Beyond Contagion:
Explaining International Cooperation on Health

Rajaie Batniji MD MA
University College, Oxford

Thesis submitted in partial fulfilment of the requirements for the degree of
DPhil in International Relations
in the Department of Politics and International Relations at the University of Oxford

May 2010

96,748 words

Abstract

Beyond Contagion:
Explaining International Cooperation on Health

Rajaie Batniji MD MA, University College, Oxford

Thesis submitted in partial fulfilment of the requirements for the degree of
DPhil in International Relations in the Department of Politics and International Relations at the
University of Oxford, May 2010
96,748 words

International cooperation on health has varied widely across diseases. While some diseases have received international funding and have been subject to regulation, others have been neglected. This thesis conceptualises, measures and explains variations in international cooperation on health. Explanations begin with a rationalist 'contagion thesis,' which predicts that cooperation emerges when a disease poses an international threat. Historically, it appears that much cooperation has not addressed international threats, and many serious threats have not been addressed. To explain this, I turn the 'health cooperation thesis,' which predicts that states cooperate on health when the leadership of powerful actors, international institutions or knowledge communities drive cooperative efforts. To test these frameworks, I define indices for measuring cooperation on health, and for measuring the international threat presented by each disease. Using archives, budgets, interviews and secondary sources, I examine major episodes of cooperation from 1918 to 2006. These cases include cooperation on typhus and international standards in the interwar period; cooperation on malaria and smallpox from the 1948 to 1976; and cooperation on nutrition, HIV/AIDS and tobacco control from 1976 to 2006. I also examine the delays to cooperation on pandemic influenza, smallpox, and HIV/AIDS prevention. The case studies and quantitative assessments suggest that contagion explains little of the cooperation observed on health. Powerful actors have initiated and expanded cooperation, as they did for malaria in the 1950s and HIV/AIDS in the present. Knowledge communities have developed new technologies and communicated previously unrealised international externalities in nearly all cases examined. However, international institutions can best explain cooperation beyond contagion. International institution's rules and autonomy have allowed cooperation to diverge from contagion and the interests of powerful actors, making possible cooperation on nutrition, HIV/AIDS treatment, and tobacco control. Even among infectious diseases with high levels of contagion, like smallpox, cooperation may not have been possible without international institutions.

Acknowledgements

My greatest debt is to my family, friends, patients, and colleagues living in circumstances far less favourable than mine. Were it not for my birth in Gaza, and my exposures to the health challenges faced in developing countries as a medical student and undergraduate, I probably would not have pursued this thesis, and certainly would not have had the zeal to see it through to its completion. Spending time in poor places has provided my research with questions and purpose. While what follows is, I think, a dispassionate analysis of international cooperation on health, my aim is to make a modest contribution to helping our cooperative efforts work better for the world's poor.

Professor Ngaire Woods has been a brilliant and enthusiastic guide and mentor. I initially approached her with a rather scattered list of questions I wanted to explore. With her open door, she helped me navigate these questions, and guided me in developing the methods and analytic approach for answering them. Her careful and insightful advice has shaped me as a scholar, and made this thesis possible. Many superlatives would be necessary to adequately describe her supervision.

I was fortunate to have been based at the Global Economic Governance Programme (GEG) for the duration of my time in Oxford. My work with Devi Sridhar on our Global Health Governance Project has informed my thinking on global health policy. Many of my colleagues at GEG, including Alex Betts, Paolo De Renzio, Arunabha Ghosh, Mayur Patel, and Jeni Whalan, provided comments on chapters in this thesis and essential advice. Reija Fanous made GEG a wonderful place to work. The many guests we hosted, including scholars, leaders in international institutions, and health ministers helped to shape the questions I am asking in this thesis. Perhaps more than anything else, my colleagues at GEG taught me to pick questions that

matter for our world, and then to develop methods for answering them. This is an approach that is less common than it ought to be.

I benefited from comments and insights from discussion with scholars and leaders in international cooperation and global health. Robert Keohane provided important feedback on a draft of my theoretical chapter. David Stuckler provided a critique of my quantitative analysis. Peter Bourne has offered insights into policy-making and several original references. Christopher Davis, Jochen Prantl and an anonymous faculty member provided very useful comments during earlier assessments of this thesis. Jamila Headley, Tom Novotny, and Jeremy Shiffman commented on my analytic framework on a conference panel. Audiences at several conferences and seminars, where pieces of this work were presented, asked probing questions that have refined and clarified my own thinking and writing. Finally, many leaders from international organizations, health ministers and other experts shared their reflections with me in interviews and conversation.

University College has been a superb home in Oxford. I am grateful to Mike Nicholson, Dean of the college, and to the fellows, staff and students of the college. During the writing of this thesis, I served for two years as Junior Dean at Univ, and learned that Oxford's oldest college is also its friendliest.

I could not have written this thesis without the support of many mentors and friends. Sir Iain Chalmers and Lady Jan Chalmers were my second family in Oxford. Our continuing conversation taught me the value of challenging conventional wisdom, and demonstrated their exceptional humility and generosity. My work on global health has been enriched by a friendship and collaboration with Rita Giacaman, Richard Horton and Rana Khatib. Mark van Ommeren, of WHO, first introduced me to global health policy. This thesis would be incomplete without recognizing the support of my peers, whose conversation, hilarity, and

energy made Oxford a wonderful place to be. They are too many to name here, but their support has been absolutely essential.

My studies were generously supported by a Marshall Scholarship, financed by the United Kingdom's Government in gratitude for the Marshall Plan that helped rebuild Europe after the Second World War. I am grateful to the Marshall Commission, and to its assistant secretary, Mary Denyer. I am also grateful to the University of California, San Francisco School of Medicine for allowing time away from my final year of medical school to pursue my studies at Oxford, and to the Center for Research on International and Global Studies (RIGS) at the University of California, Irvine, and its director, Professor Deborah Avant. I spent a few productive months at RIGS as a visiting scholar, which allowed me to be near my family and to meet a wonderful group of scholars.

My mother and father, Enaam and Samir Batniji, and siblings, Raaed, Ruba and Nermine, have been a constant source of support and nourishment (literally). Having been away for many years, I was able to spend the final months of writing at home. Not only did my family put up with me while writing, they offered continuous love and laughter that made this process thoroughly enjoyable.

Although I share the credit for this thesis with many, any errors or misrepresentations it contains are entirely my own.

Rajaie Batniji

Contents

Abstract 3

Acknowledgements 5

List of abbreviations 9

Introduction 11

Chapter 1: A Framework for Explaining Variation in Cooperation 18

Chapter 2: The Contagion Thesis 48

Chapter 3: Measuring Contagion and Cooperation 76

Chapter 4: 1918-1947 – International Cooperation on Health in the Interwar Period 102

Chapter 5: 1948-1976 – International Cooperation to Eradicate Malaria and Smallpox 143

Chapter 6: 1976-2006 – International Cooperation on Nutrition, HIV/AIDS and Tobacco 202

Chapter 7: Conclusions 262

Works Cited 295

Appendices 308

Abbreviations

CDC: Centers for Disease Control (United States)

DDT: Dichlorodiphenyltrichloroethane

DFID: Department for International Development (United Kingdom)

FCTC: Framework Convention for Tobacco Control

FDA: Food and Drug Administration (United States)

GFATM: Global Fund to Fight AIDS, Tuberculosis and Malaria

HCI: Health Cooperation Index

HIV/AIDS: Human Immunodeficiency Virus / Acquired Immune Deficiency Syndrome

ISO: International Standards Organization

LNHO: League of Nations Health Office

MEP: Malaria Eradication Programme

OECD: Organisation for Economic Cooperation and Development

OIHP: Office international d'Hygiene publique

PAHO: Pan American Health Organization (successor to PASO)

PASB: Pan American Sanitary Bureau (secretariat of both PAHO and PASO)

PASO: Pan American Sanitary Organization (predecessor to PAHO)

PEPFAR: President's Emergency Plan for AIDS Relief

UNAIDS: Joint United Nations Programme on HIV and AIDS

USAID: United States Agency for International Development

USD: United States Dollars

USSR: Union of Soviet Socialist Republics

WHA: World Health Assembly

WHO: World Health Organization

Introduction

On the paediatric ward of Suba District Hospital, in the Nyanza Province of Western Kenya, Mrs. Otieno holds her 15-month-old baby boy. A faded red cloth does its best to conceal the swollen, scaly and pink flesh of an unresponsive child. Mother and child appear equally defeated. The Medical Superintendent, Dr. David, quickly makes a diagnosis of Kwashiorkor – a disease of protein and energy malnutrition. He explains the management plan: a heater at night for warmth and intravenous fluids. When the HIV test results come back, Dr. David is visibly disappointed. 'The baby is negative,' he says. If the baby had HIV, he could be given nutritional supplements. Since he is negative, there is little the hospital can do for him. Weeks later, Mrs. Otieno's baby would die.[1]

For Mrs. Otieno and her child, the key decision about resource allocation is not made by the District Medical Superintendent, nor is it made by the Ministry of Health. Instead, this critical decision is made by international efforts that provide life-saving treatment for persons with HIV. Donors have wisely provided nutritional supplements for those they treat with anti-retroviral medications. However, by offering nutritional support to some, implicit decisions have been made by international actors about those whom they will not support.

Decisions about whom not to support with international efforts on health are not new. As Brock Chisholm, the first Director-General of the World Health Organization stated in 1950:

> Faced on the one hand with a budget of only $5,000,000 for 1949, and on the other with an imperative need for attacking a staggering number of health problems throughout the world, the First World Health Assembly had to decide not so much what to do but what not to do, or rather to agree on a system of priorities according to which the various activities planned by the Interim Commission would be carried out.[2]

National and international policy makers in health face a staggering array of choices and trade-offs in formulating and implementing international health policy. Political leaders and technical

[1] This story is based on a personal experience of the author while working in a Kenyan hospital in July 2008

[2] Brock Chisholm, 'The World Health Organization', British Medical Journal, (1950) May 6, 1950.

experts, like the WHO's first Director-General, have had to decide 'what not to do' in international cooperation on health, and often this has been decided for them by factors outside their control. The result is cooperation that has varied dramatically across disease areas.

Variations in international cooperation on health can have big impacts on health priorities in poor countries. While international financing represents a minor component of overall health spending, accounting for 0.3 per cent of total expenditures on health globally, and 6.5 per cent of health expenditures in Africa, international financing exerts a great influence on domestic programs and priorities in poor countries.[3] This influence exists because international financing supports the majority of the Ministry of Health budgets in many poor countries. Meanwhile, private spending, which is the bulk of health spending, is outside of any central direction.[4] Thus, seemingly minor variations in which diseases are targeted by international financing have big impacts on the arrangement of health services in poor countries.

Variations in international cooperation on health have neither been systematically measured nor explained. Recently, scholars have dedicated attention to measuring variation in international financing.[5] However, these assessments and the corresponding criticism of international health financing, have been myopic: seldom recognising that the concentration of financing on infectious disease is a very recent trend.[6] More importantly, assessments have not recognised other forms of cooperation, including international regulation and research and surveillance. The literature explaining variations in international cooperation on health (primarily in medical

[3] Ruth Levine & Katherine Blumer, 'Following the Money: Toward Better Tracking of Global Health Resources', in *Report of the Global Health Resource Tracking Working Group* (Washington, D.C.: Center for Global Development, 2007).
[4] GEG, 'Preliminary Report of a High-Level Working Group, 11-13 May 2008', (Oxford: Global Economic Governance Programme, 2008).
[5] See Nirmala Ravishankar*, et al.*, 'Financing of global health: tracking development assistance for health from 1990 to 2007', Lancet, (2009) vol. 373, no. 9681, pp. 2113-24.; D. Sridhar & R. Batniji, 'Misfinancing global health: a case for transparency in disbursements and decision making', Lancet, (2008) vol. 372, no. 9644, Sep 27, pp. 1185-91.; and, J. Shiffman, 'Donor funding priorities for communicable disease control in the developing world', Health Policy and Planning, (2006) vol. 21, no. 6, p. 411.
[6] As discussed in Chapter 6, while infectious diseases receive the majority of international financing today, as late as the 1990s, they only received less than 15 per cent of all international health financing

and public health journals) consists of a series of suggestions about what may spur global cooperation on health, and expressions of frustration on absent cooperation. These many views are neither systematic nor grounded in an analytic frame, leaving explanations for cooperation on health in disarray. The purpose of this thesis is to conceptualise, measure, and explain variations in international cooperation on health.

Chapters 1 and 2 suggest a theoretical conceptualisation of international cooperation on health. In Chapter 1, I draw upon the cooperation literature in international relations to identify how scholars have explained variation in cooperation on trade and the economy, the environment and health. This scholarship suggests that interests play a crucial role in shaping cooperation, but points to the roles played by the leadership of powerful actors, international institutions and knowledge communities in explaining variations in cooperation. I outline the theoretical basis for how these factors may shape cooperation.

Chapter 2 uses the theoretical foundation laid in Chapter 1 to develop two competing explanations for international cooperation. First, I propose a rationalist 'contagion thesis' for explaining cooperation on health, which predicts that cooperation will emerge based on the international externalities associated with the disease. Second, I propose a 'health cooperation thesis' that seeks to explain cooperation beyond contagion. The health cooperation thesis predicts that states will cooperate on health when the leadership of powerful actors, international institutions or knowledge communities drive cooperative efforts. For each of these two theses, I identify a set of testable drivers and barriers to cooperation that can be used to distinguish and determine the role of each explanatory category.

Chapter 3 proposes metrics for measuring international cooperation on health, and for measuring the level of international externality associated with a disease. To measure international cooperation on health, I create a health cooperation index that assesses the scale of international financing, regulation and research and surveillance for each disease. To construct

metrics for cooperation, I rely on published data on international financing for health, the budgets of donors and international institutions, and official records and documents from WHO and other actors to assess the coverage of international regulation, research and surveillance of disease. To measure contagion, I create a contagion index that assesses the epidemic potential, severity, and financial externalities for each disease. To construct metrics for contagion, I rely on published data on the epidemic potential of disease (based on the basic reproductive number), the case-fatality rate, and the global burden of each disease. I incorporate qualitative information about the availability of treatment or prevention strategies into the contagion index. These indices are used to guide the selection and analysis of case studies. I focus on cases where contagion was high and cooperation was low, or vice-versa. In addition, the indices are used to make quantitative assessments of the relationship between contagion and cooperation.

Chapters 4, 5 and 6 seek to explain the observed international cooperation on health from 1918 to 2006 by applying the conceptual frameworks and the metrics to a series of case studies. The analysis in these chapters relies on published sources, archival documents and, for Chapter 6, interviews with leaders and decision-makers in international cooperation on health.

Chapter 4 looks at international cooperation from 1918 to 1947. This chapter assesses cooperation on cholera, plague, yellow fever, typhus and cooperation on international standards-setting for biological products in the interwar period. It also examines the surprising absence of cooperation on smallpox and pandemic influenza. Powerful actors created the League of Nations Health Office to address the typhus epidemic in Poland. This institution would facilitate expanded cooperation on a range of biological products. Meanwhile, even though cholera, plague and yellow fever posed a minimal threat, these diseases had become embedded in existing international institutions, causing cooperation to outlast contagion.

Chapter 5 looks at international cooperation from 1948 to 1976. This chapter contrasts the malaria and smallpox eradication campaigns during this period. As measured by the contagion

index, smallpox posed a much greater threat than malaria. Nonetheless, at the same time that proposals for smallpox eradication were being rejected by WHO member states in the 1950s, far more expensive proposals for malaria eradication were being approved. In 1959, when the goal of smallpox eradication was first endorsed by the World Health Assembly, malaria received 209 times the WHO funding as smallpox. Overall, the Malaria Eradication Programme, launched in 1955 and terminated in 1969, collected nearly three times as much funding as the intensified smallpox eradication campaign, launched in 1967 and leading to the elimination of endemic smallpox by 1976. This chapter seeks to explain why cooperation on smallpox failed to emerge until 1967, and why this cooperation was so restrained until the final days of the campaign. The findings in the chapter raise doubts about the ability of the contagion thesis to explain the observed cooperation, and lend support to some aspects of the health cooperation thesis in driving cooperation beyond contagion.

Chapter 6 looks at international cooperation from 1976 to 2006. This chapter explains the drivers behind cooperation on nutrition in the 1970s and 80s, posing a challenge to the contagion thesis. Then, it examines the very limited cooperation on HIV/AIDS throughout the 1980s and much of the 1990s, despite the high levels of contagion associated with the disease. Cooperation was restrained by bureaucratic interests at WHO, domestic politics in the United States, and disagreement within knowledge communities that could easily be exploited. Yet, cooperation on HIV/AIDS emerged, and increased sharply beginning in 1998, precisely when the threat posed by the disease was reduced by the availability of treatments. International efforts to finance HIV/AIDS treatment would become the largest ever in the history of international cooperation on health. What explains the rise in cooperation amid a fall in contagion? Finally, I assess the emergence of cooperation on tobacco control. Looking at the negotiations for the WHO's Framework Convention on Tobacco Control, which began in 1999, I explain how formal institutional rules led cooperation to go well beyond contagion. Each of the cases in this chapter suggest that the link between contagion and cooperation is tenuous, and

they demonstrate that cooperation in health can, increasingly, be explained by factors beyond rational self-interest.

Chapter 7 concludes this thesis by assessing the explanatory power of the contagion thesis and the health cooperation thesis. This assessment is based on a synthesis of the lessons from the case studies presented in Chapters 4, 5 and 6, and a quantitative analysis using the health cooperation index and the contagion index. Contagion does not drive cooperation in the case studies, and it does not explain international financing in the regression analysis. However, in regression analysis, contagion does appear to explain a small fraction of the variation in international regulation, and the variation in research and surveillance. The three aspects of the cooperation thesis better explain variations in international cooperation on health. Case-studies show that the leadership of powerful actors has initiated and expanded cooperation on some diseases – like malaria and HIV/AIDS late in the epidemic – while restraining cooperation on other diseases – like tobacco control and HIV/AIDS early in the pandemic. Case-studies and quantitative assessments offer especially strong support for the role played by international institutions in explaining variations in international cooperation. Institutions can best explain the emergence of cooperation beyond contagion, include cooperation on nutrition, HIV/AIDS treatment, and tobacco control. Even among infectious diseases with high levels of contagion, like smallpox, cooperation may not have been possible without international institutions. Regression analysis shows that the budgets of international institutions diverge from contagion more than those of bilateral initiatives. Finally, case studies reveal that knowledge communities have played a decisive role in driving cooperation. In particular, these knowledge communities are most effective when they develop new technologies, communicate previously unrealised international externalities, or create a perception of health, economic or moral crisis. Overall, the case studies and the quantitative analysis suggest that factors beyond contagion, including the leadership of powerful actors, international institutions and knowledge communities explain variations in international cooperation. The final chapter closes by offering reflections on the implications of this research for global health advocates and policy-makers.

This thesis contributes to the building and testing of a theory of cooperation on health, and suggests metrics and methods for assessing cooperation and its drivers. Additionally, it contributes to understanding an intrinsically important issue in international relations: the low levels of cooperation on the diseases killing the majority of the world's population. This thesis may serve a real world purpose. By understanding how cooperation on global public health emerges, this work may facilitate the design and implementation of arrangements for international cooperation on health. Small changes in the global governance of health may have a large impact on health priorities and services in developing countries.

Chapter 1: A Framework for Explaining Variation in Cooperation

In setting out to explain variation in international cooperation on health, I look to the explanations proposed for explaining variations in cooperation on trade and the economy, the environment and, to a limited extent, on health. These explanations of international cooperation span from rationalist and purely interest-based, to those that focus on the role of knowledge and norms in driving international cooperation.[1]

The explanatory framework begins with the rationalist assumption that cooperation will emerge to control international externalities associated with disease. These rationalist assumptions are termed the 'contagion thesis,' and developed further in Chapter 2, to make predictions about where we might expect cooperation to emerge on health. The contagion thesis, built on rational-choice theory, is not employed as a crystal ball for predicting cooperation, nor as a comprehensive way of explaining cooperation. Rather, the interests-based explanations of the contagion thesis are used to re-interpret observed cooperation and to structure a deductive analysis. This approach is modelled on analysis in international political economy (with origins in microeconomic theory) focusing on the identification of constraints and incentives for cooperation.[2] The contagion thesis provides essential '*a priori* reasoning that makes specific predictions to be compared with empirical findings.'[3] When empirical findings cannot be explained by contagion, I look to a broader framework built from the international cooperation literature.

[1] See S. Krasner, 'State Power and the Structure of International Trade', World Politics, (1976) vol. 28, no. 3, pp. 317-47. For a knowledge-based account, see P. M. Haas, 'Introduction: Epistemic Communities and International Policy Coordination', International Organization, (1992) vol. 46, no. 1, pp. 1-35.
[2] R. N. Cooper, 'International Cooperation in Public Health as a Prologue to Macroeconomic Cooperation', *Can Nations Agree? Issues in International Economic Cooperation* (Washington D.C.: Brookings Institution, 1989).
[3] R. Keohane, 'The Demand for International Regimes', International Organization, (1982) vol. 36, no. 2, Oct 14, p. 32. P. 328

Where explanations based exclusively on rational externalities fail to explain cooperation, there are three explanatory categories developed in the international relations literature that are relevant to explaining international cooperation on health. These three explanatory categories, referred to as the 'health cooperation thesis' and developed further in Chapter 2, can be used to explain cooperation beyond contagion. The first category is hegemonic leadership, where a powerful actor is willing to bear the costs of cooperation. The second is institutions, where formal rules, broad membership and the autonomy of international institutions drive cooperation beyond contagion and rational self-interests. The third is knowledge, where technical advances and scientific consensus drive cooperation by changing cost-benefit calculations or creating a perception of crisis. This thesis will build from these three categories, central to explanations in international relations, in order to explain cooperation beyond contagion. The analysis in this thesis compares cases of cooperation on health from 1918 to 2006 using this common analytical framework.

1.1 EXISTING EXPLANATIONS FOR VARIATIONS IN INTERNATIONAL COOPERATION ON HEALTH

Cooperation is understood as a process of 'mutual adjustment,' where states make active attempts to adjust their policies to better match the preferences of others.[4] In health, the earliest cooperation observed was in the form of international regulations to prevent the spread of infectious disease on shipping routes.[5] Cooperation has expanded to include collective action to fund the treatment and prevention of disease, and collaborative efforts on health research and surveillance. Much cooperation occurs in institutions, but other cooperation occurs ad hoc where policies and programs are coordinated outside of any institutions. Both institutionalised and ad hoc cooperation are considered in this analysis. A defining feature of both institutional and ad hoc cooperation considered in this thesis is mediated interaction, either through an

[4] Robert. O. Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy* (Princeton: Princeton University Press, 1984).
[5] Cooper, 'International Cooperation in Public Health as a Prologue to Macroeconomic Cooperation'.

informal set of agreements (ad hoc) or a formal institution; the cooperation is not just state-to-state.

