or rationality.

The case of polio

In the early 1950s Jonas Salk developed a killed vaccine for poliomyelitis and in 1961 Albert Sabin followed with a live vaccine. Rapidly thereafter several hundred

million children in industrialized states were immunized against the disease, and polio incidence plummeted in the developed world (<http://www.sabin.org>). It was not until more than a decade later, however, that the disease received serious attention in developing countries. In 1974 the World Health Organization launched the expanded program on immunization to combat a number of vaccine-preventable diseases that affected children, including polio.

Through the 1970s and 1980s support for devoting priority to polio control spread gradually across public health and medical communities. Several factors contributed to the growing attention (Horstmann 1984; Raymond 1986; Assad and Ljungar-Esteves 1984). First, a number of developing countries, including Cuba, Brazil and Mexico, launched mass polio immunization campaigns and experienced a considerable decline in disease incidence, demonstrating that it was possible for less industrialized nations to fight the disease effectively. Second, a series of lameness surveys in developing countries indicated that the disease was widespread in tropical and semi-tropical areas. This discovery challenged long-standing presumptions that polio was a 'disease of civilization' unlikely to become endemic in less developed settings. Third, the eradication of smallpox, the first successful global disease campaign of its kind, was completed in 1977, giving health communities confidence in the possibility of disease eradication and sparking discussion on which disease should be the next target.

This was precisely the subject of a 1980 conference organized at the National Institutes of Health in the United States in the wake of the smallpox eradication success. Delegates from multiple organizations attended, including the Centers for Disease Control, the Agency for International Development and the Food and Drug Administration of the United States, the Rockefeller Foundation, the Pan American Health Organization and numerous universities across the United States and other countries (Stuart-Harris, Western and Chamberlayne 1982). Six diseases received the bulk of the attention - schistosomiasis, leprosy, tuberculosis, measles, polio and yaws

(Anonymous 1982). Conference delegates identified the latter three as the most promising candidates (Stetten 1980) and called for additional investigations concerning the feasibility of their eradication (Anonymous 1982). The conference also offered support for global efforts to expand basic health services, and argued that directed campaigns against potentially eradicable diseases could contribute to generating support for such an initiative (Anonymous 1982).

In the wake of this conference, in 1983 approximately 400 experts from over 50 countries attended an international symposium on polio in Washington, DC, an event organized by the Pan American Health Organization (PAHO), the Americas branch of the WHO (WHO 1983: 349; Horstmann 1984). Representatives of numerous national and international organizations attended, including the Centers for Disease Control, pharmaceutical companies, USAID and Save the Children. Among other issues delegates discussed the possibility of eradication in the 20th century. Some expressed doubt, noting a lack of political will, logistical problems, technical difficulties in detecting the presence of the wild poliovirus and questions over the advisability of such an initiative given polio's lighter burden vis-à-vis other diseases (Evans 1984; Creese 1984; Ward 1984; WHO 1983: 349). Also, some delegates argued that the move toward horizontal primary healthcare made a vertically-oriented eradication program ill-advised, and unlikely to generate sufficient political support (Chin 1984; Robinson 1984). Other delegates, however, expressed optimism and called for a global eradication initiative (Gregg 1984). The meeting ended without a consensus on the subject, and with a call for flexible approaches at the national level for polio control (Robbins 1984).

A number of subsequent developments in the second half of the 1980s contributed to an increase in confidence in the possibility of eradication. In 1985 Rotary International initiated a global fund-raising effort to support the World Health Organization's polio immunization efforts (Smith 1988). Also in 1985, the member countries of PAHO announced a formal commitment to seeking to eliminate indigenous

transmission of the disease from the Americas region by the year 1990 (Daniel and Robbins 1997: 19; WHO 1985: 394). PAHO's announcement sparked enthusiasm among global health organizations and generated financial and logistical support from Rotary, USAID, the Inter-American Development Bank, UNICEF and the Canadian Public Health Association (Randall 1991). In an April 1987 meeting PAHO delegates laid down a series of guidelines on procedures for polio reporting, surveillance and the conduct of national immunization days (WHO 1988b: 17-18), setting precedents for countries in other regions that would later undertake these activities. By 1991, only one year behind target, PAHO succeeded in achieving its goal of the elimination of indigenous transmission.