Today, the most striking variation is between cooperation in fighting infectious disease and cooperation in fighting non-infectious disease. Infectious disease refers to diseases caused by infectious organisms, and the most visible today are HIV/AIDS, malaria, pandemic influenza and tuberculosis. Non-infectious disease refers to diseases not caused by an infectious organism, and refers most prominently to cardiovascular disease, cancer, nutritional deficiency, and injury. While non-infectious diseases cause the great majority of death and disease around the world, international funding and collective action in health now favour infectious diseases. This observation has led to a common belief that contagion (which is closely linked to international externality) is a key driver for cooperation. As defined in the following chapter, this is a central premise that I challenge in this thesis.

The assumption that contagion is central, or even essential, to international cooperation on health is reflected in the titles of recent books on the politics of international health. Andrew Price-Smith's *Contagion and Chaos* argues that epidemic disease, 'presents a direct threat to the power of the state' by eroding prosperity and destabilizing institutions.[6] In this analysis, contagion creates international externality, and is the basis for considering health as a public good. Price-Smith concludes that health is a global public good because, 'the health that I enjoy reduces the probability that infection may be transmitted from me (as host) to another human being and subsequently proliferate throughout the population.'[7] In *Boundaries of Contagion,* Evan Lieberman notes the natural place that infectious diseases take among global public goods. He writes,

> 'Like the eradication of smallpox, or ongoing efforts to mitigate global environmental degradation, curbing the AIDS pandemic has been understood by leading global governance actors as a global public good, with a high level of interdependency

[6] Andrew T. Price-Smith, *Contagion and Chaos: Disease, Ecology, and National Security in the Era of Globalization* (Cambridge, Massachusets: MIT Press, 2009). P. 2
[7] Ibid. p. 217

> between countries. Indeed, the problem of infectious disease is well suited to the exertion of coordinated national authority, and its rise is less theoretically problematic than for other areas of international cooperation where state interests are more likely to diverge.'[8]

Lieberman's insightful analysis of national AIDS policies determines that in less diverse societies, the public good of HIV treatment will more likely be delivered. The view that infectious diseases are unique among health issues in creating demands for international cooperation is sometimes unquestioned. In *The Politics of Global Health Governance: United By Contagion*, Mark Zacher and Tania Keefe justify their focus on infectious disease (and the exclusion of non-communicable diseases) by arguing that infectious diseases alone offer 'lessons that can be learned about cooperation and multilateralism within international relations.'[9]

Throughout this scholarship on the politics of international health, it is assumed that infection creates externalities and that the control of these externalities makes infectious disease control a global public good. This is a seemingly reasonable assumption. In this thesis, I challenge this assumption in three ways: by asking whether different levels of contagion among infectious diseases are linked to different levels of cooperation, by probing the failure to cooperate on highly infectious diseases, and by explaining the observed cooperation on non-infectious diseases and infectious diseases that posed no real risk of contagion. I demonstrate that the focus of international cooperation on infectious disease is a relatively recent trend, and that this trend is riddled with many exceptions. I contend that factors beyond contagion have driven international cooperation on health, and I show that these factors too offer lessons about cooperation in international relations.

Analytic Gap: Public health's ungrounded explanations for variation in cooperation

---

[8] Evan Lieberman, *Boundaries of Contagion: How Ethnic Politics Have Shaped Government Responses to AIDS* (Princeton: Princeton University Press, 2009). P. 73

[9] Mark Zacher & Tania Keefe, *The Politics of Global Health Governance: United by Contagion* (New York: Palgrave Macmillan, 2008). P. 1

While no study in global public health has made the explanation of variation in cooperation its core question, the public health literature offers some competing and overlapping explanations. The public health literature has many normative suggestions for where cooperation on health should occur. Public health scholars have often taken a functionalist view that call for cooperation to address those diseases with the greatest burden.[10] The burden of disease refers to measures of death and disability caused by various diseases, injuries and risk factors.[11] The first studies measuring global disease burden were published in the early 1990s, with the explicit purpose of informing international health priorities. Indeed, these studies have had substantial policy influence. As the WHO Director-General said at the time,

> 'Too often - in too many places - public attention is captured by the most vocal advocates. Large numbers of people suffering from serious problems are often ignored because they do not have good advocates. The burden of disease approach will help us address this problem …'[12]

Numerous articles in medical journals and priority-setting strategies from technical institutions, based on demonstrating disease burdens, display the popularity of this view in public health today.[13]

The assessment of disease burden provides a framework for considering where cooperation *should* exist; it does not explain where cooperation does exist. These arguments better serve a normative, rather than explanatory, purpose. Transforming this normative model, about the ideal goals and priorities for cooperation, into an explanatory model sets up a 'straw man' that is easily destroyed. The burden of disease approach was not intended to explain cooperation. Nonetheless, there is a tendency in public health to explain variation in cooperation in the terms disease burden, and the popularity of this view makes it worth considering. Two limited

---

[10] D. T. Jamison, *Priorities in Health: Disease Control Priorities Companion Volume* (Washington DC: World Bank Publications, 2006).; D. R. Gwatkin, M. Guillot & P. Heuveline, 'The burden of disease among the global poor', Lancet, (1999) vol. 354, no. 9178, Aug 14, pp. 586-9.

[11] 'Disease burden' refers to the magnitude of death and disability caused by particular disease. In addition to crude estimates of death, it is common to measure disability using a metric known as the Disability-Adjusted Life Year, or DALY. This complex metric provides an measure of the years of healthy life lost to disease.

[12] Gro Harlem Brundtland, 'Speech on burden of disease concept', (Geneva, Switzerland: 1998).

[13] DT Jamison, World Bank. & Disease Control Priorities Project., eds., *Disease control priorities in developing countries, 2nd edition* (New York; Washington, DC: Oxford University Press; World Bank, 2006).; See also, Gates Foundation, *Priority Health Strategies* (2007 [cited July 4 2007]); available from www.gatesfoundation.org/GlobalHealth/Grantseekers/GH_Strategy/Strategy_Grantmaking.htm.

empirical studies examined variation in international financial assistance in health demonstrating that the disease burden has not shaped global spending on health.[14] Other studies examined variation in health research and, similarly, observed that health research trends favouring infectious disease were out of sync with measures of disease burden.[15] Finally, another study examined the distribution of funding within the World Health Organization, and not surprisingly, found disease burden was not correlated with funding.[16] It is obvious that disease burden, used to form normative arguments, does not offer an explanation for variations in cooperation.

Some public health scholars, frustrated by the failure of international cooperation to reflect disease burdens have focused on explaining cooperation in terms of unrestrained political interference in a technical process.[17] This view, in contrast to the normative and goal-oriented view dominant in public health, is descriptive and actor-oriented. Scholars taking this view speak with what political economist Haggard has called a 'lingering authoritarian undertone' that is seen as necessary to defeat entrenched interests.[18] Expressed more often in editorials than analysis, the belief that technocrats are thwarted by vested interests calls for these 'political' forces to be countered with authoritative institutions and politically astute leaders in global health.[19] A review of the literature finds only two analytic studies on the role of external influence in explaining variations in international cooperation on health. The earliest finds that donors have influenced the forms of cooperation initiated by the WHO, while suggesting that

[14] Shiffman, 'Donor funding priorities for communicable disease control in the developing world'. Sridhar & Batniji, 'Misfinancing global health: a case for transparency in disbursements and decision making'.
[15] P. Perel*, et al.*, 'Relation between the Global Burden of Disease and Randomized Clinical Trials Conducted in Latin America Published in the Five Leading Medical Journals', PLoS ONE, (2008) vol. 3, no. 2, Jan 1, p. e1696.; P. A. Rochon*, et al.*, 'Relation between randomized controlled trials published in leading general medical journals and the global burden of disease', CMAJ : Canadian Medical Association journal, (2004) vol. 170, no. 11, May 25, pp. 1673-7.
[16] D. Stuckler*, et al.*, 'WHO's budgetary allocations and burden of disease: a comparative analysis', Lancet, (2008) vol. 372, no. 9649, pp. 1563-69.
[17] E. Ollila, 'Global health priorities—Priorities of the wealthy', Global Health, (2005) vol. 1, no. 6.
[18] S. Haggard, 'Interests, Institutions, and Policy Reform', in Anne O. Krueger, ed., *Economic Policy Reform: The Second Stage* (Chicago: University of Chicago Press, 2000). p 37
[19] Susan L Erikson, 'Getting political: fighting for global health', Lancet, (2008) vol. 371, no. 9620.

these influences have brought the WHO strategic advantages.[20] A more recent study finds that the WHO budget allocated by the secretariat more closely matches disease burden than the (much larger) WHO budget earmarked by donor states, which favours infectious disease.[21]

Related, and in many ways overlapping with the view focused on 'political' influence in a technical process, is the view that explains variation in cooperation in terms of political priority. This argument is advanced by the demonstration of the factors and conditions necessary for public health issues to gain priority.[22] This view sees global advocacy campaigns as a key to increasing cooperation and reducing variations in cooperation that have led to the relative neglect of some disease areas. While it does not explicitly seek to explain variation, applying this view for this purpose would require the assumption that political priority is causally linked to cooperation. This assumption is opened for scrutiny by Oran Young's conclusion from his studies on environmental cooperation, in which he found that political priority was neither necessary nor sufficient for cooperation.[23] It is conceivable that there would be cooperation on some diseases with low political priority, like smallpox eradication (which lacked political priority even at the height of the campaign). On the other hand, meaningful cooperation may fail to emerge on diseases that dominate headlines and capture the attention of policy-makers, like pandemic influenza for much of the 20th century.

Finally, another view suggests that international cooperation on health should prioritise, in the words of the WHO's first Director General, 'diseases which lend themselves to international action.'[24] This is a rational approach which suggests that given finite resources and opportunities for cooperation, those issues should be targeted that are most likely to deliver

[20] J. P. Vaughan, *et al.*, 'WHO and the effects of extrabudgetary funds: is the Organization donor driven?' Health Policy and Planning, (1996) vol. 11, no. 3, pp. 253-64.
[21] Stuckler, *et al.*, 'WHO's budgetary allocations and burden of disease: a comparative analysis'.
[22] J. Shiffman & S. Smith, 'Generation of political priority for global health initiatives: a framework and case study of maternal mortality', Lancet, (2007) vol. 370, no. 9595, pp. 1370-79.
[23] O. R. Young & G. Osherenko, 'Testing Theories of Regime Formation: Findings from a Large Collaborative Research Project', in V. Rittberger & P. Mayer, eds., *Regime Theory and International Relations* (New York: Oxford University Press, 1993).
[24] Chisholm, 'The World Health Organization'.

global public goods. At first glance, it can be argued that the control of infectious diseases is a public good, while non-communicable disease are a private matter, caused and controlled by an individual's choice.[25] This is problematic on two fronts. First, while cooperation on infectious diseases has provided global public goods, like the elimination of smallpox, this has been the exception, not the rule.[26] In fact, most cooperation on health has been targeted towards the provision of national public goods, including cooperation for the treatment of infectious disease within a country unable to provide care. Second, many non-infectious causes of illness can be targeted with the provision of global public goods, including the control of international tobacco and illicit drug trade, and cooperation to minimize environmental health threats.[27] On the other hand, some health issues may be well suited for international action, even if they do not provide a global public good. For example, cooperation to finance and deliver drugs made by a pharmaceutical company based in the United States and Europe can make the drugs available which otherwise would have been inaccessible. The provision of these drugs does not necessarily provide a global public good, nor even a national one, but it would have been impossible without international cooperation, and thus it can be said to lend itself to international action. While considerations of global public goods can be useful in making allocative decisions, they provide limited leverage in explaining the observed cooperation on health.

The scant empirical examinations of these public health explanations demonstrate the current state of analysis and opinion in explaining cooperation in health. In public health discussions, burden of disease, political influence, political priority and arguments based on public goods are used in parallel to explain variations in cooperation. Together, these views give an overview of the, perhaps dismal, state-of-the-art in explaining variation in international cooperation on health. These explanations are not grounded in a broader analytic framework that can allow for

[25] L. Chen, T. Evans & R. Cash, 'Health as a Global Public Good', in I. Kaul, I. Grunberg & M. A. Stern, eds., *Global public goods: international cooperation in the 21st century* (Oxford University Press, 1999).
[26] S. Barrett, *Why Cooperate?: The Incentive to Supply Global Public Goods* (Oxford: Oxford University Press, USA, 2007).
[27] Chen, Evans & Cash, 'Health as a Global Public Good'.

interaction between the competing explanations. Individually testing and elaborating these explanations of cooperation would be useful. At the same time, understanding their interdependence requires the structure for investigation provided by the international relations literature explaining variations in cooperation more generally. This international relations literature will frame my analysis, as discussed in the next section (1.2) of this chapter.

Empirical Gap: Measuring international cooperation in health

While international cooperation on health has been the topic of increasing, though ungrounded, discussion, the metrics by which the scale of cooperation can be assessed have not been clearly identified. I propose three dimensions, rooted in a framework devised by leading public health scholars,[28] which allows international cooperation on health to be dissected and measured. These dimensions are (a) jointly financed action in public health, (b) international regulation and agreements governing health policies, (c) health research, health surveillance and technical assistance. In Chapter 3, I identify metrics for measuring international cooperation that include these three dimensions.

Today, the scale of variation in cooperation between infectious and non-infectious diseases is dramatic, especially when considering that non-infectious diseases are responsible for the majority of all deaths worldwide. For infectious diseases, approximately 14 billion dollars in international financial assistance for health is disbursed annually. [29] Further, technical assistance and expertise at global health institutions, estimated at 2-3 billion dollars per year, is directed overwhelmingly on infectious diseases.[30] Jointly financed action in global health is focused on global campaigns to treat and prevent HIV, tuberculosis and malaria, provide

[28] D. T. Jamison, J. Frenk & F. Knaul, 'International collective action in health: objectives, functions, and rationale', Lancet, (1998) vol. 351, no. 9101, pp. 514-7.
[29] J Kates, JS Morrison & E Lief, 'Global health funding: a glass half full?' Lancet, (2006) vol. 368, no. 9531, Jul 15, pp. 187-8.; L. MacKellar, 'Priorities in global assistance for health, AIDS, and population', Population and Development Review, (2005) vol. 31, no. 2, pp. 293-312.
[30] This figure is an approximation emerging from the WHO's annual *Details of International Health Programme Costs* and the World Bank *Annual Report* from 2005 and 2006

childhood vaccines, and support ongoing efforts to eradicate some infectious diseases.[31] New institutions like the Global Fund to Fight AIDS, Tuberculosis and Malaria, and the GAVI Alliance have been created to facilitate jointly financed efforts. International regulation governing health policies has been most robust in addressing the threats of emerging infectious diseases, like avian influenza, with the 2006 International Health Regulations. These regulations give the World Health Organization (WHO) substantial power and authority, without requiring national ratification. Finally, health research and health surveillance have grown tremendously since 2000, largely due to the Bill and Melinda Gates Foundation's support for health research. The Foundation, which has an endowment of 67 billion dollars, directed 98% of its funding to infectious disease in 2005.[32] This focus on infectious disease does not suggest that current funding levels surpass, or even meet health needs. Funding for infectious disease has, historically and in the present, fallen far short of needs (see Table 3.5). However, the overwhelming focus on infectious disease in cooperation on health requires explanation.

For non-infectious disease, international financial assistance, technical assistance from global health institutions, and collaborative research has been limited. WHO has small and poorly funded teams addressing non-infectious diseases, which comprise about 1% of the organisation's budget. A similar percentage is given in development assistance for health and in health surveillance.[33] The most robust cooperation is in the form of global tobacco regulations (addressing a leading cause of non-infectious diseases) negotiated at the WHO (Chapter 6). While tobacco regulations require national adaptation, the International Health Regulations addressing infectious disease provide central authority to WHO. The variations observed today, in favour of infectious disease, emerge from a history of variation in cooperation that has altered the scope, strategies and institutions for cooperation on health.

---

[31] For the most comprehensive and current overview of global health financing, see Ravishankar*, et al.*, 'Financing of global health: tracking development assistance for health from 1990 to 2007'. Note however, that this article distinguishes among HIV, TB, malaria though does not define funding levels for other disease areas.

[32] Sridhar & Batniji, 'Misfinancing global health: a case for transparency in disbursements and decision making'.

[33] Ibid.

Empirically, this thesis provides an assessment of the strength of the relationship between contagion and cooperation. Since not all contagious diseases are equally contagious, this assessment demands a measure of contagion, based on the ability of the disease to spread, the lethality of the disease, and its economic impact. This measure is detailed in Chapter 3, and termed the Contagion Index. Similarly, not all cooperation is equal. This thesis provides an approximate measure of the degree of cooperation on each of the three areas: financing, regulation, and research. This measure is detailed in Chapter 3, and termed the Health Cooperation Index. These measures of contagion and cooperation serve three key functions. First, the measures allow for identification of those cases where contagion is high and cooperation is low, and vice versa. These cases are probed in the empirical chapters. Second, these measures allow for a comparison of contagion and cooperation on one particular disease across time (e.g. smallpox in the 1950s, when there was high contagion and no cooperation, and smallpox in the 1970s, when there was high contagion and intense cooperation). Third, the measures allow for a comparison of the levels of contagion and cooperation among infectious diseases, allowing us to ask more precisely whether differences in a disease's ability to spread, and its likelihood of causing death may explain the variations in cooperation. Together, these measures allow this thesis to ask the basic question of whether international externalities can explain cooperation on health. For those cases where externalities have not explained cooperation, a broader analysis exploring the role of leadership, institutions and knowledge is pursued in Chapters 4 to 6.

Shortcomings in explaining variation between cooperation on infectious and non-infectious disease

The risks created by bacteria, viruses and parasites are not limited to the individuals they infect; they pose local, national and international threat. As states, technical experts, institutions and advocates have realised this risk of spread, 'contagion' has come to mean 'externality' in the language of public health. The international threat posed by infectious diseases has multiplied

with the increasing and faster transport of goods and persons across borders. This growing threat of pandemic disease has been used, by public health experts, to make the case that the international control of infectious disease is vital for national security.[34] It is not surprising that international cooperation to limit 'contagion' evolved.[35]

States have less interest in cooperation on non-infectious diseases because they seem to carry less trans-national threat. While the control of infectious diseases is seen as a global public good, non-infectious diseases are seen as private matters, caused and controlled by an individual's choice or personal circumstance. While cooperation on infectious disease results in many mutual gains, these gains are less obvious in cooperation on non-infectious diseases. National governments may seek to prevent non-infectious diseases because of the economic burden posed on national healthcare systems by these diseases, but these costs and burdens on the healthcare system do not translate into international costs and burdens. Just as it was once assumed that hegemony (which concentrates capability, and supply of cooperation) is necessary for economic cooperation,[36] it is commonly assumed that contagion (which concentrates threat, and demand for cooperation) is necessary for international cooperation on health.[37] Examined more closely, these intuitive assumptions may not explain the variation in cooperation.

There are highly infectious diseases for which cooperation did not emerge. Cooperation did not emerge on pandemic influenza after the pandemic killed between 20 and 100 million people in 1918. Nor did cooperation emerge for the control of smallpox until more than 30 years after the disease had been eliminated from Europe. More recently, cooperation on HIV prevention was stalled in the early days of the epidemic. These cases of non-cooperation on contagious diseases will be examined and explained in the next three chapters.

---

[34] United States Institute of Medicine, 'America's Vital Interest in Global Health', (Washington DC: Institute of Medicine, 1997).
[35] I. Kaul & M. Faust, 'Global public goods and health: taking the agenda forward', Bull World Health Organ, (2001) vol. 79, pp. 869-74.
[36] Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy*.
[37] This parallel to Keohane's analysis in *After Hegemony* inspires the title of this thesis.

Infectious diseases are typically associated with negative international externalities. However, there may sometimes be positive externalities associated with some infectious diseases. Such externalities are seldom discussed, and would offend anyone who holds the normative belief that all people deserve health and freedom. However, the positive externalities of disease (or the negative externalities of disease control), may have factored in to cooperation decisions. In 1949, as an international malaria eradication program was being considered, it was suggested that malaria is a 'blessing in disguise, since a large proportion of the malaria belt is not suited to agriculture, and the disease has helped to keep man from destroying it – and from wasting his substance upon it.'[38] These opponents of malaria eradication asked, if it was kind to keep people from 'dying from malaria so that they could die more slowly from starvation.'[39] More recently, an analysis by the World Bank suggested that an AIDS epidemic might be good for per capita growth. A June 1992 World Bank report stated, 'If the only effect of the AIDS epidemic were to reduce the population growth rate, it would increase the growth rate of per capita income in any plausible economic model.'[40] The Bank noted that this positive effect on per capita income had occurred in the 14th century with bubonic plague.

Beyond the surface, there may be negative international externalities presented by non-infectious diseases. The economic burden of heart disease and cancer, much of it caused by tobacco use, like the loss of a healthy workforce due to under-nutrition or injury, are among these externalities of non-infectious diseases. In an assessment of the economic externalities associated with global threats, the World Economic Forum determined that the only threats more severe than the continuing epidemic of chronic non-communicable diseases were spikes in oil prices, an asset price collapse, and the retrenchment from globalization of developed countries.[41] Of these, only an asset price collapse was more likely in 2010. In this assessment, chronic disease posed an economic threat greater than, and more likely than, that posed by

[38] Vogt 1949, as quoted in Socrates Litsios, *The Tomorrow of Malaria* (Wellington, New Zealand: Pacific Press, 1996). P. 142
[39] Vogt 1949, as quoted in Ibid. P. 142
[40] Barton Gellman, 'The Belated Global Response to AIDS in Africa', *Washington Post*, July 5 2000.
[41] World Economic Forum, 'Global Risks 2010', (Geneva: World Economic Forum, 2010).

pandemics, international terrorism, transnational crime, and the breakdown of critical information infrastructure. The threat of chronic disease was about even with that posed by fiscal crisis.[42] Chronic diseases scored highly in this assessment because of their interconnectedness to other issues, including food prices, infectious disease, and economic growth in China.