Launch of global polio eradication initiative

The demonstration effects of PAHO's efforts and success cannot be over-estimated. The possibility of eradicating the disease in a large contiguous geographic region inspired delegates at a November 1987 international WHO meeting to declare that global poliomyelitis eradication could now be envisioned (WHO 1988a: 10). The existence of a global network to support vaccination provided by the expanded program on immunization, which had grown into a powerful transnational coalition of UN agencies, multilateral donors, bilateral donors, national programs and voluntary groups (Wright et. al 1991), provided a well-established institutional framework for enhancing the likelihood of success of any initiative.

In 1988 the World Health Assembly made a formal commitment to the global eradication of polio by the year 2000, citing this as a gift from the twentieth to the twenty-first century (WHO 1988c: 161). Between 1988 and 2000, as a direct consequence of this commitment, the world witnessed an acceleration in polio control efforts. The effort received an enormous boost when Rotary International also adopted

the global eradication goal and committed itself to an international fund-raising effort in support of the initiative, ultimately raising \$378 million (WHO 2000b).

Eradication efforts accelerated in the mid-1990s, with the national immunization day (NID) - concentrated campaigns to vaccinate infants and children in short periods of time - as the centerpiece of the strategy (WHO 1993: 225). In 1995 more than half of the world's children under the age of 5 - around 300 million - were immunized against polio in NIDs (WHO 1998b) and by April 1998, all but four of the world's polio-endemic countries had held these events (WHO 1998a).

While eradication had not been achieved by the end of year 2000, the world was well on its way to doing so, and in that year WHO director-general Gro Harlem Brundtland announced a five-year strategic plan in order to ensure that the world would be certified as polio free by the year 2005 (WHO and UNICEF 2000a and 2000b). Meanwhile, Rotary International maintained its financial commitment and private philanthropic foundations joined the cause (WHO 1999c). By 2000 the eradication initiative had evolved into a transnational coalition including the Centers for Disease Control, the World Bank, corporate partners, the governments of multiple OECD states, Rotary International and several private foundations (WHO 2000b).¹

In the wake of the smallpox success it was polio, and not other infectious diseases, that ultimately was chosen for an eradication campaign. What explains this selection? The 1980 conference at the National Institutes of Health, drawing on epidemiological, medical and technical criteria, narrowed the focus of attention of the scientific and health community to measles, polio and yaws. Yaws may have received less subsequent attention as it did not pose a serious threat to the populations of advanced industrial states, nor was there an available vaccine. Epidemiological considerations and the experience of advanced industrial states with measles and polio may have favored the latter disease. Measles, but not polio, re-appeared in the United States after mass vaccination campaigns for both, suggesting that measles was the more easily

transmittable of the two and the harder disease to fight (Nathanson 1984). Beyond this, multiple developing world states in the 1970s and 1980s managed to eliminate polio but not measles from their borders, spurring momentum for the PAHO initiative and the attention given to the disease by Rotary. Finally, the demonstration effects of the PAHO experience proved decisive.

Policy models and the case of polio

If we examine the case of polio in the context of existing models of the policy process we see that rational and incremental models cannot adequately account for the historical ebbs and flows of polio control initiatives. The rationality model does capture dimensions of the experience, including aspects of the scientific investigations that led to discovery of the vaccines, and deliberation among public health and medical professionals concerning strategies for making these vaccines available to children in the developing world. Incrementalism also captures dimensions of the process, particularly the gradual spread of faith through the 1970s and 1980s in the idea of eradication. However, the dynamics of polio control involved not only rational deliberation and incremental change. They also involved sudden bursts of attention. In the course of just several years in the late 1950s and early 1960s following vaccine development, most children in the advanced industrial world were inoculated and disease rates plummeted. Three decades later the World Health Assembly committed itself to eradicating the disease from the earth and priority swept across the developing world like a tidal wave. The history of polio control involved extended periods of incrementalism punctuated by bursts of rapid change. These bursts were sparked by the emergence of new policy venues - coalitions of global health actors - and a new policy image - faith in the possibility of eradication. Across time polio control exhibited a pattern of punctuated equilibria.