Recognition of the negative externalities of chronic non-communicable disease is not new. Non-communicable health problems like nutrition, cancer and poor housing made their way to the agenda of the League of Nations in the 1920s by the belief that improving health and ameliorating social tensions could prevent war. While non-communicable diseases do not directly cross borders, the causes of these disease, like tobacco and shortages in the food supply, do cross borders.[43] For example, the industries behind tobacco and alcohol are trans-national and may require cooperative arrangements for regulation, especially in nations with weak regulatory capacity (i.e. developing countries). These arguments, made by technical experts and pursued by WHO, led to an international agreement on tobacco control, discussed in Chapter 6. WHO experts convinced states that in order to achieve national objectives for the control of non-infectious diseases, international cooperation was necessary to control the trans-national causes of these diseases.[44]

1.2 EXPLAINING VARIATIONS IN COOPERATION IN INTERNATIONAL RELATIONS: A RESEARCH AGENDA

International relations scholars describe and propose explanations for variations in international cooperation. Keohane notes that trade cooperation has been institutionalised, while issues

[42] Ibid. Note that in this report, 'The numerical assessment of these categories of risks is created through qualitative assessment by the partners of the report.' In effect, the analysis is based n a survey of risk efforts, developed by Zurich Financial Services
[43] Chen, Evans & Cash, 'Health as a Global Public Good'.
[44] A. L. Taylor & D. W. Bettcher, 'WHO Framework Convention on Tobacco Control: a global good for public health', Bull World Health Organ, (2000) vol. 78, pp. 920-29.

involving money and oil were not.[45] Similarly, coffee was the subject of international cooperative regimes, while other commodities were not. Zacher and Sutton propose explanations for variation in global regulation on international shipping, air transport, telecommunications and postal services.[46] Young offers some explanations for why cooperative arrangements (largely international regulation) on tanker discharges, open sea fisheries and Antarctica were well ahead of efforts to establish cooperative arrangements to regulate trans-boundary pollutants, deep-sea mining, or ozone depletion.[47] By drawing out and applying the causal explanations emerging from the international relations literature to global health, we can better explain variations in cooperation in health and strengthen the empirical basis for understanding cooperation in international relations. The theoretical background for this framework is presented here, while a set of testable propositions that emerge from theory is presented in the following chapter.

In grounding the analytic frame in empirical study, Richard Cooper, an international economist provides a useful starting point for explaining variation in cooperation on health. Cooper, by meticulously chronicling the early emergence of international cooperation on public health, suggests two factors necessary for cooperation to emerge: shared objectives and consensus on 'means-ends relationships.'[48] The first of these – shared objectives – emerged as states cooperated on public health to avoid the quarantine of ships and persons. If a ship received a clean bill of health, trade would be facilitated. Cooperation on public health would decrease the costs and burdens of travel and commerce, and such cooperation began even in the absence of institutions. The second criteria – consensus on means-ends relationships – emerged from scientific debate and progress. In discussing debates between miasmatic and contagion theories, Cooper notes that delays in achieving international consensus on the mechanism of spread of

[45] R. O. Keohane, 'The Analysis of International Regimes: Towards a European-American Research Programme', in V. Rittberger & P. Mayer, eds., *Regime Theory and International Relations* (New York: Oxford University Press, 1993).
[46] Mark W. Zacher & Brent Sutton, *Governing global networks : international regimes for transportation and communications* (Cambridge: Cambridge University Press, 1996).
[47] Young & Osherenko, 'Testing Theories of Regime Formation: Findings from a Large Collaborative Research Project'.
[48] Cooper, 'International Cooperation in Public Health as a Prologue to Macroeconomic Cooperation'.

disease (the means-ends relationship) delayed public health cooperation for several decades. In Cooper's account, variation in cooperation on health can be traced to variance in the recognition of shared objectives and variance in the development of consensus on strategy.

Cooper takes shared objectives as a necessary starting point and focuses his explanation on the role of the public health community. In his analytic history of early cooperation on public health, he attributes the initiation and formalisation of cooperation to progress in achieving consensus among technical experts at the negotiating table, tracing the debates and advances among scientists meticulously. While Cooper's account of the emergence of cooperation on health gives knowledge communities an important role, it is posited that the control of international externalities associated with infectious diseases (a shared interest) is necessary for cooperation. That argument, highlighting the economic rationale for cooperation is elaborated and termed as the 'contagion thesis' in Chapter 2. Cooper's analysis stops at 1917, with the creation of the earliest institutions for cooperation, so there is little opportunity to assess how the existence of institutions affects later cooperation. Furthermore, Cooper's analysis focuses on a cooperation problem that primarily affected the Mediterranean during a period of British hegemony; it therefore does not allow for an evaluation of how a hegemonic leader can bear the costs of cooperation. By expanding the scope of study to include a wide range of health issues from 1918 to the present, this thesis allows for the testing of hypotheses on the role of contagion, leadership, institutions and knowledge in driving cooperation on health.

Interests may be insufficient in explaining variations in cooperation

International cooperation on health began because of a confluence of state interests. Namely, an agreement to standardize and limit quarantine of ships led to economic benefits for participating states. An analysis limited to a state's objective trade and security interests would not explain the range of cooperation in heath today, and it would not get beyond the obvious explanations about contagion as externality. For example, why would cooperation on malaria be robust when the mosquitoes necessary to transmit the disease are absent from the countries leading malaria

control initiatives? What factors, beyond shared interests, drive cooperation on health? Overlapping interests could have been the beginning and the end of the explanation on international cooperation in health, but the international relations literature tells us about three other factors which may explain the emergence of, and variations in, cooperation on health: leadership, institutions and knowledge.

The explanations for variation in cooperation rest on different mechanisms for explaining the changes in state interests, and in turn, cooperation outcomes. Arguments about leadership and power point to the capability of a powerful actor to bear the costs and burdens of cooperation. Institutional arguments point to variations in the autonomy, strength, and formal rules of international institutions. Finally, knowledge-based explanations focus on variations in negotiations and progress among technical communities. These explanations are not mutually exclusive. State interests have been pursued by the powerful, embedded in international institutions and 'discovered' by technical experts.

In public health, analysts have often sought to highlight deviations from 'rational' goals for health cooperation, without recognizing the equally rational trade and security goals and the domestic interests that assert them. Ezrahi describes this utopian and rationalistic view that is common to many technical communities, including public health. This view 'attributes the imprecision in the definition of objectives to intellectual deficiencies which can be removed by enlightenment or to parochial interests which can be unmasked by objective social-scientific inquiry.'[49] Facing similar challenges explaining why states do not pursue their interests in free trade (this time in favor of national security interests), Krasner bemoans economic theorists who dismiss these political leaders as somehow inept. He states, 'Stupidity is not a very interesting analytic category.'[50] In his explanation of trade policy he proposes that an alternative approach to explaining international trading structures is to assume that states seek a broad range of goals.

[49] Y. Ezrahi, 'Utopian and pragmatic rationalism: The political context of scientific advice', Minerva, (1980) vol. 18, no. 1, pp. 111-31. p. 113
[50] Krasner, 'State Power and the Structure of International Trade'.

Health has been in competition with other international, domestic and bureaucratic interests. The decision not to cooperate on health issues, when the rational case for cooperation is overwhelming, can be understood only in light of these other competing interests. Conversely, the decision to cooperate on health issues, when the rational case for cooperation is weak, may be understood in light of the competing international, domestic and bureaucratic interests.

Keohane sets the basis for an analysis where changing interests may explain variations in cooperation. He focused the explanation of variation on demand-side factors,[51] noting the centrality of the changing preferences of states. As elaborated below and in Chapter 2, institutions and knowledge can act to increase the demand for cooperation, while leadership can increase its supply. Below, I relate the theoretical basis for explaining variations in cooperation that emerges from the international relations literature. The following chapter builds on the debates and perspectives described here to propose a set of testable propositions that distinguish between each of the explanatory categories described below.

Leadership

The proposition that a powerful actor will bear the costs of international cooperation when the benefits to that actor exceed the costs emerges from rational-choice theories. This proposition is at the core of hegemonic stability theory. However, hegemonic stability theory makes a critical, and less obviously rational, inference that the fragmentation of power is associated with the collapse or failure of cooperation. The observation that cooperation has developed and persisted in the absence of hegemonic leadership (with fragmented power) has led to a wide range of studies on international cooperation.[52] [53]

[51] Keohane separates the conditions for cooperation (and thus the causal explanations of variation), into the categories of supply and demand. On the supply-side, the source of variation is the concentration of capability. Through a series of case studies, Keohane notes that the concentration of capability is not a requirement for sustaining cooperation. He shifts his focus to the factors that create a demand for international cooperation, based on changing interests and preferences of states. For more, see Keohane, Robert. O., *After Hegemony: Cooperation and Discord in the World Political Economy*, Princeton: Princeton University Press, 1984.

[52] Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy*.

Studies of international cooperation in the absence of a hegemon can broadly be divided into two categories. One category focuses on demonstrating how institutions can extend or delay the influence of a hegemon. This scholarship is perhaps best characterised by Keohane's work pointing out that arguments based on hegemonic leadership fail to 'explain lags between changes in power structures and changes in international regimes' and fail to account 'for the differential durability of different institutions within a given issue-area.'[54] These are critical arguments pointing to institutions as drivers of cooperation; these arguments are considered in the discussion about the explanatory role of institutions. The second category of studies of cooperation without hegemony focuses on demonstrating that collective action is possible when a minimum number of states benefit. These arguments, best characterised by Snidal's criticisms of hegemonic stability theory, are essentially about the leadership of powerful states and are central to the discussions here.[55]

The key arguments of hegemonic stability theory hold that the demand and supply for cooperation are both necessary. Kindleberger argues that international public goods will not be provided unless a 'single state has sufficient interest in the good to be willing to bear the full cost of provision.'[56] Very few international issue areas meet the constraints of hegemonic stability theory. In the strictest view, for cooperation to emerge on a disease, it must be associated with externality, and there must be a hegemonic actor who will reap a benefit greater than the cost of controlling the disease. As discussed in Chapter 5, both of these conditions were clearly met for smallpox eradication, but the United States was not willing to bear the costs of eradication and gave limited support to WHO's eradication efforts. On other health issues, like the attempts at malaria eradication in the 1950s, the United States was willing to bear most of the costs of cooperation, even though it was far from clear that the benefits would exceed the

---

[53] D Snidal, 'The limits of hegemonic stability theory', International Organization, (1985) vol. 39, no. 4, pp. 579-614.
[54] Keohane, 'The Demand for International Regimes'. P. 326
[55] Snidal, 'The limits of hegemonic stability theory'.
[56] Ibid. p. 581

costs. The history of international cooperation on health suggests that hegemony is neither necessary nor sufficient for cooperation to emerge.

If leadership is to be a useful explanatory category, our understandings of the conditions under which powerful actors will bear the costs and burdens of cooperation must be modified. Snidal opens up the explanatory category of leadership to a broader range of issues and actors by taking apart hegemonic stability theory's 'virtually hidden assumption' that collective action is impossible. Snidal argues that cooperation can emerge when a minimum number of states will benefit from that cooperation. He defines 'k' as the minimum number of states that can benefit from cooperation. Hegemonic stability theory holds that k = 1, where a single state must find it in its own interest to provide the good, or cooperation will fail. Snidal suggests that even when k is greater 1, cooperation can emerge. Empirically, this seems to better match the emergence of cooperation on health observed. The role of leadership can be better understood by Snidal's argument that a small k-group of states that benefit from cooperation can work together to provide a public good. It should be noted that institutions may simplify the arrangement of k-groups of states.

Theories of hegemonic leadership make a claim about the distribution of the benefits of cooperation within the international system that has great relevance for international cooperation on health. Hegemonic stability theory's claim that a dominant state will enforce a stable global order for its own benefit is not new. However, as Snidal points out, the theory's novelty is in claiming 'that domination will benefit all and especially the weaker members of the international system.'[57] This claim to benefit the weak more than the powerful is not abandoned by expanding to a small k-group of states. However, this idea of distributing benefits to the poorest has been challenged. Krasner argues that powerful actors will bear the costs of cooperation to benefit themselves and hurt others, while Gilpin suggests that a coercive leader can provide a public good and tax others, or demand contributions. Regardless, these

[57] Ibid. P. 582

ideas of benefiting the weakest make no claim that the benefit of weaker states is a goal in and of itself. These benefits are the result of self-interest alone. Such a view fits with a rational limited altruism theory, in which self-interest can be equated for morality. Here, a state that faces a threat from a disease can equate its own self-interest in preventing the pandemic, with moral claims. For example, as discussed in Chapter 5, when announcing a plan to eradicate malaria, President Eisenhower asserted a moral claim by inviting 'the Soviets to join us in this great work of humanity.'[58]

A core, though un-stated assumption of hegemonic stability theory, is that the costs of cooperation are great. If the costs of international cooperation could be met by weak states, there is no reason to believe that a hegemon would be needed to provide global public goods. Indeed, if the costs were low, a k-group of states could be composed of weak actors. Unlike other issue areas in international cooperation, the costs of cooperation on health are sometimes very low. Even the greatest success of international cooperation on health, the elimination of smallpox, required 98 million dollars in international financing during the course of the campaign, or 468 million in 2008 dollars (see Chapter 5, Appendix 5B). Compared to the costs of cooperation on trade, international finance, climate, and other areas of 'low politics,' these costs are strikingly low. For comparison, the American commitments to rebuild European economies after the Second World War totalled 25 billion dollars in 1948, or 221 billion in 2008 dollars.

The low costs of cooperation on health change leadership dynamics in two important ways. First, the costs of cooperation may be so low that a non-hegemonic actor can meet them, acting in it is own interest. Small and weak states acting in their own interests may bear the costs of international cooperation. Second, non-state actors (e.g. private foundations) which do not necessarily make the same cost-benefit calculations as rational states, may be able to fully bear

[58] Javed Siddiqi, *World health and world politics : the World Health Organization and the UN system* (Columbia, SC: University of South Carolina Press, 1995). p. 143

the costs of cooperation, or reduce these costs substantially so that states have the incentive to bear some of the costs.

Institutions

International cooperation on health involves many types of organisations, including private, national and international organisations, and others falling in between these categories. Global health organisations perform many functions. For example, WHO creates formal rules in treaties and regulations, creates informal constraints through norms and codes of conduct, serves as a facilitator of knowledge creation and consensus development, and serves as an agent of advocacy. International institutions often serve as a forum where the public health community can shape interests. International instiutions create new sources of information and new actors (like national epistemic communities), which alter the role and impact of the public health community.[59] In an analysis of variation in environmental cooperation, Young and Osherenko conclude that explaining cooperation is not just about understanding power, interests and scientific knowledge.[60] Rather, they argue, the interaction of these is most interesting and potentially explanatory. Institutions are a key forum for this interaction.

In considering the role of institutions in explaining cooperation in health, I focus on the institution's role in providing informal constraints and formal rules, in line with North's definition of institutions.[61] I exclude the work of institutions in facilitating knowledge generation, considering this roles in a separate category. Institutions in global health have varied in their autonomy and most importantly, in their ability to make and enforce rules. Assessing these variations in institutions may explain some of the variation observed in international cooperation on health.

---

[59] P. M. Haas, 'Epistemic Communities and the Dynamics of International Environmental Co-operation', in V. Rittberger & P. Mayer, eds., *Regime Theory and International Relations* (New York: Oxford University Press, 1993).
[60] Young & Osherenko, 'Testing Theories of Regime Formation: Findings from a Large Collaborative Research Project'.
[61] D. C. North, 'Institutions', Journal of Economic Perspectives, (1991) vol. 5, no. 1, pp. 97-112.

Perhaps the central question that the institutionalist literature sets out to explain is, 'do institutions matter in explaining state behaviour?' Some Realists may suggest that institutions are merely intervening variables, incidental to cooperation.[62] While other scholars (including some Realists) suggest that institutions may play an explanatory role in cooperation. The differing externalities, uncertainties, and transaction costs between issue areas shape the membership (restricted, open or somewhere in between) and scope (regional or global) of institutions.[63] Institutionalist scholars, drawing on the neo-realist tradition, argue that the existence of institutions lowers transaction costs of cooperation, and issue density facilitates the expansion of cooperation to additional health issues. When there is no appropriate venue for a cooperation problem, an existing institution can be changed, or a new institution can be created.[64] The existence of institutions, and choice among institutions, may itself be an important driver of cooperation.

The nature of institutions is important in determining if and why states cooperate on health. Abbott and Snidal suggest that organizations characterized by centralization and independence best facilitate cooperation.[65] Centralization brings efficiency, and ability to pool resources and risks, thus making international cooperation on health more likely. Similarly, Keohane suggests that international institutions improve information-sharing and are able to raise the costs of violation of norms and rules.[66] Independence brings neutrality and legitimacy for collective and individual actions and norms. Legitimacy of individual actions entices powerful states to participate, while neutrality demands that institutions be buffered from direct pressures of states, and allows international organizations to act as trustees, allocators and arbiters, facilitating

[62] S. D. Krasner, 'Structural Causes and Regime Consequences: Regimes as Intervening Variables', International Organization, (1982) vol. 36, no. 2, Spring.
[63] Keohane, 'The Analysis of International Regimes: Towards a European-American Research Programme'.
[64] J. Jupille & D. Snidal, 'The Choice of International Institutions: Cooperation, Alternatives and Strategies', Social Science Research Network, (2006) July 2006.
[65] K. W. Abbott & D. Snidal, 'Why States Act through Formal International Organizations', The Journal of Conflict Resolution, (1998) vol. 42, no. 1, pp. 3-32.
[66] Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy*.

activities which might be otherwise unacceptable in interstate relations.[67] Notably, these accounts do not explain major shifts in cooperation and systemic change, which shapes the centralization and independence of institutions. It has been suggested that some key successes in cooperation on infectious diseases, like the eradication of smallpox, can be attributed to a strong, centralised and independent WHO able to make rules and execute programs with central authority.[68] Have variations in the centralisation and independence of institutions altered cooperation?

Institutions can also act as barriers to cooperation. Institutions may limit the nature and goals of cooperation on health by imposing a 'bounded rationality,' or bureaucratic self-interests can lead to suboptimal behaviour. Identified by Herbert Simon and elaborated by Robert Keohane, 'bounded rationality' can be understood as 'constraints on the information-processing capacities of actors.'[69] At global health institutions, staff pursue interests within a 'zone of acceptability' defined by the institution. That is, 'actors subject to bounded rationality cannot maximize in the classical sense, because they are not capable of using all the information that is potentially available.'[70] This leads people to 'satisfice' rather than maximize. Thus, the variation in cooperation that leads to variation in cooperation, typically favouring infectious disease, has an internal institutional component: staff are 'satisficing,' rather than maximising improvements in health. Related to this, bureaucratic self-interests arise when an institution's autonomy and its routines collude to obscure the overall mission of the institution.[71] These actions and rules of institutions can serve as barriers to cooperation, a concept elaborated in the following chapter.

The need for international institutions in health most clearly emerged when the United States wanted their consular officials to inspect and certify vessels in countries of departure, so as not

[67] Abbott & Snidal, 'Why States Act through Formal International Organizations'.
[68] R. Levine, 'Eradicating Smallpox', *Millions saved: proven successes in global health* (Washington DC: Peterson Institute, 2004).
[69] Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy*.
[70] Ibid. p. 111
[71] M. N. Barnett & M. Finnemore, 'The Politics, Power, and Pathologies of International Organizations', International Organization, (1999) vol. 53, no. 04, pp. 699-732. P. 699

to slow trade upon arrival. Other states rejected this as a violation of their sovereignty, and at the 1881 International Sanitary Conference in Washington, it was proposed that an international agency for the notification of disease be created.[72] The creation of neutral institutions to give international ships a "clean bill of health" was one of the earliest actions taken to build trust and achieve greater efficiency in global public health. Since, institutions have played a critical role in driving cooperation. However, distinguishing the role that institutions play in driving cooperation from the role that hegemonic leadership or knowledge plays is delicate. This is because institutions in health can serve as tools of the powerful (such as the earliest created to monitor trading vessels), and because institutions can serve as forums for developing consensus among knowledge communities. This thesis will attempt to isolate the role of institutions by focusing on how institutions have led cooperation to deviate from the interests of powerful states, and by considering the role of scientific consensus (even if it develops within an institution) in a separate explanatory category. A full set of testable propositions that allow us to distinguish among the roles played by contagion, leadership, institutions and knowledge is presented in the following chapter.

Knowledge

Most studies of cooperation on health place the public health community at the centre of analysis.[73] These explanations focus on the role of technical experts in achieving consensus on strategy, and progress in the technologies and science needed to fight disease. Peter Haas, in a volume tracing the impact of the work of scientists and technical experts, defines these groups as epistemic communities.[74] The epistemic community in global health consists of scientists, public health experts and clinicians united by shared technical principles embedded in professional training. The international relations literature on epistemic communities can clarify the role of these communities by more clearly distinguishing their role in international

[72] Cooper, 'International Cooperation in Public Health as a Prologue to Macroeconomic Cooperation'.
[73] Shiffman & Smith, 'Generation of political priority for global health initiatives: a framework and case study of maternal mortality'.; Cooper, 'International Cooperation in Public Health as a Prologue to Macroeconomic Cooperation'.
[74] Haas, 'Introduction: Epistemic Communities and International Policy Coordination'.

cooperation from the role of institutions. The epistemic communities literature places the focus of analysis on international negotiations, and variations with these negotiations and discussions among technical experts.[75] According to Haas, there are three key roles for the epistemic community in public health: explaining cause and effect relations; demonstrating issue interlinkages; and framing, proposing and identifying regulations.[76] These communities will change interests and explain variation when they have international presence and the clarity of scientific consensus.

International institutions impact, first, the formation of epistemic communities and, second, the conduct of their discussions. The existence of an international epistemic community, Haas suggests, depends on the existence of multiple national epistemic communities working to change state interests.[77] For example, cooperation to control pollution in the Mediterranean did not include North African countries until the improvement of marine science capabilities in those countries (facilitated by a United Nations agency) led Algerian and Egyptian scientists to support policy changes.[78] Based on this, Haas suggests that the impact of epistemic communities is greatest in developed countries as familiarity with their beliefs makes it easier for policy-makers to defer issues to international scientists. Second, institutions facilitate negotiations among experts. While discussions among experts might take place in international institutions, the content, rather than the structure, of these discussions is relevant in considering the role of knowledge communities.

While many scholars accept that clear scientific consensus and technical advances can facilitate cooperation, there is some disagreement regarding their ability to overcome competing interests. For example, Krasner suggests that in cooperation on health 'the advance of science and consensus led national behavior to no longer be shaped by political concerns, but rather by a set

[75] Ibid.
[76] Ibid.
[77] Ibid.
[78] P. M. Haas, 'Do Regimes Matter? Epistemic Communities and Mediterranean Pollution Control', International Organization, (1989) vol. 43, no. 3, Summer, pp. 377-403.

of rules, dictated by accepted scientific knowledge.'[79] Krasner builds on the writings of Arthur Stein, who also suggested that science removes politics from cooperation on health. Stein writes,

> As long as there was no agreed body of validated knowledge about the causes of communicable disease and the nature of its transmission and cure, then state policy could and did reflect political concerns […] New knowledge thus changed state preferences and provided the basis for international cooperation and the depoliticization of health care.[80]

In describing the 'depoliticization' of health and arguing that 'political concerns' were no longer shaping policy, these authors seem to suggest that technical progress and consensus can fully overcome competing interests. Neither Haas, whose scholarship has provided some of the most robust explanations of the impact of technical communities on state interests, nor Cooper, who bases his central explanatory argument explaining health cooperation on progress towards a means-ends relationship, go this far in attributing science with the power to explain changes in cooperation.

Haas's research agenda on epistemic communities is explained by his departure from the school of thought that, 'much of the history of social progress in the Twentieth Century can be described in terms of the transfer of wider and wider areas of public policy from politics to expertise.'[81] Haas notes that even on technical issues, 'policy-making decisions generally involve the weighing of a number of complex and non-technical issues centring around who is to get what in society and at what cost.'[82] This concern for allocative consequences, questions of 'who is to get what,' is magnified when science is ambiguous. Cooper provides an informative example of the entry of allocative concerns amid ambiguous science,

> In the presence of conflicting hypotheses about the propagation of disease, poorer countries favoured contagion theory with its policy implication of quarantine rather than miasmatic theory with its policy implication of provision of an extensive urban infrastructure.[83]

---

[79] Krasner, 'Structural Causes and Regime Consequences: Regimes as Intervening Variables'. P 203-204
[80] A. A. Stein, 'Coordination and Collaboration: Regimes in an Anarchic World', International Organization, (1982) vol. 36, no. 2, Spring. P. 320-321
[81] Haas, 'Introduction: Epistemic Communities and International Policy Coordination'.
[82] Ibid.
[83] Cooper, 'International Cooperation in Public Health as a Prologue to Macroeconomic Cooperation'.

Haas suggests that when interests of the technical community diverge from other competing interests, any lack of consensus would be magnified; when they converge, epistemic communities can work to define state interests. In this view, technical consensus is far from 'depoliticized' as it responds to interests. Empirically, he does not seek to demonstrate that technical consensus has removed or replaced 'politics.' Rather, Haas suggests that scholars probe the role of these communities in explaining changes in the substance, strength and effectiveness of cooperation.

Crisis, which challenges the perceived state interests, can empower the epistemic community to take a more prominent role, and has contributed to the initiation of many cooperative endeavours in global health.[84] Indeed, Haas describes crisis as 'probably necessary' but not a sufficient factor for epistemic communities to explain new cooperative arrangements.[85] In an analysis of cooperation and regime formation on the environment, Young and Osherenko found that in three out of five cases examined, exogenous shocks and crisis (including the manufactured crisis on polar bears) were important in explaining cooperation. They postulated that crisis was not necessary for cooperation, but helpful for 'agreement on terms of a constitutional contract.'[86] Cooper notes that 'hypothetical forecasts and a priori reasoning' about shared interests were insufficient to initiate cooperation.[87] It took an actual crisis to demonstrate interdependence and the resulting need for cooperation: the European cholera epidemic of 1848 and the associated quarantines of trading ships. The SARS epidemic in 2003 led to severe disruptions in travel, tourism and the market for poultry, and this led to the revision of the International Health Regulations. The revised regulations allow increased delegation of authority to the World Health Organization to respond to emerging infectious diseases. It is postulated that crisis weakens interest groups, thereby opening a space for policy reforms. The

[84] Haggard, 'Interests, Institutions, and Policy Reform'.
[85] Haas, 'Epistemic Communities and the Dynamics of International Environmental Co-operation'.
[86] Young & Osherenko, 'Testing Theories of Regime Formation: Findings from a Large Collaborative Research Project'. P. 235
[87] Cooper, 'International Cooperation in Public Health as a Prologue to Macroeconomic Cooperation'. p 193

'crisis begets reform' model has been common in economic policy.[88] Yet, based on a careful review of the empirical literature, Haggard suggests that more convincing is a model based on the ability of crisis to facilitate learning, demonstrate the failure of the status quo, and change state preferences.[89] The epistemic community is thus empowered by crisis, and clarity of consensus may determine the ability of the community to shape new cooperative arrangements.

The epistemic community not only responds to crisis, it plays a role in directing attention towards situations that may pose threats, thereby facilitating the perception and even the creation of crisis. Cooperative financing on HIV/AIDS may have had its origins in new understandings of the human and economic crisis posed by the pandemic.[90] It has been suggested that 'manufactured crisis,' such as that used to facilitate cooperation on polar bear protection, may also facilitate cooperation.[91] Reports on global health, including those on non-infectious disease, have often used the language of crisis in calls for cooperation. The essence of a manufactured crisis is that externalities are presented which may not actually exist. In subsequent chapters, I refer to the generation of these externalities by knowledge communities as the process of 'manufacturing contagion.' As Sara Davies points out, arguments linking infectious disease to national security are typically made to appeal for large commitments to disease control; she maintains that the security implications of infectious disease are limited and indirect.[92] Nonetheless, the language of security and crisis has become pervasive in reports on infectious disease.

An assessment of the explanatory role of the epistemic community in cooperation on health focuses on the impact of the scientific consensus and advances on state interests and the cost-benefit calculations that states make. The possible causal role of epistemic communities will be

[88] Haggard attributes this model to and unpublished manuscript, M. Bruno & W. Easterly, 'Inflation's Children', (Washington DC: World Bank, 1996).
[89] Haggard, 'Interests, Institutions, and Policy Reform'.
[90] J. D. Sachs, *Macroeconomics and Health: Investing in Health for Economic Development* (Geneva, Switzerland: World Health Organization, 2001).
[91] Young & Osherenko, 'Testing Theories of Regime Formation: Findings from a Large Collaborative Research Project'.
[92] Sara Davies, *Global Politics of Health* (Boston: Polity, 2010).

probed by considering how changes in consensus or technological advances have driven or obstructed international cooperation on health.

Conclusions

This chapter has laid out the theoretical basis for assessing variations in international cooperation on health. The analytic approach depends on assessing deviations from the rational predictions for cooperation, as defined in by the contagion thesis, detailed in Chapter 2. Deviations are measured using metrics for cooperation defined in Chapter 3. Explanations of international cooperation begin with rational interests and expand to systematically consider the role of leadership of powerful actors, international institutions and knowledge communities.

The framework proposed here serves as an analytic map for my thesis, providing a set of questions from the international relations literature that may explain variation in cooperation. By incorporating the dominant explanatory models in public health, this thesis also contributes to the building and testing of a micro-theory of cooperation on health, rooted in international relations theory.

Chapter 2: The Contagion Thesis

"Modern technology has obliterated the frontiers of disease. Thanks to jet planes, a louse brushed from the sleeve of a beggar in an Oriental bazaar may attach itself to a tourist who will land in San Francisco the next day—already infected with typhus.

Only five months ago, Pakistan's failure to control smallpox led to needless deaths in Britain."
--*TIME, Feb. 2, 1962*

If diseases pose a threat of spreading internationally and causing harm, it is in the self-interest of states to engage in cooperation or collective action to minimise that threat. I refer to the preceding statement – the spirit of which is captured in the quote above – as the contagion thesis. This thesis enjoys widespread use and acceptance among global public health actors. It is invoked in calls for global action, and used to justify new or expanded cooperation and collective action in health. The thesis is often correct, but it does not explain the range of observed cooperation and collective action in health.

Rational-choice theories of international relations, as discussed in chapter one, predict that cooperation will occur when the costs of cooperation are less than the costs of non-cooperation. For infectious diseases, the costs of non-cooperation can be great because of the negative international externalities presented by the disease. The contagion thesis captures these externalities, and we can use it to make predictions on the emergence of cooperation. However, these predictions based on contagion are not always correct. In fact, at critical instances, they have been wrong. Research on international cooperation has shown other factors, outside of externalities, can explain the emergence of cooperation. Continuing in a rational-choice, interest-based explanation, it has been argued that leadership of powerful actors can increase the supply of cooperation, as these actors bear the costs and burdens of cooperation. Meanwhile, as described in the introduction, institutions and knowledge–communities can increase the demand for cooperation by lowering transaction costs and re-shaping state interests. I refer to the explanatory role of leadership, institutions, and knowledge-communities as the 'health

cooperation thesis,' and contrast these explanations to those from the more narrowly defined contagion thesis.

This chapter starts by defining the key terms for the analysis, setting theoretical thresholds for 'expected' and 'not expected' cooperation, and empirical thresholds for 'observed' and 'not observed' cooperation and collective action. The following chapter defines metrics and methods for measuring contagion and cooperation more precisely, allowing us to compare varying levels of contagion, even among infectious diseases, to varying levels of cooperation. From this, we can identify two types of incongruent cases: those cases where cooperation was not expected and observed (low contagion, high cooperation), and those cases where cooperation was expected and not observed (high contagion, low cooperation). Describing and systematically explaining these incongruent cases will be the focus of Chapters 4 to 6.

2.1 PREDICTING AND IDENTIFYING COOPERATION AND COLLECTIVE ACTION

Defining and expecting cooperation and collective action

Cooperation is understood, as defined in Chapter 1, as a process of mutual adjustment.[1] That is international cooperation requires active attempts to adjust policies to match the preferences of other states. Collective action is an important subset of cooperation. Olson and Barrett define collective action respectively, as, 'independent contributions'[2] and 'organised volunteerism.'[3] Embedded in collective action is the idea of mutual adjustment. States engage in collective action because acting independently would achieve sub-optimal results. Collective action arises when the preferences and goals of actors cannot be reached without acting collectively, or if acting collectively brings down the costs of action. These benefits compel states to adjust in order to act collectively. For example, in attempting to control the HIV/AIDS epidemic in sub-

[1] Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy*.
[2] M. Olson, 'Increasing the Incentives for International Cooperation', International Organization, (1971) vol. 25, no. 4, Autumn, pp. 866-74.
[3] Barrett, *Why Cooperate?: The Incentive to Supply Global Public Goods*.

Saharan Africa, the United Kingdom may sponsor HIV/AIDS treatment and prevention programs. Other states also share this goal of controlling the epidemic, and their representatives recognize that the redundancy of efforts is leading to sub-optimal outcomes. The states then decide to act collectively by working through a shared funding mechanism, or towards mutually agreed targets. Collective action, like other forms of cooperation, arises from discord.

Cooperation, including collective action, emerges from interdependence. Sensitivity and vulnerability are the two key aspects of interdependence as defined by Keohane and Nye, and in turn are the two key aspects of the contagion thesis.[4] Vulnerability can be understood as the idea that a state is threatened by factors outside of its borders. Sensitivity refers to the idea that the state is unable to fully and unilaterally mitigate this threat. If a disease has universal geographic presence, or if it can be prevented easily within a state, vulnerability is not a concern, and therefore interdependence probably does not exist. If a disease can easily be treated within a state, those states with the resources to treat it are not sensitive, and again, interdependence probably does not exist. In addition to these negative externalities determining cooperation, positive economic externalities can also make cooperation 'expected.' If a state will benefit financially from cooperation, cooperation is predicted in the contagion thesis. These core ideas of the contagion thesis rest on the classic explanation for the provision of global public goods, where the incentive to supply them is rooted in shared gains. The contagion thesis is shorthand for this rationalist approach looking at costs and benefits to explain the emergence of cooperation.

The contagion thesis predicts that cooperation and collective action will occur when states are vulnerable and sensitive to a threat, or when there are economic benefits to cooperation. Thus, we expect a state to cooperate on *diseases that are not universally present, when they pose a viable threat of harming the population* or *when cooperation produces demonstrated financial benefit*. Universal presence (e.g. smallpox in the early 1900s, a global disease) suggests no

[4] R. O. Keohane & J. S. Nye, *Power and interdependence* (New York: Longman, 2001).

obvious risk of spread, yet patterns of geographic presence can change over time (e.g. smallpox in the 1930s, when it was eliminated from most of Europe). Viability of the threat is important, as some infectious diseases may lack vectors (e.g. mosquitoes to transmit malaria), and other infectious diseases (e.g. measles) pose little threat because of social, medical or public health interventions (e.g. high immunisation rates).

The inverse of the contagion thesis leads to the hypothesis that cooperation and collective action are 'not expected' on *diseases that are universally present,* or *when diseases pose no viable threat of harming the population* or *when there is no net financial benefit to cooperation*. Contrasting the contagion thesis and this inverse thesis creates a clear theoretical categorisation of 'expected' or 'not expected' cooperation and collective action during any particular time period. As geographic presence and viability of threat may have changed during a defined time period, cooperation is defined as 'expected' if it fulfils the criteria at any point in that time period. I have stated that states will not cooperate where there is no 'net financial benefit.' This net benefit allows for the discounting of the benefits of other states with which the state in question may be in competition, accommodating Realist concerns about relative gains.[5]

The contagion thesis and the categories of 'expected' and 'not expected' refer to a small subset of the international relations literature. The purpose in using these categories is to identify those cases of cooperation that are not explained by this simple, interest-based, rational thesis, thereby allowing the reader to draw from the broader explanations for cooperation – which address leadership, institutions and knowledge – in a structured manner.

Observing cooperation and collective action

I determine that cooperation has occurred in a specified time period if there is evidence of mutual policy adjustment. Policy adjustment occurs through agreement on a universal set of

[5] J. M. Grieco, 'Anarchy and the Limits of Cooperation: A Realist Critique of the Newest Liberal Institutionalism', International Organization, (1988) vol. 42, no. 3, pp. 485-507.

rules, or by sacrifice of autonomy.[6] For example, changes in domestic policy to meet international agreements on tobacco control, or agreements to deliver virus samples to an international laboratory constitute cooperation. I determine that collective action has occurred in a specified time period if there is an organised international effort to make contributions (usually financial) toward a desired outcome.[7] For example, the contributions of states to the smallpox eradication campaign constitute collective action. These characteristics of joint financing, international regulation, and cooperative research and surveillance are measured in the following chapter.

A cooperation or collective action failure is said to have occurred if there is a clearly demonstrable unrealised benefit. That is, if states, acting based on individual rationality, fail to deliver public goods, control externalities, or address market failures.[8] The classic example of cooperation failure is trade protectionism, whereby both parties reach non-optimal results due to a lack of mutual policy adjustment.[9] Further examples of this type of cooperation or collective action failure have been mapped using game theoretical approaches.[10] In the tables below, these cooperation failures are in the bottom-left boxes, where cooperation is expected and not observed. In the following chapter, these cooperation failures are identified more precisely as cases of high contagion (externality) and low cooperation.

A second type of cooperation or collective action failure may occur if there is cooperation or collective action that does not deliver public goods, control externalities or address market failures. This latter type of cooperation failure appears to be common in international cooperation on health, and is often justified on humanitarian or altruistic grounds, where the 'unrealised benefit' may be international good will and improved reputation. In the tables

---

[6] T. Sandler, *Global Collective Action* (Cambridge: Cambridge University Press, 2004).
[7] While a distinction between cooperation and collective action can be made, the empirical findings and analysis in this thesis are not structured around this distinction. Throughout, collective action is implicitly referred to as a subset of cooperation.
[8] Sandler, *Global Collective Action*.
[9] Keohane, 'The Demand for International Regimes'.
[10] Robert M. Axelrod, *The evolution of cooperation* (New York: Basic Books, 1984).; Barrett, *Why Cooperate?: The Incentive to Supply Global Public Goods*.

below, these cooperation failures are in the top-right boxes, where cooperation is not expected, but observed. In the following chapter, these cooperation failures are identified more precisely as cases of low contagion (externality) and high cooperation. Both types of cooperation failure violate the contagion thesis.

The tables below (Tables 2.1 –2.3) provide a first approximation of expected and observed cooperation during the time periods considered in the following three chapters. Some health issues change from 'expected' to 'not expected' over time because of changes in disease presence, and the ability to prevent and treat the disease at a national level. The analysis in the chapters that follow focuses on the cases identified in the white boxes below, where expectations and observations of cooperation are incongruent. These cases best help to identify the drivers (not expected, observed) and pre-conditions (expected, not observed) for cooperation that are beyond the contagion thesis. The structure of this thesis allows for an assessment of these drivers and conditions over time while controlling for some of the characteristics of the cooperation problem.[11] That is, a cooperation problem, like smallpox, can be considered across time, to allow for an explanation of cooperation based on change and continuity in contagion, the interests of powerful states, international institutions, and knowledge.

[11] C. C. Ragin, *The comparative method: Moving beyond qualitative and quantitative strategies* (Berkeley: University of California Press, 1989).

	Expected	Not Expected
Observed	**Cholera** Malaria **Plague** **Typhus** **Yellow fever**	**Diabetes mellitus** **Diarrhoeal disease (dysentery antitoxin)** **Diphtheria** **Nutrition** **Sex-hormone disorders** **Tetanus**
Not Observed	**Pandemic influenza** Polio **Smallpox (after 1923)** Tuberculosis	Cardiovascular disease Guinea worm Injury Maternal health Mental health Pneumonia Tobacco

Table 2.1: International cooperation and collective action in health, 1918-1947 (Cases in bold are examined in Chapter 4)

	Expected	Not Expected
Observed	Cholera **Malaria** **Smallpox (since 1967)** Tuberculosis (since 1947)	Guinea worm Nutrition Onchocerciasis
Not Observed	Childhood immunisations Pandemic influenza Pneumonia **Smallpox (until 1967)**	Chronic Non-Communicable Disease Diarrhoeal disease Maternal health Mental health Tobacco

Table 2.2: International cooperation and collective action in health, 1948 – 1976 (Cases in bold are examined in Chapter 5)

	Expected	Not Expected
Observed	Avian influenza Cholera Childhood immunisations Emerging infectious diseases **HIV/AIDS prevention (since late 1990s)** Pandemic influenza Polio (beginning 1988) Tuberculosis	Diarrhoeal disease Guinea worm **HIV/AIDS treatment** Maternal Health Malaria **Nutrition** Onchocerciasis **Tobacco**
Not Observed	Pneumonia **HIV/AIDS prevention (until late 1990s)**	Chronic Non-Communicable Disease Injury Mental health

Table 2.3: International cooperation and collective action in health, 1976 – 2006 (Cases in bold are examined in Chapter 6)

Some preliminary observations about the historical trends in cooperation and collective action shape the format of the analysis. What do the cases of not expected but observed cooperation share? Institutions may play an important explanatory role in explaining the drivers of cooperation beyond contagion. Beginning with the standards on biological products from the

League of Nations and continuing to the modern day work of the World Bank, Global Fund, and WHO, institutions may have played an especially important role in explaining unexpected cooperation. Very little unexpected cooperation has occurred outside of formal institutions. In contrast, some of the expected and observed cooperation and collective action has occurred ad hoc, outside of institutions, like the work of the United States government Center for Disease Control in addressing emerging infectious diseases. But, ad hoc cooperation did not emerge in some instances where it would have been expected, like the control of smallpox from the 1930s to 1965. The health cooperation thesis, explained in section 2.3 may help us make sense some of these observations that are not explained by contagion.

2.2 DEFINING HISTORICAL PERIODS AND FORMS OF INTERNATIONAL COOPERATION ON HEALTH

Before measuring the scale of cooperation, it is necessary to create distinct categories for the forms of international cooperation and collective action observed in health. Scholars studying international health have proposed several approaches for categorising cooperation on health. One approach proposes three categories of cooperation: surveillance, assistance, and rules. [12] However, this leaves out key considerations of public goods in health that expand beyond surveillance and rules, like research and protection of the vulnerable. Another framework, proposed by Macfarlane, builds on the work of Yach and Bettcher to suggest four purposes of cooperation – all related to public goods in health: 'surveillance of infectious disease, regulation and standard-setting, protection of intellectual property rights, and safeguarding of vulnerable populations in conflict or disaster situations.'[13] This approach is too narrow, as it excludes the majority of cooperation in health, which exists to strengthen and protect health within a nation. This distinction between efforts to provide international public goods, and efforts to support

[12] Zacher & Keefe, *The Politics of Global Health Governance: United by Contagion*. Zacher argues that the three key functions are: "promoting *surveillance* of infectious disease and disseminating knowledge of their impacts"; "Providing financial and material *assistance* for emergency interventions and long-term health improvement programs"; "Adopting *rules* that prescribe and proscribe particular behaviours." p.16

[13] S. Macfarlane, M. Racelis & F. Muli-Musiime, 'Public health in developing countries', Lancet, (2000) vol. 356, no. 9232, Sep 2, pp. 841-6., p 845

national health systems is made by Jamison, Frenk and Knaul, who classify those as core and supportive functions, respectively.[14] In this framework, core functions provide international public goods, including research, surveillance, and the control of international externalities (which include the spread of infectious disease). And, supportive functions provide financial and technical assistance to national health systems, and protect the health of vulnerable groups. These categories of cooperation, and a consideration of their shortcomings in this analysis, inform the categories used in measuring cooperation in this thesis.

I propose three dimensions, which allow international cooperation and collective action on health to be measured and dissected. These three dimensions are (1) jointly financed action in public health, including all efforts to a globally agreed goal, like the smallpox eradication program and the bilateral and multilateral efforts to provide HIV/AIDS treatment; (2) international regulation governing health policies, including the International Health Regulations (on infectious disease) and the Framework Convention on Tobacco Control; and (3) health research and health surveillance, including the work of the WHO secretariat in monitoring disease trends and research aimed to provide global public goods in health. As cooperation has grown in scale, so too have the variations in these dimensions of cooperation across disease areas. The next chapter details the metrics for each form of cooperation, allowing us to relate the varying forms and levels of cooperation with varying levels of contagion.

Defining Historical Division and Comparisons

The analysis in the historical chapters is divided into three time periods, with the divisions based on major shifts in world politics and in international cooperation on health. Chapter 4 deals with the interwar period and the Second World War (1918 to 1947). During this period, the pandemic influenza of 1918 and the post-war outbreaks of typhus brought health into considerations of collective security in the League of Nations. While cooperation on cholera,

[14] Jamison, Frenk & Knaul, 'International collective action in health: objectives, functions, and rationale'.

yellow fever and plague continued during the interwar period, new institutional arrangements expanded cooperation to include typhus, the standardisation of medicines and nutrition. These institutional arrangements established the basis for international cooperation on health after the Second World War. Chapter 5 begins in the early post-war period and the creation of WHO, and concludes with the last known case of smallpox in 1976 (1948-1976). This chapter analyses the malaria eradication campaign, the early failure to cooperate on smallpox and the subsequent success in eliminating the disease. Health cooperation during this period was influenced by the Cold War, and the post-war institutional arrangements for international cooperation. Chapter 6 (1976 – 2005) begins with the success of WHO's smallpox eradication campaign and the entry of the World Bank into health cooperation. This chapter analyses the emergence of cooperation on nutrition and tobacco, and the early failure and subsequent momentum for cooperation on HIV. These cases have been selected because of their deviation from expected cooperation on health, and because they are among the most substantial cooperative efforts. In addition to these cases, a quantitative assessment of contagion and cooperation is provided for several other diseases during each historical period. Throughout this broad history, the analytic categories described below are applied to explain variations in international cooperation on health.

2.3 EXPLAINING UNEXPECTED COOPERATION AND COLLECTIVE ACTION: THE HEALTH COOPERATION THESIS

The framework I use begins with the contagion thesis. The contagion thesis serves as an analytic benchmark by which to assess the causal significance of factors beyond externalities. The contagion thesis begins by accepting that cooperation and collective action are expected under circumstances of clear interdependence.[15] In addition, the contagion thesis also takes into account the positive economic externalities associated with the provision of a global public

[15] I use the concept of interdependence as described in Keohane & Nye, *Power and interdependence*. The two key aspects of interdependence are sensitivity and vulnerability, as defined at the start of this Chapter.

good, and expects cooperation to emerge when it is associated with demonstrated economic benefit.