The case of malaria

Malaria was regarded as a major public health problem even before World War Two but it was not until the discovery of dichlorodipheny dichloromethane (DDT) during the war that the first global efforts to fight the disease emerged. Since then the world has experienced two major anti-malaria campaigns, each pushed by a different coalition of actors and grounded in a different set of images concerning the nature of the problem and appropriate solutions.

The eradication wave

The discovery of DDT sparked widespread faith among international health organizations that it was possible to eradicate this long-standing scourge. The strategy was simple: spray malaria-endemic areas extensively to reduce the number of infected mosquitoes below the critical level of density, and the malaria parasite will no longer be transmitted - or so it was believed. In 1954, the 14th Pan American Sanitary Conference adopted a plan for the eradication of malaria from the Americas and in the same year, the Second Asian Malaria Conference recommended that the ultimate goal of nationwide malaria control programs should be eradication. The WHO's World Health Assembly adopted this policy in 1955. A sense of urgency marked these calls for action, prompted by a fear that if not completed rapidly insecticide resistance would emerge (Spielman et. al 1993).

The World Health Organization immediately embarked on a coalition-building effort to support the initiative, forging an alliance of Third World states, UN agencies including UNICEF, and governments of industrialized states, most importantly the United States. UNICEF participation was grounded, in the words of one its key malaria experts, in the observation that, "a successful eradication programme will save...more children's lives than all the other UNICEF-aided programmes put together" (cited in Farid

1980, 13). Cold war political and economic self-interest may in part have prompted U.S. government involvement. In Asia, the United States concentrated its assistance to India, Pakistan, Indonesia and Sri Lanka, countries surrounding the periphery of the People's Republic of China, its communist adversary in the region (Spielman et. al 1993). Also, a U.S. government report stated that the burden of disease, "constitutes a hidden malaria tax of more than a third of a billion dollars paid annually by the United States on its imports" (IDAB 1956). The United States was the primary financier for this campaign, between 1957 and 1969 providing \$407 million in grants and loans for 44 programs in 37 countries (Conahan and US General Accounting Office 1982). The United States effectively used this financial power to pressure countries to shift the objectives of their programs from control to eradication (USAID 1976).

The initiative progressed rapidly. Almost all malaria-endemic countries on earth joined the first campaign, adopting eradication as the goal (Najera, Liese, and Hammer 1993).² By 1973 malaria eradication programs covered 99 and 84 percent, respectively, of malarious populations in America and Southeast Asia (WHO 1974). Dramatic reductions in malaria incidence and malaria-related mortality were achieved, especially in India and Sri Lanka (WHO 1999b).

The retreat from eradication to control

However, such success was far from uniform. Resurgences of malaria endemicity occurred increasingly frequently, particularly in Central Africa and Southeast Asia (Najera, Liese, and Hammer 1993). Reasons for failure of eradication projects included resistance to DDT, inadequate epidemiological knowledge, insufficient administrative capacity and weak health care systems in poor countries. At the same time another potentially eradicable disease, smallpox, was competing for the attention of the global health community (Grammicia and Beales 1988). These problems and this new

contender made it difficult for malaria campaign advocates to sustain the high level of political will, forcing a re-examination of the global eradication strategy. One consequence was the curtailment of U.S. financial assistance. The government approved only 12 new projects in 9 countries between 1970 and 1981 (Conahan and US General Accounting Office 1982). In 1969 the WHO officially retreated from its eradication strategy in favor of a policy that encouraged the lesser goal of control (Shuler and USAID 1985).³

Malaria moved off the top of the global disease agenda in the 1970s and 1980s. However, research on the disease continued. A tropical diseases research program sponsored by the WHO, World Bank and the United Nations Development Programme supported the development of new anti-malarial drugs, the search for a vaccine and the evaluation of impregnated mosquito nets (Najera 1999). USAID also supported vaccine and drug development (Spielman et. al 1993). These initiatives formed the groundwork and created a set of intervention instruments for a campaign that was to emerge in the late 1990s.