Empirically, there are some situations where the contagion thesis does hold true. These situations are represented in the grey boxes of Tables 2.1 to 2.3, where cooperation is expected and observed, or not expected and not observed. Studying these cases may add more texture to the contagion thesis, and identify other drivers that may have been at work. Key cases that support the thesis will be considered in my analysis. However, we can better understand variations in cooperation on health by studying the incongruent cases (in white boxes of Tables 2.1 to 2.3), where expectations and observation of cooperation do not align. Those incongruent cases, where the contagion thesis does not explain cooperation, illuminate the drivers and barriers to cooperation on health.

Explaining the drivers of cooperation and collective action

The notion that state behaviour cannot be explained by rationality is not a new one. An entire field of study has been dedicated to the study of the failure of states to work together in the interest of all. As Mancur Olson writes,

> 'Taken individually, the states of the world are more often than not rational; taken together, they constitute an international system that is usually irrational. They conform, in other words to the central insight of the theory of collective goods: With these goods, unlike others, rational behavior normally does not spontaneously lead to a rational collective outcome.'[16]

In Olson's view, contagion is, at best, a necessary but not sufficient driver for international cooperation. I build on these views by exploring the role of powerful actors in bearing the costs of cooperation and collective action. However, the collective action literature offers very little insight into explaining the cooperation that is observed even without any apparent international externality. For these cases, I turn to explanations based on international institutions and epistemic communities.

[16] Olson, 'Increasing the Incentives for International Cooperation'. P. 873

Explanations of collective action failure, like Olson's above, maintain that states acting alone will most likely act rationally. However, this is not always observed. Individual states have been unwilling to bear the costs of international action, even if they stand to benefit many times more than these costs. Studies of hegemonic leadership have refined and expanded on the conditions under which a powerful actor, or a group of actors might bear the costs for cooperation. These explanations emerge from the same rational, interest-based assumptions of the contagion thesis, and thus serve as an excellent starting point for considering the drivers of cooperation that are beyond contagion.

The contagion thesis captures only part of the *demand* for international cooperation, and says nothing about its *supply*. Emerging from theories about hegemonic stability, the key factor in determining the supply of international cooperation is hegemonic leadership. That is, a dominant state, which concentrates power, will be able to create and sustain international cooperation by bearing costs and enforcement responsibilities in cooperative efforts. Realist and neo-realist explanations for cooperation have focused predominantly on the analysis of state capabilities determining the supply of cooperation. Implicit in this explanation based on leadership is the assumption that powerful states will bear the costs cooperation when they are sensitive and vulnerable to international threats. Thus, the core element of the contagion thesis is assumed, but not directly examined, in arguments focused on the supply of cooperation.

The key factors in determining the demand for international cooperation are state interests and preferences. These preferences, and changes in them, can be explained by variations in interdependence (contagion), variations in the contractual environment (uncertainties and transaction costs differ between issue areas[17]) and issue density (institutions lower uncertainty and transaction costs on related issues[18]), variations in the success of international cooperation

[17] Keohane, 'The Analysis of International Regimes: Towards a European-American Research Programme'.
[18] Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy*.

(success increases demand and tasks for regimes[19]), variations in the effectiveness of epistemic communities (knowledge communities shape preferences and offer policy options), and variations in advocacy (advocates create demand for institutional cooperation[20]). These considerations of the demand for international cooperation, and initial impressions of the shared characteristics among cases of unexpected cooperation on health since 1918 (Tables 2.1 to 2.3), shape the framework for explaining variations in cooperation on health. In shorthand, I refer to this framework as the 'health cooperation thesis.'

The health cooperation thesis is made up of three key explanatory categories. I carefully distinguish and isolate each of these explanatory categories (Table 2.4 and 2.6). The first category is leadership, which refers to the presence of a hegemonic actor (or actors) bearing the burden of costs and enforcement responsibilities.[21] Second, institutions, which refers to institutions that embed formal rules and lower the costs of cooperation. And third, knowledge, which refers to the development of consensus within the international scientific community on strategies for disease control and prevention. I elaborate on each of these categories below.

The goal of this framework is to identify testable propositions specific to each explanatory category (contagion, leadership, institutions and knowledge) by defining the parameters of each in an exclusive manner. Delineating between these categories requires some deliberate distinctions, imposed progressively based on a differentiation from the contagion thesis (Table 2.4 and 2.6). These distinctions are necessary because of the interaction between the explanatory categories of leadership, institutions and knowledge. For example, powerful states exert influence on international institutions, and use them to push their priorities forward. The drivers of cooperation identified under the analytic category of international institutions explicitly focus on how the autonomy, membership and formal rules of institutions allow them

[19] D. Mitrany, 'The Functional Approach to World Organization', International Affairs (Royal Institute of International Affairs 1944-), (1948) vol. 24, no. 3, pp. 350-63.
[20] Shiffman & Smith, 'Generation of political priority for global health initiatives: a framework and case study of maternal mortality'.
[21] Like contagion, leadership is an interest-based explanation.

to move cooperation beyond where powerful actors would have taken it. Similarly, international institutions interact with knowledge communities in several ways. Institutions serve as forums for knowledge communities to develop consensus. The funding priorities of institutions may shape technical consensus and advance, and in turn, knowledge communities may shape the priority-setting process for health institutions. To clarify these distinctions, the drivers of cooperation attributed to knowledge communities focus on the role of those communities in changing real or perceived interests through scientific consensus and advancements.

The attribution of causality to any driver or drivers is based on a qualitative analysis in which all the explanatory categories and drivers are considered.[22] These distinctions between explanatory categories may answer major critiques of regime theory regarding the lack of clarity between the many factors employed in the explanation of international cooperation. This framework (Table 2.4 and 2.5) is not necessarily specific to cooperation on health, and can be utilised to give greater precision to explanations of international cooperation on other issue areas.

The explanatory framework below is biased towards contagion, as the empirical thresholds for attributing causality to factors beyond contagion are more demanding than identifying the presence or absence of contagion. So, any conclusion that cooperation can be explained by explanatory categories beyond contagion is likely to underestimate the impact of these categories.

[22] Because the influence of these drivers is iterative, no specific time point for the emergence of cooperation will necessarily be identified.

Explanatory Category	Description	Drivers of international cooperation
Contagion	International externalities determine cooperation	1. Sensitivity and vulnerability to disease threat, as shaped by epidemic potential and lethality of disease. 2. International economic burden created by disease and the financial benefits of cooperation
Leadership	Powerful actors (including private actors) bear the costs and burdens of cooperation, driven by rational self-interest	3. Benefits of cooperation greater than costs for a powerful actor (k=1) 4. Benefits of cooperation greater than costs for a minimal number of actors (k>1) 5. Powerful actor that stands to benefit from cooperation is able to influence other actors to bear the costs of cooperation.
International Institutions	International institutions reduce the transaction costs of cooperation; issue density facilitates expansion of cooperation to additional health issues; long-term and repeated interaction changes strategic interests	6. Autonomous and independent institutions determine priorities, diverging from the influence or interests of powerful actors 7. Broad membership and scope of institutions allows concerns of weaker members to shape cooperation 8. Formal rules of institutions determine priorities, diverging from contagion (negative international externalities) 9. Permanence of institutions allows rules and priorities to persist after a shift in contagion or a change in the interests of powerful actors.
Knowledge	Scientific consensus and advances redefine interests	10. Scientific developments change cost-benefit calculations, and in turn, lead rational self-interests to support cooperation 11. Knowledge communities and advocates direct attention toward, or create perception of, contagion or crisis (real or manufactured).

Table 2.4: Drivers for explaining international cooperation on health. Numbers in brackets in the text refer to the corresponding number of the driver as outlined in this table. Note that only one driver from each explanatory category needs to be demonstrated to suggest causal attribution to that category. The drivers are not summative, but instead are used to delineate among the categories.

Contagion. The role of contagion in explaining cooperation has been discussed in detail in this chapter. The two key drivers of cooperation related to contagion are the negative externalities associated with the spread and lethality of disease (Table 2.4, 1) and the positive and negative economic externalities associated with either cooperation or non-cooperation on a disease. Faced with a threat to which it is both sensitive and vulnerable, a state will face three sets of costs: the cost of a non-productive workforce and healthcare costs associated with insufficient

action (e.g. importation of smallpox and resultant illness), the cost of domestic action (e.g. continued domestic smallpox vaccination), and the cost of unilateral international action (e.g. bearing the costs of international smallpox vaccination). When these costs exceed the cost of cooperative action, cooperation is preferred (Table 2.4, 2). The most revealing study of the role of contagion will emerge from analysing changes in the preferences of states over time. Does cooperation emerge or cease when a disease shifts from 'not expected' to 'expected' cooperation (Tables 2.1 to 2.3)?

Leadership. A continuation of this rational-choice perspective, on which the contagion thesis is based, is the argument that a powerful actor will bear the costs of cooperation when cooperation is in the interest of this actor (Table 2.4, 3). This might be termed the 'contagion plus power' thesis because of the continuity with the interest-based explanation, and the addition of supply-side considerations. However, there are several aspects of this argument that should be opened for scrutiny. Arguments about hegemonic leadership expect that the fragmentation of power is associated with the collapse or failure of cooperation. Many scholars have observed this not to be true.[23] In particular, I build on studies showing that even without a hegemon, cooperation may emerge when the benefits of cooperation are greater than the costs for a minimal number of actors (Table 2.4, 4).[24] Leadership is considered a driver for cooperation under the conditions defined by 'classical' hegemonic stability theory and under the conditions in a refined 'k-group' theory about hegemonic leadership. It should be noted that the benefits and costs of cooperation, while often financial, also include strategic costs and benefits, such as those related to Cold War rivalries that were sometimes linked to decisions about cooperation on health.

As discussed in the previous chapter, in international health, private or non-state actors may be able to bear the costs and burdens of cooperation. As demonstrated in following chapters, non-state actors, like the Rockefeller Foundation and the Gates Foundation, have sometimes borne

[23] Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy*.
[24] Snidal, 'The limits of hegemonic stability theory'.

the implementation costs of international cooperation on health. The small scale, and relatively low costs, of cooperation on international health may make it possible for non-state actors to adopt the role of a 'hegemon,' where this may have been impossible in other issue areas. Where this occurs, such activity is considered under the category of leadership.

One scenario, in which the cost-benefit calculations employed by powerful private actors differ markedly from those of states, involves international cooperation associated with great financial benefits for a private actor and no commitment from those actors to bear the costs of cooperation. Powerful private actors, freed from bearing the costs of cooperation, may be able to exert concentrated influence on government or other private actors to push cooperation forward (Table 2.4, 5). This scenario is still based fundamentally on a calculation, by an actor, that the benefits of cooperation are greater than the costs. However, here the costs may not be the delivery of health services, but the costs of influencing other actors. For example, pharmaceutical companies may be involved in influencing decisions of states and multilateral institutions to sponsor international programs for HIV/AIDS treatment, based on their own financial interests. In this example, the pharmaceutical companies are unlikely to bear the costs of cooperation. Here, as in other explanations of policy choice from interest-group politics, policy decisions are considered 'rational' by decision-makers, even though the outcome may appear to be sub-optimal.[25]

If the contagion thesis, or the 'contagion-plus-power thesis' are always correct, interests have pre-determined cooperation on health. It follows that global health institutions, scientists, advocates and analysts are superfluous, not changing the observed cooperation on health in meaningful ways. It is readily observed, and detailed in the following chapters, that even when the benefits of cooperation are greater than the costs for either a single actor or a minimal number of actors, cooperation does not always occur. The drivers of leadership may be

[25] For more on this, see Walter Mattli & Ngaire Woods, 'In Whose Benefit? Explaining regulatory change in global politics ', in Walter Mattli & Ngaire Woods, eds., *The Politics of Global Regulation* (Princeton: Princeton University Press, 2008).

necessary for cooperation, but are certainly not sufficient, as demonstrated by the failure to cooperate on smallpox control for over 30 years, or the failure to cooperate on the control of the early HIV/AIDS epidemic. A core purpose of this thesis is to identify the drivers for cooperation that extend beyond crudely obvious contagion and power. The following analysis of the role of institutions and knowledge communities is critical in identifying the drivers for cooperation, and in identifying the areas where humans may have agency to alter cooperation outcomes.

Institutions. The core question on the role of institutions is whether or not the existence of institutions alters cooperation outcomes, causing them to deviate from the contagion thesis. To assess the impact of institutions on cooperation, three sources of evidence have been proposed.[26] The first is the historical counterfactual. I will compare behaviour before and after the creation of an institution, and before and after the expansion of the institution's scope, to isolate the impact of the institution or its expansion. Second, I will assess compliance with the institutions by asking 'do governments routinely follow the rules of the institution?' Third, I will examine the 'resilience' of the institution by considering what happens when relations among participants deteriorate. Do the rules persist when conditions change? In a 1950 article, Charles Allen assesses the compliance and resilience of the early institutions for cooperation on health, yet no analysis since has been conducted on international health institutions.[27]

Furthermore, an analysis of the functional role and governance of institutions may also explain some variation in cooperation. This analysis builds on insights from three strands of scholarship. These include insights on the functionalist expansion of scope for cooperation within institutions,[28] theories of delegation that highlight the conditions under which institutions can have autonomy to take actions which states would not have taken,[29] and understandings of

[26] Keohane, 'The Demand for International Regimes'.
[27] C. E. Allen, 'World Health and World Politics', International Organization, (1950) vol. 4, no. 1, Feb.
[28] Mitrany, 'The Functional Approach to World Organization'.
[29] D. L. Nielson & M. J. Tierney, 'Delegation to International Organizations: Agency Theory and World Bank Environmental Reform', International Organization, (2003) vol. 57, no. 02, pp. 241-76.

the choice among international institutions, including the creation of institutions to either facilitate or hinder cooperation.[30] I build on these sources and hypotheses to establish testable drivers of international cooperation related to international institutions.

This thesis tests four drivers of international cooperation related to international institutions.[31] First, as Abbott and Snidal suggest, autonomous or independent institutions will be able to shape priorities that may diverge from the influence of the most powerful actors (Table 2.4, 6). Domestic politics can shape the degree of autonomy given to international institutions and may drive institutional reform.[32] Institutions with multiple principals (principals are those bodies, like boards, which give orders to the institution), or divergent principals, are likely to have greater autonomy and may thus address issues that would not be expected based on interests and interdependence alone.[33] Second, institutions with a broad membership and scope may be able to allow for the concerns of weaker members to shape cooperation, and for the inclusion of considerations beyond contagion (Table 2.4, 7). For example, in voting on a budget allocation for smallpox in WHO in 1966, the limited proposals supported by the 10 wealthiest nations was defeated by a more ambitious proposal supported by weaker and smaller states. Third, formal rules within institutions may also drive cooperation in directions that diverge from those suggested by contagion alone (Table 2.4, 8). For example, the decision to base priority areas on the measured burden of disease during Gro Harlem Brundtland's leadership of WHO, led to support for cooperation on tobacco control.[34] Finally, the permanence of institutions may allow their rules and priorities (and in turn cooperation) to persist even after a change in the externalities associated with a disease, or a change in the interests of powerful actors (Table 2.4, 9). For example, even though the threats posed by the international spread of cholera had

[30] Jupille & Snidal, 'The Choice of International Institutions: Cooperation, Alternatives and Strategies'.
[31] In international health, institutions have often served as forums for knowledge communities to organise, and to form a consensus. This tradition begins with the 19th century International Sanitary Conferences and continues to the present. These interactions of knowledge communities, while facilitated by international institutions, are considered in a separate explanatory category.
[32] Nielson & Tierney, 'Delegation to International Organizations: Agency Theory and World Bank Environmental Reform'.
[33] Ibid.
[34] Brundtland, 'Speech on burden of disease concept'.

minimised, the disease remained (along with yellow fever and plague) among the only diseases regulated by WHO until 2006. This has led scholars to suggest that 'approaches to controlling infectious diseases are rooted in and potentially constrained by their 19th century antecedents.'[35] This regulatory cooperation was clearly driven by the persistence of an international institution that outlived the interests that created it.

In defining the drivers for cooperation that emerge from institutions, I emphasize the role of each driver in moving cooperation beyond contagion and the interests of the most powerful states. For clarity, it should be noted that drivers 6 and 7 differentiate institutions from leadership and power, while drivers 8 and 9 differentiate institutions from contagion (Table 2.4). Early on, WHO was seen as a tool for driving cooperation beyond the interests of the most powerful member-states. WHO's broad remit, which included much health cooperation beyond contagion was embraced by the membership, especially developing countries. Writing on the early work of WHO, Jacobsen describes the important role that the organisation has played in expanding the scope of cooperation,

> The rich states of the Northern Hemisphere can easily be contaminated by the health problems of the Southern Hemisphere. As the rich states of the North see the situation, however, there are limits to their self-interest in improving health conditions in the South. The director-general's task is to see to it that these limits are not breached, but he must also try to constantly widen them.[36]

The Organisation worked as an arbiter of interests. As Jacobsen wrote 'The director-general's problem is not to muster this majority, but rather to prevent it from going too far.'[37] My evaluation of international institutions' influence focuses on how institutions have succeeded in expanding cooperation beyond contagion the interests of the powerful.

---

[35] A. M. Stern & H. Markel, 'International efforts to control infectious diseases, 1851 to the present', Jama, (2004) vol. 292, no. 12, pp. 1474-9. P.1477. See also L. O. Gostin, 'International Infectious Disease Law: Revision of the World Health Organization's International Health Regulations', Jama, (2004) vol. 291, no. 21, June 2, p. 2633.

[36] H. K. Jacobson, 'WHO: Medicine, Regionalism, and Managed Politics', *The Anatomy of Influence: Decision Making in International Organization* (New Haven: Yale University Press, 1973).

[37] Ibid. p. 214-215

Knowledge. Just as institutions increase the demand for cooperation, knowledge and consensus within an epistemic community can increase demand by establishing that interdependence exists, by changing the costs and benefits of cooperation through scientific advances and proposed policy alternatives, and by calling attention to the need for cooperation. I look to theories of epistemic communities, focusing on how new consensus or technological advances can change state interests.

This thesis tests two drivers of international cooperation related to knowledge, or epistemic communities. First, scientific developments, or the development of scientific consensus and policy alternatives, may change cost-benefit calculations, and in turn, rational self-interests (Table 2.4, 10). For example, the development of vaccination technology for smallpox, which meant that only one-fourth as much vaccine was needed, may have tipped the cost-benefit calculations. Scientific consensus may redefine state interests. For example, a consensus in the mid-1980s that HIV/AIDS was not limited only to homosexuals could have altered the interests and cost-benefit calculations of states. This scientific advance established an intensified interdependence between states as a much greater portion of their population was perceived to be vulnerable. The second driver of international cooperation related to knowledge communities assesses their success in directing attention toward, or creating perception of, crisis (Table 2.4, 11). For example, nutrition became an international priority after scientists and development experts made the case that nutrition was essential to national development.[38] Knowledge communities are not limited to health workers and public health experts. Advocates and policy scholars pointed attention towards the human rights and national security implications of HIV, facilitating cooperation on the disease (Chapter 6).[39]

These knowledge-based drivers focus on the ability of an epistemic community to create the perception of interdependence. The contagion thesis assumes that the interdependence created

[38] Alan Berg, 'Malnutrition and National Development', Foreign Affairs, (1967) no. October.
[39] L. Garrett, *HIV and National Security: Where are the Links?* (Washington DC: Council on Foreign Relations, 2005).

by health issues is perceived well enough to influence cooperation decisions. The contagion thesis assumes correct understandings of the presence of disease and the viability of threats. Historically, it appears that perceptions of interdependence and the viability of threats may not have always been correct. In addition to pointing out unrecognised contagion, scientific communities and advocates play a critical role in 'manufacturing contagion.' As discussed in the first chapter, the threats posed by the spread of infectious disease have sometimes been overstated in order to justify commitments to disease control.

Like the other drivers for cooperation, those within the explanatory category of knowledge have an ability to alter state interests. In order to study how knowledge changes interests, I use the historical approach as outlined by Haas.[40] [41] After identifying the membership and the principled and causal beliefs of the epistemic community, Haas advises scholars to trace activities and demonstrate the influence the community has had on decision makers at key time points. Using this historical analysis, I can explore the role that knowledge communities may have had on cooperation outcomes.

[40] Haas, 'Introduction: Epistemic Communities and International Policy Coordination'.
[41] E. Adler & P. M. Haas, 'Conclusion: Epistemic Communities, World Order, and the Creation of a Reflective Research Program', International Organization, (1992) vol. 46, no. 1, Winter.

	Expected Cooperation	**Not Expected Cooperation**
Observed	Explained by: Contagion thesis (externalities)	Explained by: Health cooperation thesis (leadership, institutions, knowledge)
Not Observed	Explained by: Health cooperation thesis (leadership, institutions, knowledge)	Explained by: Contagion thesis (externalities)

Table 2.5: A Framework for explaining drivers of and barriers to cooperation and collective action in health. Note that the contagion thesis and health cooperation thesis are not mutually exclusive. That is, the contagion thesis may not fully explain cooperation when it is expected; leadership, institutions and knowledge may contribute to those understandings.

Explaining barriers to cooperation and collective action

Without the drivers for cooperation, cooperation might not occur. Therefore, in explaining expected cooperation that does not occur, analysis will focus on the presence and role of the drivers of cooperation from the explanatory categories of contagion, leadership, institutions, and knowledge, using the framework detailed above. These same explanatory categories also point to some barriers to cooperation, which are sometimes the direct inverse of the drivers. Here, I consider the barriers to cooperation emerging from international relations theory that may explain the absence of expected cooperation. These barriers to cooperation are considered alongside the drivers in the qualitative analysis of the historical chapters.

Explanatory Category	Barriers to international cooperation
Contagion	12. Unequal relative gains between cooperating states
Leadership	13. Costs of cooperation greater than benefits for a powerful actor (even if other states willing to bear costs of cooperation) 14. Costs of cooperation greater than benefits for a minimal group of powerful actors (even if other states willing to bear costs of cooperation) 15. Collusion among powerful actors to oppose cooperation for private benefit.
International Institutions	16. Institutions impose a 'bounded rationality' that limits the 'zone of acceptability' for cooperation. 17. Bureaucratic self-interest within institutions leads to suboptimal cooperation outcomes. 18. Permanence of institutions allows rules and priorities to persist after a shift in contagion or a change in the interests of powerful actors, inhibiting expanded cooperation.
Knowledge	19. Scientific developments change cost-benefit calculations, and in turn, lead rational self-interests to oppose cooperation 20. Gaps in scientific consensus are amplified, inhibiting international cooperation

Table 2.6: Barriers to international cooperation on health. Numbers in brackets in the text refer to the corresponding number of the driver as outlined in this table. Note that only one barrier from each explanatory category needs to be demonstrated to suggest causal attribution to that category. The barriers are not summative, but instead are used to delineate among the categories.