Through these years the WHO struggled to keep the malaria issue alive in the international health community. In the early 1990s it finally began to meet with success. In 1992 the organization arranged a meeting of ministers of health in Amsterdam, at which time participants ratified a global malaria control strategy. In 1993 the first meeting of a regional working group on malaria control for the WHO African Region was convened in Brazzaville. Member countries adopted a regional plan of action for 1994-1997 on malaria disease management and prevention. Subsequently, a majority of African countries undertook an initial evaluation of their malaria situations, while the WHO engaged in technical cooperation with over thirty African countries to strengthen malaria control programs. By the end of 1994, the majority of endemic countries in the African region had completed national plans of action in line with the global malaria control strategy (WHO 1997).

These WHO efforts would have had little impact had it not been for a surge of attention in malaria control by an organization with the financial resources to back these initiatives. The World Bank came to play the same financier role in the 1990s as the United States government had played in the 1950s and 1960s, allocating more than US\$450 million for malaria control in 46 countries (<http://www.worldbank.org/html/extdr/pb/pbmalaria.htm>). The backdrop to this priority was the Bank's move into health in the 1980s and 1990s as a primary focus of its lending portfolio, after a history of little attention to this sector (Buse and Gwin 1998). The World Bank's publication of its 1993 World Development Report, *Investing in Health*, signaled a significant heightening of its priority for this sector. The Bank's interest emerged as a result of criticism in the late 1970s and 1980s of its inattention to social welfare issues, and from a recognition that sustained economic growth required attention to the quality of human capital (Abbasi 1999). A series of studies sponsored by the organization in the early 1990s indicated that malaria control was a cost-effective investment (see for instance Najera, Liese and Hammer 1993), providing direct impetus for Bank involvement.

The emergence of a roll-back malaria campaign

With the technical backing of the WHO and the financial support of the World Bank, priority for fighting malaria rose rapidly in the second half of the 1990s. Pushed by African leaders who were concerned with rising case incidence in the 1990s, the G8 countries raised the subject at their annual meeting in 1998 (WHO 2000a). This wave of attention culminated in a WHO-led global campaign to fight malaria, launched in May 1998 and known as 'Roll Back Malaria.' Substantial pledges of financial resources came from G8 countries, the European Commission, development banks and other organizations (Nabarro and Mendis 2000), marking the emergence of a new transnational

alliance of states and international organizations in support of a global disease control campaign.

The roll-back malaria movement began with great momentum, with regional meetings convened throughout Asia, Africa and Central Europe to build consensus for implementation. Forty-one African governments expressed an intention to participate in the campaign, as well as all seven of the ten countries in the WHO's Southeast Asian region where malaria was endemic (<http://www.who.int>).

Policy models and the case of malaria

The history of malaria control efforts indicates shortcomings in the rationality framework as a model of disease control patterns. Many factors besides disease burden levels and the development of cost-effective interventions shaped priority. Malaria levels were high in the 1970s and 1980s when resources to fight the disease were low, and the reaction to the discovery of DDT reflected as much exuberant faith in the possibility of eradication as it did a rational response to a new intervention. Nor did the history of malaria control follow a unidirectional, incremental path: radical shifts in strategies occurred, and interest waxed and waned in response to discoveries and the priorities of global health actors.

Anti-malarial initiatives did show patterns of punctuated equilibria. DDT was associated with one surge; the roll-back malaria campaign represented another. Each involved new policy images. The first surge was grounded in a vision of a malaria-free world achieved through global application of a miracle intervention; the second in an image of actors in concert rolling up their sleeves to face a scourge head on. Each also involved new policy venues: the eradication campaign a transnational alliance led by the World Health Organization, UNICEF and the United States government; roll-back malaria an even broader coalition with the World Bank as the primary financier.

The case of tuberculosis

In 1944 doctors for the first time successfully used antibiotics to cure a TB patient (New Jersey Medical School). This intervention triggered the disappearance of hundreds of open-air resorts in developed countries, the dominant mode of treatment, and sparked a radical change in the focus of national tuberculosis control programs. Industrialized countries settled into TB case management based on hospital beds and chemotherapy, supplemented by the decades-old BCG vaccine. These interventions initiated a steady decline in TB incidence and mortality rates in the developed world that lasted nearly three decades (Murray, Styblo and Rouillon 1993).

Consequently governments and health leaders in industrialized states largely ignored the disease. Coverage in Western media evaporated and policy makers considered the problem well under control. The *International Union against Tuberculosis and Lung Disease* (IUATLD) to its title and expanded its focus as research on tuberculosis alone could no longer fill the pages of its publications. Holme (1998) recounts that, “[tuberculosis] disappeared from medical school curriculums as quickly as it did from the research programmes of pharmaceutical companies and the political agenda.” In 1986, Margaret Thatcher disbanded the Medical Research Council, which had been founded in response to the public clamor over tuberculosis. The prevalence of TB coverage in the World Health Organization’s own publications dwindled to almost nothing by the late 1980s. By the end of the decade, the WHO’s entire staff for TB monitoring and control consisted of one person (Holme 1998).

Advances from developing countries in tuberculosis treatment

Meanwhile, developing country health leaders, with few resources of their own and none slated for tuberculosis coming from the developed world, were unable to afford expensive institutions and the training of specialized personnel (Bayer and Wilkinson

1995). They therefore placed hope in ambulatory care - treatment outside costly medical institutions - and passive case detection - a strategy that avoided expensive massive screenings of whole populations - as potential answers to the accelerating prevalence of TB among the poor. Rarely acknowledged in contemporary publications about the history of tuberculosis treatment, a series of studies in the 1950s and 1960s in India eventually revolutionized TB control programs across the globe. A 1958 study demonstrated that treatment of TB patients in their home could be as effective as treatment in sanatoria (Tuberculosis Chemotherapy Centre Madras 1959). A 1962 study suggested that priority should be given to sputum smear positive patients who were actively seeking treatment (Banerji and Anderson 1963), rather than to expensive mass screenings of suspect populations. Influenced by these studies, in 1964 the WHO Expert Committee on Tuberculosis officially adopted a policy of ambulatory care as the recommended practice.

In the mid-1970s IUATLD scientific director Karel Styblo, supported by the Ministry of Health of Tanzania, undertook research in that country to develop affordable TB control based on general health services (WHO 1995). His research formed the foundation for the development of the DOTS (Directly Observed Treatment Short-course) strategy, now the predominant global intervention (WHO 1999a).

While these advances influenced control programs in a handful of developing countries, they were not enough to have a significant impact on this widespread problem. Resource constraints continued to put adequate tuberculosis care out of reach for the majority of the world's poor. It would take developments elsewhere to change this situation.

Priority for tuberculosis control emerges

In 1986 in the United States, the Centers for Disease Control noted a startling reversal in the thirty-year downward trend of TB incidence, a reflection of a decade of neglect of infectious TB patients, as well as an increase in HIV prevalence. The Advisory Council for the Elimination of Tuberculosis (ACET) of the Department of Health and Human Services announced that from 1953 to 1985, the number of TB cases reported annually in the United States dropped 74% but that from 1985 to 1992, the trend reversed (1999). Consequently, ACET requested funding to reinvest in what it perceived as a re-emerging problem. It was refused by the U.S. Congress, whose members had passed resolutions resulting in widespread cuts in public health services in general, and who considered TB to be a disease of low priority.

In 1989 the CDC and ACET issued a *A Strategic Plan for the Elimination of Tuberculosis in the United States*. The report identified AIDS patients, immigrants, refugees, migrant workers from high-prevalence countries and minority populations of low socio-economic status as the primary pockets of infection. A later ACET report warned that (1993), "TB elimination in the United States will not be possible without a substantial reduction in the global TB burden." These reports reflected a concern that the demography of TB would shift to other populations if it were not controlled in these 'high-risk' groups. As Bayer and Wilkinson put it (1995), media attention and public concern about those failing to complete their treatment grew, "...as a result of the fear that what had been a treatable disease might become an untreatable danger to middle-class populations that had in recent years been spared the threat of tuberculosis."