Contagion The key obstacle to cooperation suggested by Realists is that states will exit from a beneficial cooperative arrangement if 'the partner is achieving relatively greater gains.'[42] Here, it is posited that even if the conditions of the contagion thesis are fulfilled, cooperation may not occur because of a concern that other states will benefit more from the endeavor (Table 2.6, 12). The contagion thesis assumes that states will cooperate when their self-interest compels them to do so. But, with the relative gains arguments, even this self-interested cooperation is obstructed by a difference in relative gains. In a study of transatlantic cooperation on non-tariff trade barriers, Grieco explains that a state will 'limit its commitment to a cooperative arrangement if it believes that [...] otherwise mutually positive gains favor partners.'[43] Building on the work of Waltz, Greico notes that while some states may be negative altruists, '*all* states will be

[42] Grieco, 'Anarchy and the Limits of Cooperation: A Realist Critique of the Newest Liberal Institutionalism'. P. 17

[43] Joseph Greico, *Cooperation among Nations: Europe, America and Non-Tariff Barriers to Trade* (Ithaca, New York: Cornell University Press, 1990). P. 10

'defensive positionalists.'[44] In asserting the neoliberal position, Keohane does not discount relative gains entirely. Rather, he suggests that relative gains impede cooperation only for 'positional goods,' like status.[45] It may be that gains must be distributed equally among participating states, or that the relative costs of cooperation be commensurate to the relative benefits, for cooperation to occur. In turn, arrangements that avoid unequal relative gains may be a pre-condition for cooperation.

International cooperation on health issues often brings greater benefit to poor countries. Just as poor and endemic countries benefited most from the smallpox eradication campaign and campaigns to provide treatment for HIV,[46] poor countries are expected to have greater gains than rich countries in cooperation and collective action addressing pandemic influenza.[47] To borrow Keohane and Nye's term, many health issues demonstrate 'asymmetrical interdependence.'[48] Such asymmetry may hinder cooperation expected in the contagion thesis. As Sandler notes, amid this asymmetrical interdependence, the rich may handle a health problem on their own until cooperation or collective action becomes imperative.[49] However, this asymmetry is compatible with, and even essential to, theories of hegemonic cooperation as clarified by Snidal, where a dominant actor sponsors cooperation that benefits smaller and weaker states more than the larger states.[50] Further, institutions can facilitate asymmetric cooperation by reducing transaction costs and facilitating repeated and long-term interactions. So while the contagion thesis sees asymmetry as a barrier to cooperation, the observation of asymmetry suggests the drivers under the explanatory categories of leadership and institutions may be playing an important and positive role.

---

[44] Grieco, 'Anarchy and the Limits of Cooperation: A Realist Critique of the Newest Liberal Institutionalism'. p. 17
[45] Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy*. P. 54
[46] S. Barrett, 'The Smallpox Eradication Game', Public Choice, (2007) vol. 130, no. 1, pp. 179-207.
[47] C. J. Murray*, et al.*, 'Estimation of potential global pandemic influenza mortality on the basis of vital registry data from the 1918-20 pandemic: a quantitative analysis', Lancet, (2006) vol. 368, no. 9554, pp. 2211-8.
[48] Keohane & Nye, *Power and interdependence*.
[49] Sandler, *Global Collective Action*. p. 100
[50] Snidal, 'The limits of hegemonic stability theory'.

Leadership While a powerful actor or group of actors may drive cooperation when the benefits for that actor, or those actors, exceed the costs of cooperation, these countries may obstruct cooperation when costs exceed benefits (Table 2.6, 13, 14). As previously noted, the costs of cooperation in health are often relatively low, and can be met by weaker states, or even private actors. It is postulated here that powerful actors will actively oppose cooperation (even if other states are willing to bear the costs) when this cooperation will bring them greater costs than benefits. For example, the United States has opposed international treaties and regulations on the control of alcohol and was opposed to WHO's Global Strategy on Diet, Physical Activity and Health. Both of these international efforts were a threat to American industry, and the United States exerted its influence in opposition to these relatively low-cost programs.[51] Even if the aggregate costs to a powerful actor would still be less than the benefits (as they likely would be with alcohol regulation), powerful actors may collude to oppose cooperation for private benefit (Table 2.6, 15), sometimes driven by domestic interest groups or by the formation of patronage networks with international elites.[52]

Institutions Institutions may also create barriers to cooperation in three important ways. First, bounded rationality, understood as the pursuit of goals within a narrow 'zone of acceptability' may limit the range of cooperation problems addressed by an institution (Table 2.6, 16). For example, until very recently, international health institutions avoided engagement with international trade and development policies, leading them to focus narrowly on the range of issues that could be addressed through health interventions and health policy. Work on the social determinants of health has begun to change this 'zone of acceptability,' though the legacy of 'satisficing' persists in range of issues addressed by international health institutions.[53] Second, the work of institutions is sometimes limited by bureaucratic self-interests, which can

[51] A. Waxman, 'The WHO Global Strategy on Diet, Physical Activity and Health: The controversy on sugar', Development, (2004) vol. 47, no. 2, pp. 75-82.
[52] Janine R. Wedel, *Collision and collusion: the strange case of Western aid to Eastern Europe* (New York: Palgrave, 2001).
[53] M. Marmot, 'Social determinants of health inequalities', Lancet, (2005) vol. 365, no. 9464, pp. 1099-104.

be obstacles to cooperation (Table 2.6, 17).[54] [55] As Barnett and Finnemore write, international organizations may 'exercise power autonomously in ways unintended and unanticipated by states at their creation.'[56] While this autonomy can facilitate cooperation, it can also impede it when the rules and routines of international organizations 'obscure overall missions and larger goals.'[57] Finally, the permanence of institutional rules and priorities, which can drive cooperation, can also inhibit it as these rules and patterns of cooperation become resistant to change (Table 2.6, 18). For example, the 1891 International Sanitary Regulations were adopted by WHO as the International Health Regulations in 1948, and were essentially unchanged until 2006. These regulations would form the basis for WHO's infectious disease control policies, despite the fact that the regulations were only designed to control cholera, plague and yellow fever. The constraints that bounded rationality, bureaucracy and long-lived rules of institutions place on cooperation serve as barriers to cooperation that will be considered in this thesis.

Knowledge Knowledge has been a critical driver of cooperation, but advances in science, disagreements among scientists, and diffuse calls for international attention and cooperation from scientific communities have also hindered cooperation. Just as scientific developments, including advances in technology and strategy can change cost-benefit calculations to favour cooperation, scientific developments can change cost-benefit calculations to oppose cooperation (Table 2.6, 19). For example, conclusions that HIV spread through sexual contact may have limited cooperation on the disease by creating the perception in some policy circles that HIV would only affect homosexuals and the 'promiscuous few.' Related to this, uncertainty about the nature of disease transmission, a disease's lethality, or its global burden may hinder cooperation. Gaps in scientific consensus can be amplified, inhibiting international cooperation (Table 2.6, 20). Relatively minor gaps in scientific knowledge have been amplified by AIDS

[54] Barnett & Finnemore, 'The Politics, Power, and Pathologies of International Organizations'.
[55] W. Easterly, 'The cartel of good intentions: the problem of bureaucracy in foreign aid', The Journal of Policy Reform, (2002) vol. 5, no. 4, pp. 223-50.
[56] Barnett & Finnemore, 'The Politics, Power, and Pathologies of International Organizations'. P. 699
[57] Ibid. p. 718

sceptics to suggest that the HIV does not cause AIDS, hindering international action in some settings.[58]

A stronger explanation of cooperation and collective action in health

In this thesis, I use systematic description to analyse how contagion, leadership, institutions and knowledge, may explain cooperation. In addition, I consider questions about what drives cooperation by comparing predictions from a priori reasoning (the contagion thesis) with empirical findings. The goal of this analysis is not to produce a list of conditions that matter in explaining variations in cooperation. Rather, it is the goal of this analysis to identify and create a hierarchy of explanatory drivers and barriers that explain cooperation on health, and to identify which drivers lead to specific instances or forms of cooperation. By considering the sets of drivers and barriers, this approach allows for causal complexity, avoiding the unrealistic reduction of explanations to a single variable.

The following chapter sets out a novel set of metrics for measuring contagion and cooperation on health, which is used to complement the qualitative explanations used in this framework with quantitative analytics. The chapters that follow analyse variations in cooperation and collective action observed in health on the basis of the definitions and analytic framework discussed above. Those situations where cooperation occurs, but is not expected, can help us understand the drivers for cooperation and collective action, including contagion, leadership, institutions and knowledge. Those situations where cooperation is expected, but does not occur, re-affirm the role of key drivers, and can help us identify barriers to cooperation and collective action. By dissecting cooperation and collective action in health over the past 90 years, precise and analytically grounded explanations can be derived for the wide variations observed in international cooperation on health.

---

[58] Steven Epstein, *Impure Science: AIDS, Activism, and the Politics of Knowledge* (Berkeley, California: University of California Press, 1996).

Chapter 3: Measuring Contagion and Cooperation

This chapter lays out the quantitative and analytic tools employed in answering the central question of this thesis: 'does contagion explain international cooperation on health?' In the previous chapter, I discussed the assumption commonly made in analysis of global health that infectious diseases are loaded with international externality and that this drives international cooperation. However, not all infectious diseases are equally infectious. And, not all infectious diseases are equally lethal. The technologies that exist to prevent and treat disease may mitigate their spread and their lethality. Further, international cooperation on disease may be costly, or it may be cost-saving and revenue-producing. In short, there is a great deal of variation in the international externalities presented by infectious disease. There is a wide spectrum of contagion, just as there is a wide spectrum of cooperation. Here, I present a method for measuring some of this variation in contagion, and a related method for measuring the variation in international cooperation on health. These tools allow us to ask a more precise version of our central question, 'does variation in contagion explain variation in international cooperation on health?'

3.1 THE CONTAGION INDEX

I use a Contagion Index to characterise the level of international externality associated with a disease, and a Health Cooperation Index to characterise the level of cooperation observed on a disease. The Contagion Index may have relevance to current policy-makers, but here it serves an analytic tool in understanding the how variations in contagion have been met with variations in cooperation. Used historically, this index provides a tool for identifying the incentives for cooperation on health, in a manner similar to the analyses of economic historians on other issue

areas.[1] Until now, empirical study of the incentives shaping cooperation decisions in health have been limited to estimates on the costs and benefits of the smallpox eradication campaign.[2] While this work has been important, it is necessary to conceptualize the externalities associated with cooperation in a manner that can allow for comparison across diseases and time. The Contagion Index is a first attempt to approximate the externalities associated with disease in a manner that allows for analytic comparisons.

Contagion Index indicators and scales	
Individual indicator	Scale
International Epidemic Potential Indicator (I_E)	
Indicator is composed of two parts, to be multiplied	
1. R_0 (basic reproductive number)	0 to X (linear)
2. National control (prevention) impossible (1)	0 to 1 (interval)
Unlikely (0.5)	
Easy (0.25)	
Transmission impossible (0)	
Disease Severity Indicator (I_S)	
Indicator is composed of two parts, to be multiplied	
1.Annual case-fatality rate	0 to 1 (linear)
2. Life-saving treatment impossible (1)	0 to 1 (interval)
Unlikely (0.5)	
Easy (0.25)	
Fatality impossible (0)	
**Financial Incentives Indicator (I_F)*	
1. Per cent of DALY burden attributable to disease	0 to 100 (interval)

Table 3.1 The Contagion Index indicators and scales.
Contagion Index = $I_E + I_S + I_F$ (with each indicator weighted to provide an equal average value)
*DALY burden is considered only in the alternative contagion index in Chapter 6, as data on the burden of disability does not exist for previous time periods. For clarity, when I_F is used, it is referred to as the 'Contagion + Index'

International Epidemic Potential Indicator (I_E)

At the heart of the contagion thesis is the idea that the spread of disease creates international externality. It follows that diseases with the potential to spread quickly and are impossible or difficult and expensive to control at the national level will be associated with greater international externality.

[1] R Fogel & S Engerman, 'A model for the explanation of industrial expansion during the nineteenth century: with an application to the American iron industry', The Journal of Political Economy, (1969) vol. 77, no. 3, pp. 306-28.
[2] S. Barrett, 'The Smallpox Eradication Game', Public Choice, (2006) vol. 130, pp. 179-207.

This first part of this indicator is a figure from epidemiology, called the 'basic reproductive number,' commonly denoted as R_0. This figure reflects the 'number of secondary cases produced by a *typical* infected individual during its entire period of infectiousness.'[3] In other words, the figure reflects the number of people to which each infected person will pass the disease. If the value of R_0 is less then 1, then the infection will ultimately die out, and there is little risk for an epidemic spreading throughout a population. If the value of R_0 is greater than 1, then the infection will spread. Higher values reflect a greater (though not necessarily faster) spread through a population. The R_0 for the 1918 pandemic influenza has been estimated at between 2 and 3, while the R_0 for smallpox has been estimated at between 5 and 7, and the R_0 for HIV between 2 and 5. These figures are calculated by studying individual epidemics, and are sensitive to a variety of local factors. For example, sexual practices change the value of R_0 for HIV, variability in climate alters the value of R_0 for malaria,[4] and sanitation practices change the R_0 for polio. While the global application of these figures is imperfect considering the variability in health, sanitation, climate, and social practices, R_0 remains the best available measure for the spread or reproduction of a disease. Where a range of estimates exists for R_0, the average reported in a scientific review article or by my own calculations is used here, and the sources are detailed in Appendix 3A.

The use of R_0 within this index is congruent with its intended use in epidemiology as a means to 'justify severe or costly control measures' or, 'less severe, more sustainable measures.'[5] That is R_0 is essential to assessing the intensity of the threat and a basis for determining the scale of the public health response. Put succinctly, 'R_0 is estimated in order to gauge the relative risk

[3] O Diekmann, J Heesterbeek & J Metz, 'On the definition and the computation of the basic reproduction ratio R0 in models for infectious diseases in heterogeneous populations', Journal of Mathematical Biology, (1990) vol. 28, pp. 365-82.
[4] Since malaria is spread by an intermediate vector (the mosquito), and not directly between people, there has been a great deal of debate about how the R_0 should be calculated. For more see, D Smith, *et al.*, 'Revisiting the basic reproductive number for malaria and its implications for malaria control', PLOS Biology, (2007) vol. 5, no. 5, p. e42.
[5] J M Heffernan, R J Smith & L M Wahl, 'Perspectives on the basic reproductive ratio', J R Soc Interface, (2005) vol. 2, no. 4, Sep 22, pp. 281-93. P. 291

associated with a pathogen.'[6] A second use of R_0 is in the assessment of control measures. R_0 is compared before and after a control measure has been applied, and these observations can help guide public health strategies. For example, scientists have used R_0 to create models that can guide strategies for international cooperation on pandemic influenza. The following example illustrates the escalating needs for international action in the control of pandemic influenza as the value of R_0 rises:

> 'If the basic reproductive number (R_0) was below 1.60, our simulations showed that a prepared response with targeted antivirals would have a high probability of containing the disease. In that case, an antiviral agent stockpile on the order of 100,000 to 1 million courses for treatment and prophylaxis would be sufficient. If pre-vaccination occurred, then targeted antiviral prophylaxis could be effective for containing strains with an R_0 as high as 2.1. Combinations of targeted antiviral prophylaxis, pre-vaccination, and quarantine could contain strains with an R_0 as high as 2.4.'[7]

The values of the basic reproductive number provide a barometer of the risk for epidemic associated with a pathogen. These values are used to model the degree of international action needed to address a potential pandemic. These applications in epidemiology make R_0 relevant to a contagion index that seeks to assess the level of international externality associated with a disease. In turn, R_0 is relevant to the contagion thesis that predicts increasing externalities demand greater international cooperation.

A major challenge with using measures of R_0 in a comparative and historical analysis is that these measures can change as diseases interact with their environment and with other diseases. This challenge is perhaps most pronounced in measuring R_0 for diseases that are carried by intermediary vectors, like malaria, which passes through mosquitoes (not directly between people). Scientists have shown that the values of R_0 for malaria, have an exceptionally wide range (interquartile range of 30 to 815).[8] This range is so wide because of the many variables along the disease's transmission spectrum, including the prevalence of malaria within a population, who is bitten most, and the abundance of mosquitoes. An additional challenge is

---

[6] Ibid. p. 291
[7] Ira M Longini, *et al.*, 'Containing pandemic influenza at the source', Science, (2005) vol. 309, no. 5737, Aug 12, pp. 1083-7.
[8] Smith, *et al.*, 'Revisiting the basic reproductive number for malaria and its implications for malaria control'.

the interaction that some diseases have with each other, which can impact their values for R_0. For example, yellow fever and dengue are both carried by the same mosquito, and so transmission of yellow fever will depend on the prevalence of the dengue within a community, and vice versa.[9] Similarly, HIV infection compromises the immune system, making it easier to spread tuberculosis (resulting in a higher R_0 for tuberculosis in communities that have a high HIV prevalence).[10] HIV/AIDS treatment thus reduces the R_0 for tuberculosis, possibly more than it does for HIV.

Another challenge is that values of R_0 can change over time and place. Some of this change may be related to genetic changes in bacteria, viruses and parasites,[11] though much of the change is likely due to changes in human behaviour. For example, R_0 for HIV depends on number of new sexual partners per year within the population. But, the measure does not depend on the average number of new sexual partners per person; rather, it depends most on the presence of a core group within a population that has many new partners. Even if the overall population average is low, a group within that population that has many new sexual partners each year can lead to much higher values of R_0 for the entire population.[12] Further debate emerged among mathematical biologists on the possibility of saturation effects with infections like HIV. Once the disease reached saturation levels in high-risk groups, some scientists anticipated that exponential growth would end, and the disease would spread slowly.[13] Finally, the transmission and geographic reach of malaria and other mosquito borne diseases could change significantly with global warming. Models show that malaria could become endemic in

[9] Eduardo Massad*, et al.*, 'Dengue and the risk of urban yellow fever reintroduction in São Paulo State, Brazil', Rev Saude Publica, (2003) vol. 37, no. 4, Aug 1, pp. 477-84.
[10] C P Bhunu, W Garira & Z Mukandavire, 'Modeling HIV/AIDS and tuberculosis coinfection', Bull Math Biol, (2009) vol. 71, no. 7, Oct 1, pp. 1745-80.
[11] Rustom Antia*, et al.*, 'The role of evolution in the emergence of infectious diseases', Nature, (2003) vol. 426, no. 6967, Dec 11, pp. 658-61.
[12] R M May, S Gupta & A R McLean, 'Infectious disease dynamics: What characterizes a successful invader?' Philos Trans R Soc Lond, B, Biol Sci, (2001) vol. 356, no. 1410, Jun 29, pp. 901-10.
[13] R M May & R M Anderson, 'Transmission dynamics of HIV infection', Nature, (1987) vol. 326, no. 6109, Jan 1, pp. 137-42. Notably, the prediction that HIV would saturate when 1% of the population was infected proved to be entirely incorrect.

the Southern United States, and in parts of Europe with a modest rise in global temperatures.[14] I illustrate these shortcomings of the measure so that the inferences I make from the basic reproductive number can be fully understood.

The imperfections of R_0 as a measure for epidemic potential in varied settings is mediated by the second part of the International Epidemic Potential Indicator, which reflects the feasibility of preventing the disease at the national level. These prevention efforts include vaccines, sanitation improvements, and mosquito eradication. A disease that cannot be prevented at the national level (e.g. a new virus for which no vaccine exists), scores a 1, whereas a disease that can be easily and cheaply prevented at the national level scores a 0.25 (e.g. measles, for which there is a cheap and widely used vaccine) (Table 3.1). This score is multiplied with the value for R_0 to account for the fact that a disease that spreads widely, but can easily be stopped at the national level does not pose as much international externality as a disease that spreads widely and cannot be stopped. The resulting International Epidemic Potential Indicator is thus a rough estimate of the likelihood of an international epidemic that cannot be stopped by nations acting alone.

The epidemic potential indicator is not a perfect measure of the international externalities associated with the spread and prevention of disease. This model could be improved in two directions: by accounting for 'social contagion' of non-communicable diseases, and assessing the cost-benefit calculations involved in selecting between national or international prevention efforts. Social contagion refers to the idea that eating habits, and in turn diabetes and heart disease, spread through social networks. While there has been some recent research measuring the impact of these networks, metrics for measuring the spread of disease through 'social contagion' have not yet been developed.[15] Second, the current international epidemic potential

[14] W Martens*, et al.*, 'Potential impact of global climate change on malaria risk.' Environmental Health Perspectives, (1995) vol. 103, no. 5.; Richard Horton, 'The Plagues are Flying', *Health Wars: On the global front lines of modern medicine* (New York: New York Review of Books, 2003).
[15] Nicholas A Christakis & James H Fowler, 'The spread of obesity in a large social network over 32 years', N Engl J Med, (2007) vol. 357, no. 4, Jul 26, pp. 370-9.; see also Nicholas A Christakis & James

indicator is based on a rough estimate of the costs and ease of implementing national prevention programs. An improved indicator could quantify the costs associated with preventive action at the international level (e.g. an international smallpox eradication campaign) and subtract from these the costs associated with preventive action at the national level (e.g. continued national smallpox vaccination). These figures, if widely available for all diseases, could be incorporated into the index to provide a better approximation of the costs and benefits of international cooperation on disease prevention.

Disease Severity Indicator (I_S)

A widely spreading disease that does not cause death will likely not be associated with as much international externality as a similarly spreading disease that kills all who are infected. So, some measure of disease severity must be included in considering the international threat posed by a disease.

The central part of the disease severity indicator is the case-fatality rate, the number of annual deaths due to a disease divided by the annual number of cases of that disease. A few diseases, like avian influenza, have a case-fatality rate of over 70 per cent. Similarly, before treatment existed for HIV, case-fatality rates of over 75 per cent were documented.[16] These numbers are astronomical. A severe infectious disease, like the 1918 influenza had a case-fatality rate of 2.5 per cent,[17] while typically influenza pandemics have a case-fatality rate of about 0.1 per cent. The 2009 'swine flu' pandemic had a case-fatality more typical of seasonal influenza, between 0.1 and 0.4 per cent.[18] Case-fatality rates are often reported both for treated and untreated disease. Since the indicator accounts for the ability to easily treat disease, I use untreated case-fatality rates. Much of the data on case-fatality rates used in this indicator come from WHO's

---

H Fowler, 'The collective dynamics of smoking in a large social network', N Engl J Med, (2008) vol. 358, no. 21, May 22, pp. 2249-58.

[16] GW Rutherford, AR Lifson & NA Hessol, 'Course of HIV-1 infection in a cohort of homosexual and bisexual men: an 11-year follow up study', British Medical Journal, (1990) vol. 301, pp. 1183-88.

[17] Jeffery K Taubenberger & David M Morens, '1918 Influenza: the mother of all pandemics', Emerging Infect Dis, (2006) vol. 12, no. 1, pp. 15-22.