The significance for the global health agenda of this new attention to TB in the United States, and of a similar alarm in Europe (Raviglione et al. 1992; Rieder 1992), is immeasurable. Congress increased funding for the CDC's TB control efforts to \$25 million in 1991, and raised it again to \$104 million for 1993 (Bayer and Wilkinson 1995).⁴ Major international organizations involved with health suddenly became concerned about the disease. The WHO initiated TB program reviews in the early 1990s

in cooperation with the World Bank (Pio et al. 1997). In 1991 the World Health Assembly declared a global TB reduction target, and the WHO announced a general TB strategy. A 1994 WHO/IUATLD report on global TB drug resistance explicitly recognized the outbreak of multi-drug resistant tuberculosis in HIV-infected patients in the United States and Europe as a catalyst behind international attention to the issue. The WHO declared TB a global emergency and began intensive marketing to developing nations of a fine-tuned version of the IUATLD plan designated as WHO-DOTS. World Bank loans for health sector reform became tied to its implementation. The Bank, in line with its new attention to the health sector, argued that tuberculosis control should be a priority since treatment of the disease was inexpensive and its global burden high (World Bank 1993). The World Bank became the largest single source of financing for TB control programs in the developing countries (<http://www.worldbank.org/html/extdr/pb/tbpb.htm>), committing US\$350 million from 1989. With the global health powers behind this particular plan, even those resource-poor countries that had TB control programs in place for decades, such as India, subscribed to the WHO plan, thereby securing necessary funding (World Bank 1997). Within five years of the declaration of the WHO-DOTS plan, 120 countries had adopted DOTS, including all 22 high-burden countries.

This new WHO/World Bank cooperation for tuberculosis control was not without tension. The emergence of the World Bank as a major player in health emphasized the weaknesses of the WHO and sparked a rivalry over leadership in the global health sector (Godlee 1994; Buse and Gwin 1998). This tension manifested itself directly with respect to tuberculosis control strategies. In India, for instance, the country with the world's highest TB burden, World Bank and WHO officials clashed over appropriate implementation strategy, each supported by a different set of political actors inside the Indian bureaucracy (Shiffman 2002). The WHO, with allies among national officials in the health sector, favored a top-down strategy that concentrated implementation authority

in the central government, while the World Bank, with supporters elsewhere in the Indian bureaucracy, was doubtful that the managerial expertise to carry out such a massive program existed at this level. It favored a decentralization strategy that would hand over considerable responsibility to the various state governments.

The election of a politically-savvy director-general, Gro Harlem Brundtland, however, helped enhance cooperation. In 1998 the Stop TB Initiative was launched, an unprecedented coalition of all major international and many national TB, lung health, and tropical disease organizations and several major pharmaceutical companies. In March of 2000, ministerial representatives from high-burden countries gathered on World TB Day and issued the Amsterdam Declaration to Stop TB, affirming the WHO-DOTS strategy and the Stop TB Initiative and requesting continued commitment from international organizations and developed nations. The G8 responded to this massive organization of forces at their 2000 meeting, naming TB a priority disease that affects economic development and prosperity. TB control thus burst onto the scene in less than a decade, linking major international actors in a network that now extends around the globe

Policy models and the case of tuberculosis

As with polio and malaria, the history of tuberculosis control displays a punctuated rather than a strictly rationalist or incremental pattern. A priority in the 1940s and 1950s for international organizations and governments of the industrialized world, tuberculosis control received little attention in the 1960s, 1970s and 1980s as rates in industrialized countries plummeted. It then burst again on to the scene in the 1990s. The disease, measured in terms of number of cases globally, did not suddenly become endemic in the developing world in the early 1990s, nor did a promising new intervention appear at that time. What changed were the policy images and venues: political elites in industrialized nations became fearful that the disease would penetrate the ranks of their

own middle-classes, spurring the creation of a transnational coalition to fight the disease globally.

Conclusion

Global attention for polio, malaria and tuberculosis control emerged surprisingly in the 1990s, in ways that no observer a decade earlier trying to envision disease priority trends could have imagined.⁵ These surges and the erratic post-World War Two histories of priority for containing these diseases expose shortcomings in the rationalist and incrementalist frameworks, taken individually, as models of disease priority generation. Elements of each do capture portions of the process. Disease burden and the availability of cost-effective interventions shaped priority levels. At times attention grew and interventions spread incrementally. However, both rationalism and incrementalism miss the ebbs and flows of policy attention, and have nothing to say about the surprising bursts of priority that have infused the histories of polio, malaria and tuberculosis control. The framework that corresponds most closely to the three case histories is the punctuated equilibrium model.

What underpins these patterns of long periods of incremental change punctuated by bursts of rapid transformation? The emergence of disease control campaigns required a convergence of conditions. They did not appear until (1) a disease was widely considered to be a major problem, (2) a disease was perceived to be amenable to containment through human intervention and, (3) a coalition had formed of powerful institutional actors that believed it to be worthwhile to fight the disease. The first two conditions concern the policy image - how the problem is conceptualized and the solution understood. The third condition concerns the policy venue - the set of actors who hold decision-making power over the issue. The creation of each condition involved extensive groundwork, making the emergence of priority incremental for periods of time. Once all

three conditions appeared, however, disease control initiatives took on a momentum of their own, producing the punctuated pattern.⁶

The case studies point to the significant groundwork involved in creating these conditions. Scientists, health policy experts and members of international organizations debated for a decade which disease should follow smallpox as the next target for global eradication. Support for polio emerged gradually as more and more health leaders became convinced of its potential for eradicability and as evidence accumulated across the developing world of the possibility of elimination of indigenous transmission from large geographic areas. The formation of an anti-malaria coalition in the 1990s occurred in stages as African states and the WHO, then multilateral lending institutions, and finally the G8 states became aware of the severity of malaria's burden and pledged their support for a global campaign. It took time for political elites in the United States and Western Europe to notice the growing threat of tuberculosis within their borders and for their governments, the WHO, the World Bank and the IUATLD to forge a transnational coalition to fight the disease. It took time, also, for knowledge to accumulate concerning appropriate tuberculosis control strategy, as research on ambulatory care, passive case detection and DOTS emerged over several decades.

The case studies also point to the bursts produced by the coupling of conditions. Once scientists noticed that polio was a burden in less developed areas, health leaders understood the disease to be eradicable, and several international organizations pledged support to fight the disease, then government after government mobilized for an eradication campaign. Once African leaders made the global health community aware of malaria's tremendous burden, several cost-effective interventions had been developed, and a WHO and World Bank led alliance created, then the roll-back malaria campaign began in earnest. Once the industrialized countries discovered tuberculosis to be a threat, the WHO identified DOTS as the treatment of choice, and a transnational coalition of

health organizations had formed, then tuberculosis became a priority disease in all high-burden countries.

It is interesting to note that the construction of policy images concerning disease threat and amenability to human intervention were social mediated, involving symbols, images and emotions as much as rational deliberation. The fear of political elites of industrialized countries was necessary for tuberculosis, a disease that had always been endemic in the developing world, to become a 'global' threat. The discovery of DDT sparked an exuberant faith in the possibility of eradication - a deceptive vision of a malaria-free world through application of a wonder pesticide. The cause of polio eradication took the form of a gripping humanitarian crusade to free the world's children in perpetuity from this crippling disease by the end of the second millennium. It is also interesting to observe how the policy images and their policy venues influenced one another reciprocally. The transnational coalitions that promoted disease control campaigns both shaped and were shaped by these understandings of disease threats and the perceptions of their amenability to human control.

Investigating the formation of global health priorities

The formation of global health priorities has received little systematic study in the health policy literature.⁷ This paper represents one effort, concentrated on a limited set of communicable diseases. We suggest a number of related questions to expand these inquiries. Have other disease control efforts follow punctuated patterns or is there something unique to the cases of polio, malaria and tuberculosis that limits the scope of generalizability of this study? How did priority for AIDS, leprosy, schistosomiasis, smallpox, African river blindness and other infectious and parasitic diseases develop? Why have acute respiratory infections and several diarrhoeal diseases received so little attention relative to their global burden? Does the emergence of priority for non-

communicable diseases follow the same dynamics as those suggested here? To what extent do non-disease specific public health causes such as health sector reform, safe motherhood and primary healthcare follow these patterns? Are the emergence of global disease control campaigns generally associated with the coupling of the three conditions of threat perception, belief in the amenability to human intervention and the appearance of transnational coalitions? What other factors matter, and under what circumstances? Do these conditions vary according to type of disease or public health cause? If so, why and how? How much explanatory power do material conditions, such as global burden and the availability of cost-effective interventions, hold in explaining the emergence of priorities, particularly vis-à-vis ideational factors such as myths, symbols and perceptions of threat? Research on these questions would contribute considerably to our understanding of the neglected but critical issue of how global health priorities form.