[18] Christophe Fraser, *et al.*, 'Pandemic potential of a strain of influenza A (H1N1): early findings', Science, (2009) vol. 324, no. 5934, Jun 19, pp. 1557-61.

Global Burden of Disease reports which standardise assessments of case-fatality rates for untreated disease.[19]

Reported case-fatality rates vary over geography and time because of the availability of treatment. I use WHO's estimates of case-fatality rates from untreated disease since the dampening effect of treatment is considered in the second part of this index. If a life-saving treatment is impossible, as it would be for avian influenza, a score of 1 is given. If a life-saving treatment is costly or difficult, as it would be for HIV treatment since the late 1990s, a score of 0.5 is given. If a life-saving treatment is easy and inexpensive, as it would be for onchoceriasis (river blindness) a score of 0.25 is given. Since the case-fatality score and this measure of treatment availability are multiplied, an easily treatable disease will have a disease severity indicator that is one-fourth that of a disease with an identical case-fatality rate and no treatment. There is some subjectivity, of course, to the second portion of this indicator. There are no clear thresholds for 'easy' or 'inexpensive' that hold true across diseases, time and geography.

In order to bring the case-fatality rate in line with perceived risk, and to limit the impact of the case-fatality rate on the Contagion Index, I use a scoring system for case-fatality rates based on the United States Centers for Disease Control's (CDC)'Pandemic Severity Index.' This 'index' was developed by CDC in 2009 to better inform public health decisions in response to pandemics (Figure 1). It reflects the CDC's view of threats based only on case-fatality rates. I modify the CDC scoring to allow the scores to go up to 10, reflecting the increased threat posed by diseases with case-fatality rates in excess of 2 per cent.

The CDC index was developed in response to criticism of WHO for not including a measure of disease severity in its pandemic alert levels; instead WHO alert levels were based on the number of countries to which a disease had spread. These criticisms originated from the observation that the 'swine flu' pandemic that began in 2009 reached the highest alert levels,

[19] WHO, 'The Global Burden of Disease: 2004 Update', (Geneva: World Health Organization, 2008).

though the flu killed a small fraction of those infected. WHO defended the exclusion of severity, stating 'even a pandemic virus that initially causes mild symptoms in otherwise healthy people can be disruptive, especially under the conditions of today's highly mobile and closely interdependent societies.'[20] The Contagion Index allows for recognition that externalities of disease are based on the potential for epidemic spread and the likely fatality rate, and that these factors are mitigated by the availability of treatment and prevention.

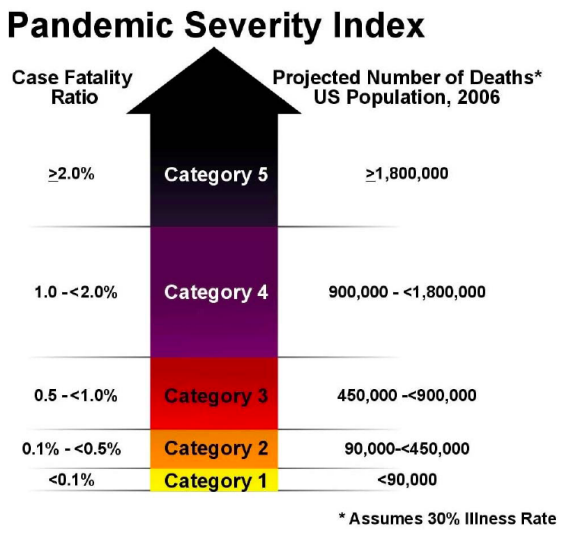


Figure 3.1 CDC Pandemic Severity Index. Source: CDC, 2009. Mitigation Slides, http://www.cdc.gov/media/pdf/MitigationSlides.pdf. (accessed 22 January, 2010)

Case-fatality score	Case-fatality ratio	CDC Pandemic Severity Index
10	>55 %	5
9	35.0 - <55.0%	5
8	20.0 - <35.0%	5
7	10.0 - <20.0%	5
6	5.0 - <10.0%	5
5	2.0 - <5.0%	5
4	1.0 - <2.0%	4
3	0.5 - <1.0%	3
2	0.1 - <0.5 %	2
1	<0.1%	1

Table 3.2: The Case Fatality Score, compared to CDC Pandemic Severity Index

[20] WHO, *Assessing the severity of an influenza pandemic* (11 May 2009 [cited 22 January 2010]); available from http://www.who.int/csr/disease/swineflu/assess/disease_swineflu_assess_20090511/en/index.html.

Financial Incentives Indicator (I_F)[21]

The spread of disease and mortality caused by disease are not the only international externalities associated with health issues. A measure of the international externalities considered by rational self-interested actors must also take account of some of the financial incentives for cooperation. Just as states have incentives to cooperate to prevent illness and death within their own borders, they also have incentives to cooperate when it is in their financial interest to do so.

Some diseases, like malaria, cause great disability and exact a large burden on economies even though they have a low case-fatality rate (and in turn, a low disease severity indicator). As shown in Chapter 5, the decision of the United States government to sponsor cooperation on malaria was based largely on the realisation that many of the countries with which the United States depended on for raw materials, and as export markets, had their economic growth limited by malaria. John Gallup and Jeff Sachs demonstrated that from 1965 to 1990, countries with intensive malaria grew 1.3 per cent less per person per year.[22] Financial incentives to cooperate on malaria are supported by the finding that a 10 per cent reduction in malaria is associated with 0.3 per cent higher growth. Economic growth is associated with positive international externalities, and these possible gains could create financial incentives to cooperate.

Since there is no standard measure for the impact of diseases on economic growth, and since retrospective studies are limited, the best proxy indicator for the economic impact of disease is the burden of Disability-Adjusted Life-Years (DALY). The DALY is a measure of the years of healthy life lost due to a disease.[23] Projections of the economic impact of a given disease are typically based on extrapolation from DALYs, because this measure gives greater weight to

[21] As detailed here, when this indicator is used (only in Chapter 6), index is termed the 'Contagion+ Index'

[22] J L Gallup & J D Sachs, 'The economic burden of malaria', Am J Trop Med Hyg, (2001) vol. 64, no. 1-2 Supplement, pp. 85-96. It should be noted that in the Gallup and Sachs analysis, these relationships between malaria and economic growth were maintained outside of Africa too.

[23] DALYs for a disease are calculated as the sum of the years of life lost due to premature mortality (YLL) and the years lost due to disability (YLD) from the disease. For details on the calculation of the DALY, see WHO, 'The Global Burden of Disease: 2004 Update'. P. 3

diseases that kill or disable the young (greater years of healthy life lost), and because the figure allows for a consideration of non-lethal illness. Malaria is an example of a disease that exacts a great toll on the young, and those likely to be most economically productive, while killing only a small fraction of those whom it infects. Assuming that rational self-interested actors would benefit from greater global economic growth, the DALY burden can place a standardised figure on the scale of economic interests.

The financial incentives indicator includes the percentage of the global burden of DALYs attributable to each disease considered in this thesis. The leading causes of the burden of DALYs in 2004 are listed in Table 3.3. Note that lower respiratory infections (primarily pneumonias) take the greatest toll with 6.2 per cent of DALYs in 2004. HIV/AIDS is responsible for 3.8 per cent of DALY's in 2004 and malaria is responsible for 2.2 per cent.[24] The initial assessment of the global burden of disease was presented in the World Bank's 1993 *World Development Report* and has subsequently been refreshed by WHO to reflect changes in disease burden since.[25] DALY figures are available based on data from 1990,[26] 2000-2002,[27] and every subsequent year in WHO reports.[28] The major limitation of DALY data in this index is the lack of such data before 1990, and the fact that changes in the calculation of DALYs make comparison between even the 1990 data and the current data impossible. As of February 2010, efforts were underway to standardise the data to make time-series comparisons possible

[24] A goal of the Global Burden of Disease Studies is to create mutually exclusive categories of disease. However, many diseases share risk-factors and determinants. For example, tobacco is a shared risk factor for cardiovascular disease, and some cancers. Unsafe sex is a risk factor for many sexually transmitted infections. The authors of these studies have provided estimations for the independent DALY burden of these risk factors. See for example, A. D. Lopez*, et al.*, 'Global and regional burden of disease and risk factors, 2001: systematic analysis of population health data', Lancet, (2006) vol. 367, no. 9524, May 27, pp. 1747-57. For these reasons, the DALY burden for tobacco presented in Chapter 6 is partially redundant with the DALY burden attributed to chronic non-communicable diseases.
[25] World Bank, *World Development Report 1993: Investing in Health* (Washington DC: The World Bank, 1993).
[26] Ibid.
[27] Alan D. Lopez*, et al.*, eds., *Global burden of disease and risk factors* (Washington, DC: World Bank, 2006).
[28] WHO, 'The Global Burden of Disease: 2004 Update'.

from 1990, though there are no plans to create a retrospective burden of disease study.[29] Due to the absence of data, it is impossible to use DALY burden in the calculation of the contagion index before 1990. In order to make comparisons across time possible, the 'Contagion Index' presented throughout this thesis does not include the financial incentives indicator. In Chapter 6, calculations with the financial incentives indicator are referred to as the 'Contagion+ Index.'

Disease or injury	Per cent of total DALYs
Lower respiratory infections (pneumonias)	6.2
Diarrhoeal diseases	4.8
Unipolar depressive disorders	4.3
Ischaemic heart disease	4.1
HIV/AIDS	3.8
Cerebrovascular disease	3.1
Prematurity and low birth weight	2.9
Birth asphyxia and birth trauma	2.7
Road traffic accidents	2.7
Neonatal infections	2.7
Tuberculosis	2.2
Malaria	2.2

Table 3.3. Leading causes of global burden of disease, 2004. Source: WHO, 'Global burden of disease: 2004 update', (Geneva: World Health Organization, 2008). p. 43

For the purposes of this thesis, the financial incentives indicator uses the global per cent of total DALYs. Of course, there is regional variation in DALY burden, with Africa having a much higher burden of infectious, nutritional and maternal conditions. In Africa, HIV/AIDS (12.4 per cent), lower respiratory infections (11.2 per cent) and diarrhoeal diseases (8.6 per cent) are the leading cause of disease burden, while in high income countries, the top causes are all noncommunicable diseases.[30] Studies of the international externalities presented by disease may wish to place greater weight on the disease burdens of trading partners (which would minimise African disease burdens), or place greater weight on the disease burdens of countries receiving international financing for health (which would maximise African disease burdens). These

[29] Personal correspondence, Dr. Colin Mathers, Director, Department of Measurement and Health Information Systems, WHO. 1 February 2010. Note that consistent estimates for 1990 and 2005 are being completed by the Institute for Health Metrics and Evaluation.
[30] WHO, 'The Global Burden of Disease: 2004 Update'. p. 43

improvements to the 'Contagion+ index' may make the index more accurately reflect economic externalities.

Calculating the Contagion Index

The Contagion Index is the sum of the three indicators described here, reflecting international epidemic potential, disease severity and financial incentives. The Contagion Index is a rough measure of the international externalities associated with disease. The Contagion Index is computed as:

$$\text{Contagion Index} = I_E + I_S/3 + I_F/6$$

Where $I_E = R_0$ x (0-1); I_S = Case-fatality score x (0-1); I_F = per cent global DALY burden

It should be noted that the values of each indicator are weighted so that the average scores for each indicator are equal in 2005. To achieve equal weighting, I_S is divided by 3 and I_F is divided by 6. This allows each indicator to have an equal impact on the Contagion Index for 2005 (see Appendix 6A).

For example, the Contagion Index for the H5N1 influenza in 2005 would be computed as:

$$\text{Contagion Index, H5N1, 2005} = [2.37(1)]/1 + [10(0.5)]/3 + 0/6 = 4.03$$

It should be noted that the Contagion Index is time-sensitive. The index for any given disease will change as advances in technology or strategy may make the prevention and treatment of a disease possible and less costly. For example, with the development of HIV treatment, the contagion index for HIV dropped sharply. In addition, some viruses and bacteria have undergone changes in virulence, altering their potential to spread (R_0) and their lethality (case-fatality) over time. Further, the costs associated with cooperation and the costs of non-cooperation on a disease will shift with changes in the costs of health interventions and the

financial arrangements for delivering these interventions. In this analysis, I compute the Contagion Index for each disease covered the historical chapters (Chapters 4 to 6). This is an imperfect attempt to capture a moving target.[31] But, this is the first attempt to identify the international externalities associated with disease in previous times.

There are several changes that can be made to improve the index. I have already outlined two of these possible changes: the inclusion of social contagion in the international epidemic potential indicator, and the inclusion of DALY measures in the financial incentives indicator. These modifications depend on improvements in the availability and comparability of empirical data on the spread and burden of disease. Other changes to the index can be made based on changes in the assumptions that underlie the measures. For example, it is assumed in this index that highly contagious (high R_0) diseases that are not lethal, and highly lethal diseases that are minimally contagious continue to pose a threat. That is why the contagion index sums the international epidemic potential indicator and the disease severity indicator. If one were operating on the assumption that a disease must be both contagious and lethal to warrant a threat, then these indicators could instead be multiplied.

A major challenge in the global application of the contagion index, or indeed any assessment of the drivers of international cooperation, is that the all-inclusive figures assume an equal level of global interconnectedness. The contagion index does not take into account the greater threat posed by diseases present in countries that neighbour or trade extensively with powerful actors. For example, the threat of contagion posed by malaria may have led to a massive global eradication effort in the 1950s. This effort had great success in the Americas and parts of Asia, yet the campaign almost entirely excluded Africa. Does the concentration of remaining disease in Africa explain the end of the malaria eradication campaigns in the 1960s? International externalities are not only presented by the nature of disease and its economic impact, they are

[31] Where there has been an important technological progress that alters one of the indicators in the contagion index sharply, I present additional calculations for the Contagion Index in the text of the historical chapters (4-7).

shaped by the geographic and economic proximity of the sick to other states. Geography and trade relations have no place in this contagion index.[32] While a quantitative analysis of these factors is not conducted in this thesis, geographic and economic proximity are considered in each of the historical chapters in discussions of the role of interest-based explanations and leadership in explaining international cooperation on health.

The Contagion Index provides an approximation of international externalities associated with disease, with the caveat that these measured externalities are diffusely present within the entire international system, and not specifically between states. The Contagion Index does not intend to provide a clear delineation of where interests lie, nor does it mean to create a rank-ordering of which diseases ought to be (or should have been) most important in international cooperation on health. Rather, the Contagion Index is used to identify those cases that are most relevant in testing the contagion thesis,[33] and to suggest possible trends in international cooperation on health that can be further explored.

3.2 THE HEALTH COOPERATION INDEX

In order to assess the relationship between contagion and cooperation, I developed a Health Cooperation Index to estimate the level of international cooperation on each disease area. The Contagion Index allows for predictions on where cooperation on health might be expected, based on estimates of the international externalities associated with each disease. The Health Cooperation Index allows for an assessment of where cooperation has been observed, based on empirical data on cooperation. The indicators within the Health Cooperation Index consider

[32] It is possible that these factors could be considered. For example, using the country-level global burden of disease data, the weighted centre of a disease could be identified (e.g. sub-Saharan Africa for malaria), and the distance to a specified reference point could be calculated (e.g. 14000 kilometres from Zambia to the centre of the United States). The extent of trade relationships could also be quantified in reference to a specific sponsor of international cooperation by including estimates of the number of trading vessels moving in each direction and the value of international trade. These analyses would only be possible for contemporary policy discussions due to the non-availability of burden of disease data before 1990.

[33] As per the previous chapter, these will be cases where contagion is high and cooperation is low, and vice versa

three forms of international cooperation: financing, regulation, and research or surveillance. Each of these indicators is discussed below.

Health Cooperation Index indicators and scales	
Individual indicator	Scale
International Financing Indicator (C_F)	
Indicator is composed of two equally weighted parts	
1. International financing (in millions of 2008 dollars) / 468 (international financing for smallpox eradication in 2008 dollars)	0 to X (linear)
International Regulation Indicator (C_R)	
Indicator is composed of two equally weighted parts	
1. International agreement/regulation on control of the disease (0.5) And evidence of policy-adjustment to meet the agreement/regulation (1)	0 to 1 (interval)
2. Percent of countries adopting regulation within time period/100 (if no regulation, this value is 0)	0 to 1 (linear)
International Research and Surveillance Indicator (C_S)	
Indicator is composed of two equally weighted parts	
1. International collaborative research aiming to prevent disease (0.5) And research is coordinated by an international institution (1)	0 to 1 (interval)
2. Disease reporting to an international institution (0.5) And disease reporting is mandatory, or direct surveillance by international institution (1)	0 to 1 (interval)

Table 3.4 The Health Cooperation Index (HCI) indicators and scales.
$HCI = C_F + C_R + C_S$

International Financing Indicator (C_F)

International financing has often been used as a barometer of international cooperation on health issues.[34] While international financing represents a minor component of overall health spending, accounting for 0.3 per cent of total expenditures on health globally and 6.5 per cent of health expenditures in Africa, international financing exerts a great influence on domestic programs and priorities in poor countries.[35] This influence exists because international financing supports the majority of the Ministry of Health budgets in many poor countries, and private spending (the bulk of health spending) is outside of any central direction.[36] Globally, international financing not only supports the prevention and control of disease, but also bolsters the implementation of international regulation, and supports research and surveillance efforts for that disease. Thus, international financing interacts positively with the other two indicators

[34] Sridhar & Batniji, 'Misfinancing global health: a case for transparency in disbursements and decision making'. ; Shiffman, 'Donor funding priorities for communicable disease control in the developing world'.
[35] Levine & Blumer, 'Following the Money: Toward Better Tracking of Global Health Resources'.
[36] GEG, 'Preliminary Report of a High-Level Working Group, 11-13 May 2008'.

in the Health Cooperation Index. Due to this central role in cooperation on health, the international financing indicator is the most heavily weighted indicator in the Health Cooperation Index. Measures of international financing come from established methods and existing data sources, mainly the OECD creditor reporting system, the annual budgets of international institutions, and published reports.[37]

The international financing indicator is a measure of the quantity of international financing in relation to a benchmark measure of international financing for smallpox eradication. Smallpox eradication is selected as a benchmark as this campaign has often been declared the greatest success in international cooperation on health. During the intensified smallpox campaign, from 1967 to 1976, the average annual funding for smallpox in 2008 USD was 38.9 million. To create a benchmark for funding, all international funding for disease control in the time periods studied is converted to millions of 2008 dollars, and divided by 38.9 to give a measure of relative international financing. For example, in 1957 312 million in 2008 USD went into the international financing of malaria eradication. Against the benchmark of smallpox, malaria financing is scored as 8.03 during this year (See appendix 5A for details).

Comparing spending to a benchmark of the international financing for smallpox control raises two key questions regarding the nature and timeline of funding being compared. First, should all funding be included or should measures of cooperation on international financing be limited to multilateral funding? Second, should funding be compared on an annualised basis or as the sum of all efforts within a given time period?

The distinction between multilateral and bilateral funding for health is unclear at best, and arbitrary at worst. As discussed in the previous chapters, multilateral initiatives in health have followed directly from bilateral initiatives. There is little evidence that WHO's special accounts

[37] Ravishankar*, et al.*, 'Financing of global health: tracking development assistance for health from 1990 to 2007'.; Shiffman, 'Donor funding priorities for communicable disease control in the developing world'.; Sridhar & Batniji, 'Misfinancing global health: a case for transparency in disbursements and decision making'.

and other methods for aggregating financing for collective action on diseases have changed the approaches and priorities of contributing donors. One key example of the failure of multilateral institutions to change funding priorities is malaria control in the 1950s and 1960s. During this period, multilateral institutions spent the equivalent of 1.34 billion in 2008 dollars on malaria eradication. While WHO directed up to 34.8% of all funds towards malaria during the 1950s, the regional distribution of funds closely resembled those of bilateral donors. Of the 45 malarious countries in Africa, only 2 benefited from WHO-sponsored eradication programs, while 21 of the 35 malarious countries in the Americas benefited from WHO eradication programs.[38] US bilateral aid had supported malaria eradication in the Americas before the start of the WHO campaign, and it is not clear that multilateralism changed funding priorities enough to warrant a distinction between bilateral and multilateral aid. Similarly, multilateral efforts to finance smallpox eradication and HIV/AIDS treatment received the majority of their funds from bilateral donors working independently on these diseases (Chapter 5 and 6). In the international financing indicator, I include all international funds that contribute to an internationally declared goal, including bilateral aid.[39]

International Regulation Indicator (C_R)

International financing is not a requirement for cooperation on all health issues, some of which may be better addressed through international standards and regulation. For example, efforts to prevent the importation of plague from international trade were well addressed by the International Health Regulations that made international reporting requirements and established protocols for the prevention of disease. Similarly, cooperation on the control of tobacco, a shared cause of some of the most pervasive non-communicable diseases, has been pursued through international regulations that limit advertising and illicit trade of tobacco products.

[38] See Chapter 5 for a complete discussion, and see also Table 5.2 in WHO, *The Second Ten Years of the World Health Organization* (Geneva: World Health Organization, 1968). P. 176

[39] Of the 468 million in 2008 dollars that went into smallpox eradication, 75.7 per cent came from multilateral sources, so 354 million in 2008 dollars would be a benchmark for multilateral aid should a benchmark based on multilateral aid be preferred.

International cooperation cannot be measured through financing alone. A measure of international regulation is essential to the Health Cooperation Index.

The international regulation indicator is composed of two parts: the first part assesses the existence of and compliance with international agreements, and the second assesses the scale of national adoption of international regulation. These two parts follow from the distinction made by Beth Simmons, separating compliance from treaty implementation.[40] Compliance is understood according to Oran Young's definition, 'compliance can be said to occur when the actual behavior of a given subject conforms to prescribed behavior, and noncompliance or violation occurs when actual behavior departs significantly from prescribed behavior.'[41] That is, compliance relates to the observed behavior and is independent of the implementation of a treaty, which involves adopting domestic rules to facilitate compliance with an international agreement. Neither measure in this indicator relates to the effectiveness of international agreements, which is understood as the 'impact on the phenomenon of concern' (like the prevention of plague).[42] This exclusion of effectiveness is intentional and consistent with the indicators for financing or research, all of which measure the process of cooperation, not cooperation outcomes.

The international regulation indicator is composed of two parts, which are summed for a total maximum score of two. The first part asks whether an international agreement exists (0.5 points), and whether there is evidence of compliance with this agreement (1 point). International agreements on the control of diseases have taken place within WHO and other parts of the United Nations system. If such an agreement has occurred, but there is no evidence of compliance, 0.5 points are given. If an agreement exists, and there is evidence of conformity to the prescribed behaviour, 1 point is given. The second part of the international regulation

[40] B Simmons, 'Compliance with international agreements', Annual Review of Political Science, (1998) vol. 1, pp. 75-93.
[41] O. R. Young, *Compliance and Public Authority* (Baltimore: Johns Hopkins University Press, 1979). P. 172
[42] Simmons, 'Compliance with international agreements'.

indicator assesses the scale of treaty implementation. This scale measures the per cent of countries implementing the agreement or regulation by altering their domestic rules to facilitate compliance with the international agreement. On this scale, a treaty with 100 per cent implementation would receive a score of 1, while a treaty with 15 percent implementation would receive a score of .15. Some regulations, like the WHO's International Health Regulations, do not require national implementation since the agreements are binding on all member states by virtue of their membership in WHO. These agreements, in which member states cede their implementation authority to an international institution, are scored as 1, reflecting full implementation. If there is no de facto binding agreement, nor ratification of a regulation or treaty, then the value for this component of the international regulation indicator is zero.