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Notes

¹ The global campaign had powerful impact. By 1990 the percentage of infants under five globally who had received all three recommended doses of oral polio vaccine was well over 80%. Corresponding to this rise in immunization rates was a decline in reported disease incidence: In 1976, there were 44,390 cases reported globally; by 1999, only 7,094 cases. (World Health Organization, Press Release WHO/71, "Major milestone reached in global polio eradication: Western Pacific region is certified polio-free," 29 October 2000).

² Countries and regions that by 1962 had adopted programs were as follows: Argentina, Barbados, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominica, UAS, Grenada, Guadeloupe, Guatemala, Br. Guiana, Honduras, Br. Honduras, Jamaica, Martinique, Mexico, Nicaragua, Panama, Peru, Puerto Rico, St. Lucia, Surinam, Trinidad & Tobago, Venezuela, Afghanistan, Burma, North Borneo, Ceylon, Taiwan, Cyprus, Hong Kong, India, Iran, Iraq, Israel, Jordan, Lebanon, Philippines, Is. Sarawak, Singapore, Syria, Thailand, Turkey, South Africa, Cape Verde Islands, French Somaliland, Libya, Mauritius, United Arab Republic, Gaza Strip, Rhodesia & Nyasaland, Swaziland, Albania, Bulgaria, Spain, Greece, Italy, Portugal, Romania, the USSR and Yugoslavia. This list includes only those countries involved in consolidation and maintenance phases, which are based on success in prerequisite preparation and attack phases, so the number of countries taking part in malaria eradication is larger than the number indicated in this list. (List extracted from "The status of malaria eradication during the six month period ending 31 December 1962," *Weekly Epidemiological Record*, 14 June 1963).

³ The failure of the malaria eradication campaign to achieve global objectives was a cause of disappointment with vertical health approaches and a contributor to the birth of the horizontal primary health care strategy at the 1978 Alma -Ata conference (Najera 1999).

⁴ Even as the United States stepped up its efforts, TB incidence and incidence of multidrug-resistant TB continued to rise. Unable to improve its treatment rates, the United States looked to the Tanzania projects begun by Styblo a decade earlier (Holme 1998). By 1993 ACET had at last recommended directly observed therapy (though not mandatory) on the level of federal policy, upon recognition of the "difficulty in predicting which patients will adhere to a prescribed regimen" (ACET 1993). The first decrease in new cases in the United States in a decade and a half occurred in 1993 and was attributed to directly observed treatment.

⁵ The campaigns we analyze represent some of the most well-known vertical efforts in the long-standing public health debate between vertical and horizontal strategies, polio eradication standing is the quintessential vertical campaign. In principle, we take these initiatives to be worthwhile, as they mobilize resources and priority for collective action problems that demand cross-national collaboration, and they have generated political and social will for the strengthening of local healthcare systems. On the other hand, there is a critical need to avoid stamping out local initiative and to have regard for local epidemiological, medical and policy expertise, without which these campaigns could not succeed.

⁶ This pattern in part mirrors the most well-known of all public policy agenda-setting theories: Kingdon's streams model (1984). He argues that agenda setting has a random character and is best described as resembling a garbage can in which problems, policies and politics develop and flow along in independent streams, meeting at random junctures in history and creating windows of opportunity during which particular issues rise to the fore. The problems stream refers to the flow of broad issues facing societies. It is from this stream of issues that agendas are shaped. The policy stream refers to the set of alternatives that

scholars, politicians, bureaucrats and other prominent figures propose to address national problems. This stream contains proposals concerning how problems may be solved. Finally, there is a politics stream. National mood, changes in political structure, social uprisings, elections and global political events are among the constituent elements of the politics stream.

⁷ One notable exception is Gill Walt's *Health Policy: An Introduction to Process and Power* (1994).