International Research and Surveillance Indicator (C_S)

International health research and surveillance is a public good, and one of the earliest forms of international cooperation on health. In a seminal article on international collective action on health, Jamison, Frenk and Knaul defined as core functions of international health organizations, the 'promotion of international public goods (eg, research and development), and surveillance and control of international externalities (eg, environmental risks and spread of pathogens).'[43] These functions are an important part of the work of international health organizations, often overlooked in debates about international health priorities that focus on international financing.[44]

The international health research and surveillance indicator is made up of two equally weighted parts, reflecting the organization and scope of international research and surveillance efforts. The first part of the indicator assesses the existence of international collaborative research (0.5

[43] Jamison, Frenk & Knaul, 'International collective action in health: objectives, functions, and rationale'. P. 514

[44] WHO Maximizing Positive Synergies Collaborative Group*, et al.*, 'An assessment of interactions between global health initiatives and country health systems', Lancet, (2009) vol. 373, no. 9681, pp. 2137-69.

points), and the coordination of this research by an international institution (1 point). The second part of the indicator assesses disease surveillance, with attention to whether an international institution has a disease surveillance program in place (0.5 points) and whether there is mandatory reporting, or direct collection of disease surveillance data by an international institution (1 point). Since a primary function of WHO is disease surveillance and the coordination of research, most of the activity considered in this indicator occurs within that institution. This indicator is based on four yes or no questions, and does not reflect the full range of variation on cooperation on research and surveillance. As with regulation, financing for research and surveillance is not included in these indicators, and is instead reflected exclusively in the financing indicator.

One possibility to make this indicator better reflect variations in cooperation is to include a measure of the number of WHO staff dedicated to research and surveillance on a particular disease. These numbers have varied dramatically, from as little as 1 staff member on HIV/AIDS in 1983 to over 300 staff by the end of that decade, most all engaged primarily in research and surveillance. Today at WHO, there is one staff member working on cardiovascular disease, diabetes and cancer.[45] The inclusion of the number of staff members would make this indicator better reflect the realities of cooperation on research and surveillance. A possible measure, which can be added to those in Table 3, is the percentage of WHO staff working on a disease divided by 20. Since only malaria and HIV/AIDS campaigns have ever occupied up to 20 per cent of staff, these efforts would receive a full score of 1. This weighting brings the figure within a range proportional to other indicators on this index. I have excluded this component of the research and surveillance indicator from this thesis due to a lack of reliable data on WHO staff assignments across time.

[45] Saraceno, Benedetto. Personal Interview. 7 November 2007.

Calculating the Health Cooperation Index

The Health Cooperation Index (HCI) is used to create a relative scale of international cooperation on health. The Health Cooperation Index is computed as:

$$HCI = C_F + C_R + C_S$$

For example, the HCI for smallpox in 1976 would be computed as:

$$HCI, \text{smallpox } (1976) = (39.4/38.9) + 2 + 2 = 5.01$$

Above, the 1976 funding for smallpox in millions of 2008 dollars, is divided by the benchmark for financing (38.9, the average annual funding during the intensified smallpox campaign). Added to this value are a full score on regulation, and research reflecting the global scope of the agreement to eradicate smallpox and the mandatory reporting of the disease. However, in 1957, there was very little financing for smallpox, nor formal agreement on its eradication, and no requirement for reporting the disease. This is reflected in the HCI for 1957:

$$HCI, \text{smallpox } (1957) = (.603/38.9) + 0 + 0.5 = .515$$

The health cooperation score for smallpox rises sharply from 1957 to 1976 because of commitments to international financing, agreement on the disease that impacts national programs, and mandated reporting of the disease. Details on these calculations, and those throughout this thesis, can be seen in Appendix 4A, 5A and 6B.

The indicators for cooperation, while reflecting three different forms of cooperation, are not entirely distinct. For example, international financing to support the implementation of a tobacco control treaty would fit under financing, but the ultimate goal is regulation. The same can be said for financing to support research and surveillance. Due to the interaction of

financing with the other two indicators, any disaggregated comparisons of cooperation indicators should be qualified. It may be that a high contagion index is necessary to see high scores on the international financing indicator, but not necessary for full scores on the regulation or research and surveillance indicators. While these relationships will be presented, they must be qualified with the understanding that financing is likely to amplify the observed international regulation and international research.

Future revisions and improvements of the HCI can include the following, which were omitted here because of empirical challenges:

- An addition to the international financing indicator of the percentage of international funding from multilateral sources / 100 (0 to 1 scale).
- An addition to the international research and surveillance indicator of the percentage of WHO staff dedicated to research & surveillance of disease / 20 (0 to 5 scale, though will not exceed 2 historically).
- Improved methods for weighting the indicators within the index

Finally, it should be emphasized that the HCI measures the *process* of cooperation, and does not reflect the effectiveness or the sufficiency of international cooperation on health. As Olson suggests, the most important distinction is not whether there is *any* cooperation, but whether there is *enough* to deal with an international problem.[46] For example, a cooperative scheme that puts 300 people on treatment for HIV infection in a country with 300,000 infected is insufficient because it fails to reach the scale that make the benefits of this cooperation a public good. Some cooperative efforts may fall far short of their goals, even though they succeeded in mobilizing international financing, regulation, research and surveillance. On the other hand, some cooperative efforts may be very successful at meeting their goals, even though they employed little financing, international regulation or international research and surveillance. A model that measures the effectiveness and sufficiency of cooperation may be more useful in

[46] Olson, 'Increasing the Incentives for International Cooperation'.

assessing functionalist explanations of cooperation, where success is seen as a key driver of international cooperation.

Measures of the sufficiency of cooperation are not readily available for international health. Health economists have done much work on measuring health needs, and recent efforts seek to measure the sufficiency of interventions and programs.[47] These efforts offer promise for future measures of the sufficiency of international cooperation on health. Without these sources now, metrics for sufficiency for financial assistance could include the percentage of costs (estimated by WHO or other experts) that were met through international financing. I have included a measure based on the per cent of estimated international financing that was delivered in Table 3.5 below. However, since sources are incomplete and not directly comparable, I exclude this measure from the Health Cooperation Index.[48] Metrics for sufficiency do not exist in comparable ways for international regulations and research and surveillance; these pose empirical questions about the success of international cooperation that go beyond the scope of this thesis.

[47] C. J. L. Murray & J. Frenk, 'Health metrics and evaluation: strengthening the science', Lancet, (2008) vol. 371, no. 9619, pp. 1191-99.
[48] Sridhar & Batniji, 'Misfinancing global health: a case for transparency in disbursements and decision making'.

Disease	International financing (in non-adjusted USD)	Estimated need for international financing (in non-adjusted USD)	Per cent financed
Smallpox (1955 – 1966)	318,000	48 million[49] to eradicate	0.67
Smallpox (1967-1979)	98 million	Estimates continually rising from $48 to $98 million to eradicate	100
Malaria (1957-67)	1.4 billion	1.60 billion [50] to eradicate	87.5
Tuberculosis (2007)	2.0 billion[51]	3.1 billion[52] to 56 billion [53]per year to control internationally	3.57 to 64.5
Immunisation (childhood)	210 million in 1994 (estimate)[54]	600 million per year in international financing (meeting 1/3 of total cost)[55]	35

Table 3.5 Per cent financed of expert estimates as a possible measure of sufficiency of cooperation

3.3 IDENTIFYING OUTLIERS: HISTORY AND THE INDICES

A basic analysis, in which the Contagion Index is the independent variable (x-axis) and the Health Cooperation Index is the dependent variable (y-axis) can be used to characterise the relationship between contagion and cooperation. According to the contagion thesis, this will be a positive and causal relationship, in which increases in contagion are met with increases in cooperation. As shown in the tables and charts in the Chapters 4, 5 and 6, there are some exceptional outliers in the time periods examined that deviate sharply from these expectations

[49] Siddiqi, *World health and world politics : the World Health Organization and the UN system*.
[50] This represents the average of three estimates during this period. WHO estimate in 1959 called for 1.66 billion, WHO estimate in 1963 called for 1.806 billion; United States estimate in 1960 called for 1.34 billion.
[51] WHO, *Global tuberculosis control: surveillance, planning, financing* (Geneva: World Health Organization, 2007).
[52] Ibid.
[53] Note that this figure of 3.1 billion, from the WHO has been disputed. An alternative estimate suggests 56 billion is needed. See Katherine Floyd & Andrea Pantoja, 'Financial resources required for tuberculosis control to achieve global targets set for 2015', Bull World Health Organ, (2008) vol. 86, no. 7, Jul 1, pp. 568-76.
[54] D McFarland, 'Review of child survival funding: 1980-1995.' Current Issues in Child Survival Series.
[55] R H Henderson, *et al.*, 'Immunizing the children of the world: progress and prospects', Bull World Health Organ, (1988) vol. 66, no. 5, Jan 1, pp. 535-43.

of the contagion thesis. I identify some of these outliers based on the frameworks presented in the preceding chapter. Ideally, the HCI could be calculated for all diseases of interest, in each year, and this method could be used to select the cases studied. Obviously, this poses an enormous empirical challenge. Instead, I use the HCI to make comparisons only in selected years (1918, 1939, 1948, 1957, 1967, 1976, 1990, 2005) within the cases selected based on the frameworks for 'expected' and 'not expected' cooperation presented in the preceding chapter. Future analyses, and efforts to synthesize data on international health financing may make wider use of the indices possible.

Chapter 4: 1918-1947 –

International Cooperation on Health in the Interwar Period

The First World War, the pandemic influenza of 1918, and post-war outbreaks of typhus made the international externalities associated with disease evident to political leaders, and brought health into considerations of collective security in the League of Nations. The rapid fluctuations in money supplies, banking, and international trade in the 1920s, followed by the collapse of industrial outputs and the Great Depression, demonstrated the interdependence of states.[1] During this period, it was recognised that improving health would improve the economy and promote international stability. This was a founding premise of the League of Nations Health Office. In addition, advances in transportation created new international externalities and challenges to the domestic control of infectious disease. By 1937, the first transoceanic passenger air services launched, making the movement of persons (and disease) shorter in duration than the incubation period for virtually all infectious diseases. In short, the interwar world was exposed to greater externalities associated with disease than ever before.

The contagion thesis is an important starting point in explaining inter-war cooperation on health. In essence, the contagion thesis expects states to cooperate when there are clear negative externalities associated with non-cooperation or positive externalities associated with cooperation. This purely rationalist thesis predicts some of the observed cooperation on health in the interwar period. Immediately after the war, states cooperated, under the auspices of the League of Nations, to finance a campaign against typhus in Poland, making this arguably the first episode of international collective action on health financing. Yet, cooperation on health in the interwar period deviated from the contagion thesis at some of the most critical moments. In particular, the decisions not to cooperate on pandemic influenza and smallpox, and the

[1] Charles H. Fienstein, Peter Temin & Gianni Toniolo, *The European Economy Between the Wars* (Oxford: Oxford University Press, 1997).

unexpected cooperation on international standard setting demand a more careful explanation of the drivers of international cooperation on health.[2]

By describing and explaining the variations in international cooperation on health during the interwar period, this chapter begins to test the contagion thesis, and to demonstrate drivers of international cooperation on health that go beyond contagion. This chapter seeks to explain how powerful states and powerful private actors, scientific communities, and formal institutions drive international cooperation that would not be expected based on contagion alone.

International institutions: Forums for regional and global cooperation

International institutions for cooperation on health were in flux during the interwar period. During this period, there were three intergovernmental forums for international cooperation on health. Two of these, the Office international d'Hygiene publique (OIHP) and the League of Nations, sought a global reach, while the third, the Pan-American Sanitary Bureau was regional. Pre-war cooperation had occurred through the Paris-based OIHP, an organization with a small secretariat concerned with the control of cholera, plague and yellow fever. The organisation's rival in the interwar period would be the League of Nations Health Office, which evolved directly from efforts to actively control the spread of typhus in Poland.

Major variations in international cooperation, 1918 – 1947

The priorities for international cooperation on health immediately after the First World War can be divided into two categories. First, there were those priorities that had been carried over from the International Sanitary Conventions of the late 19th century. These included surveillance and disease reporting on cholera, plague and yellow fever (Figure 4.1 and 4.2). Second, there were new priorities, born from the migration of soldiers, prisoners, and the breakdown of sanitation in some areas. Chief among these new priorities was typhus, which was threatening

[2] These standards would facilitate cooperation on endocrine disease (hormonal disorders, including diabetes), nutrition, and some infectious diseases.

communities in Central Europe. As shown in figure 4.1, typhus control in 1918 has the highest score on the Health Cooperation Index for the entire interwar period. Increased migration and trade also meant that new technologies needed to be standardised to avoid the risk of misusing imported biological products, and to allow their use while travelling. For example, the effective dose of a unit of insulin needed to be standardised, or a person could risk taking a lethally high dose while travelling. Standards on a wide range of biological products came in to effect by 1939, before the outbreak of the Second World War. These new standards are reflected in the modest increases in cooperation scores for tetanus (standards on tetanus anti-toxin) and chronic non-communicable disease (standards on insulin and hormones) (Figure 6.2).

While the cooperation index includes international financing, regulation and research and surveillance, it should be noted that the only substantial international financing during this period was on the control of typhus, as reflected in the discussion below. A possible exception to this trend is the financing from the United States government to target malaria in some regions of Central and Southern America. These efforts, which intensified during the Second World War, were limited to protecting the supply lines for war products and appear to have been relatively small in scale. They fall outside the definition for cooperation in Chapter 1, and thus have not been included. The Pan-American Sanitary Bureau had an operating budget in 1918 of approximately 5,000 dollars, which would not have a discernable impact on the health cooperation index (recall that all funds are divided by a baseline of 38.9 million USD, reflecting the annual funding for smallpox eradication). During this period, the primary means of cooperation on health were regulation, research and surveillance.

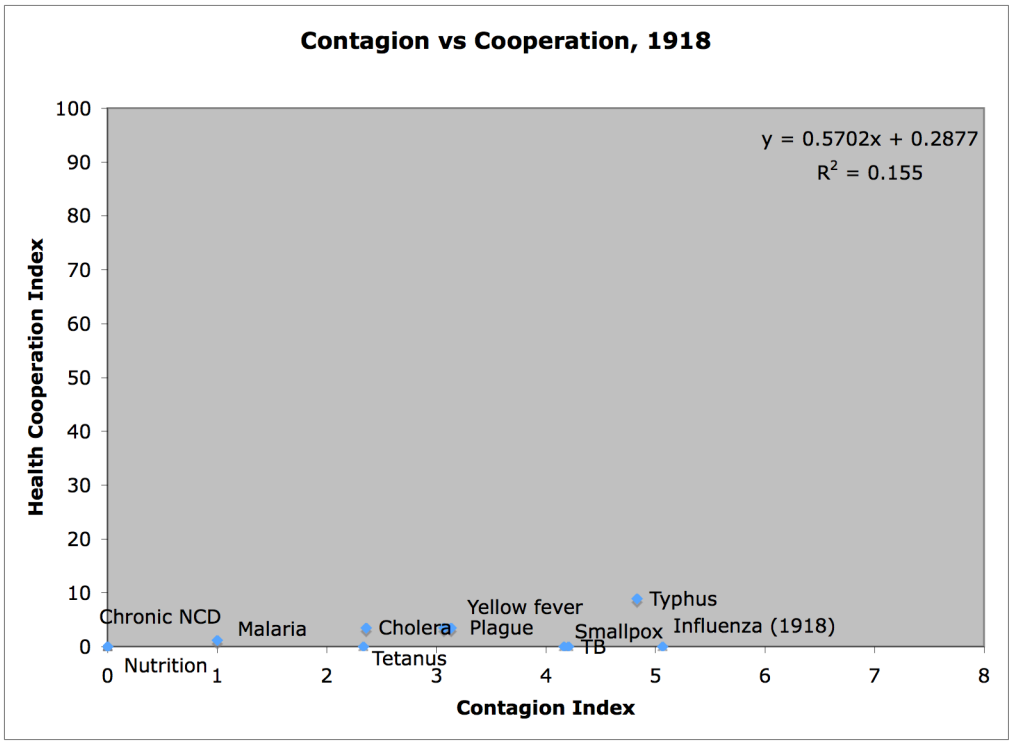


Figure 4.1 Contagion versus cooperation, 1918

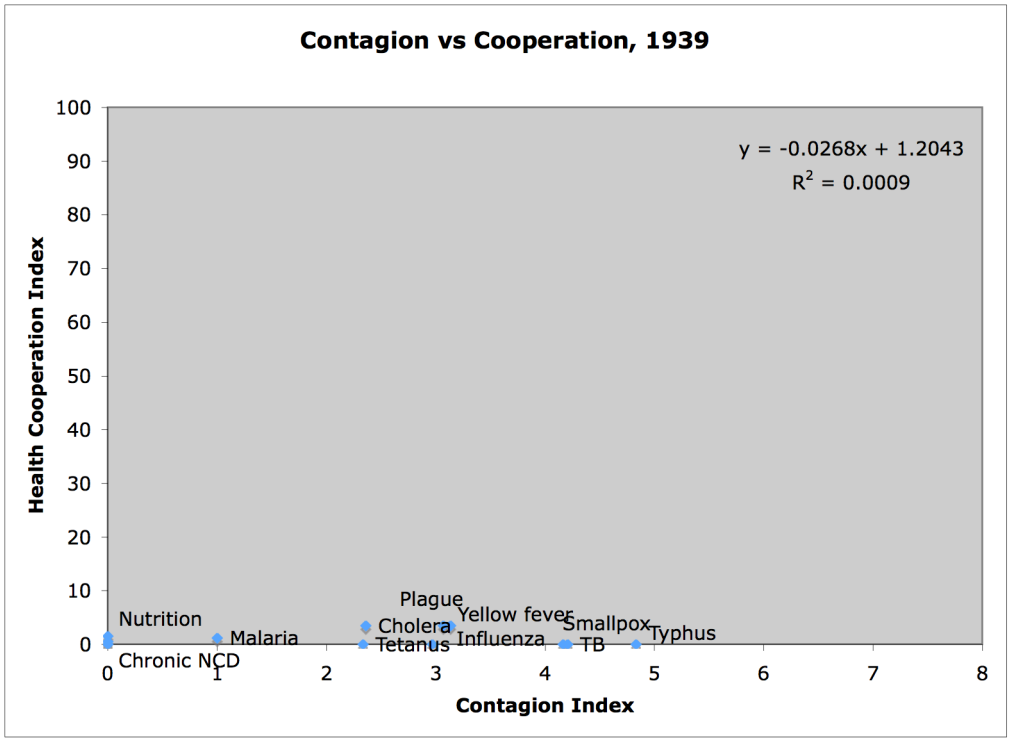


Figure 4.2 Contagion versus cooperation, 1939. Note that from 1922 to1934 approximately 2 million dollars in international financing went into standards setting at the League of Nations. These funds terminated by 1939.

This chapter is divided into three main parts. In the first of these three parts, I examine the cooperation expected by the contagion thesis. Assessing cooperation on cholera, plague, yellow

fever, and typhus, may explain how formal institutions, scientific consensus, and leadership from powerful actors play a role in explaining the continuation and emergence of cooperation. In the second part, I explore the surprising inaction on smallpox and pandemic influenza, probing the extent to which this inaction can be explained by a lack of consensus within the scientific community and a lack of knowledge about successful control efforts. Finally, I examine the unexpected cooperation on international standards setting during the interwar period, analysing how the absence of national standards, the strength of the epistemic community, and the support of a powerful private foundation may explain the emergence international standards. In concluding this chapter, I assess the extent to which contagion, leadership from powerful actors, international institutions and knowledge communities were driving international cooperation on health in the interwar period.

4.1 INTERNATIONAL COOPERATION ON TYPHUS AND CONTINUED COOPERATION ON CHOLERA, PLAGUE AND YELLOW FEVER

New cooperation on typhus is first international collective action on health

As the War ended, pandemic influenza ravaged Europe, Asia, and the Americas from 1918 to 1920, killing between 20 million and 100 million people, mostly in their youth.[3] [4] But, the most deadly epidemic in recent human history is not why the newly emerging League of Nations was called to act on health.

In Poland, there were about a quarter of a million cases of typhus that spurred the League to initiate and coordinate international action.[5] Typhus, a bacterial disease spread by the louse (plural: lice), tends to spread when basic sanitation is lost. While typhus could very easily be treated with antibiotics after the Second World War, in the interwar period, states were sensitive

[3] Murray*, et al.*, 'Estimation of potential global pandemic influenza mortality on the basis of vital registry data from the 1918-20 pandemic: a quantitative analysis'.
[4] N. P. Johnson & J. Mueller, 'Updating the accounts: global mortality of the 1918-1920 "Spanish" influenza pandemic', Bulletin of the history of medicine, (2002) vol. 76, no. 1, Mar 5, pp. 105-15.
[5] For comparison, in Russia, there were another 1.6 million cases of typhus in 1920.

and vulnerable to the disease. The Polish epidemic led to many outbreaks in Germany. Just after the War, typhus had already spread to Holland, introduced by returning prisoners of war, causing 500 deaths.

International financing for the control of typhus in 1918 alone was 7.5 times the annual expenditure on smallpox eradication during the intensified smallpox campaign, and just over half of the total international financing that went into the eradication of smallpox (see Table 4.1 and Figure 4.3). This figure is more staggering when considering that these efforts against typhus were concentrated in one country, Poland. In total, the United States, France, and the United Kingdom distributed 289.9 million 2008 dollars towards typhus control in 1918-1919. Just months after Polish independence in December 1918, the United States sent 6.5 million dollars in supplies, and 500 men led by an American surgeon to 'de-louse' Poland. The US subsequently sent another 2 million dollars in vehicles and sanitary equipment, and Herbert Hoover's American Relief Administration sent an additional 9 million dollars in supplies. The British sent 600,000 pounds for medical supplies and transportation. The French gave 1.3 million francs through their military health service (See Table 4.1 for conversions to 2008 USD).[6] The newly created League of Red Cross Societies sent an international medical commission to report on the epidemic. These efforts were just the beginning; the League of Nations coordinated a response to the Polish typhus epidemic that included assistance from several nations.

[6] Marta Balinska, 'Assistance and not mere relief: the Epidemic Commission of the League of Nations, 1920 - 1923', in Paul Weindling, ed., *International Health Organisations and Movements, 1918-1939* (Cambridge: Cambridge University Press, 1995).

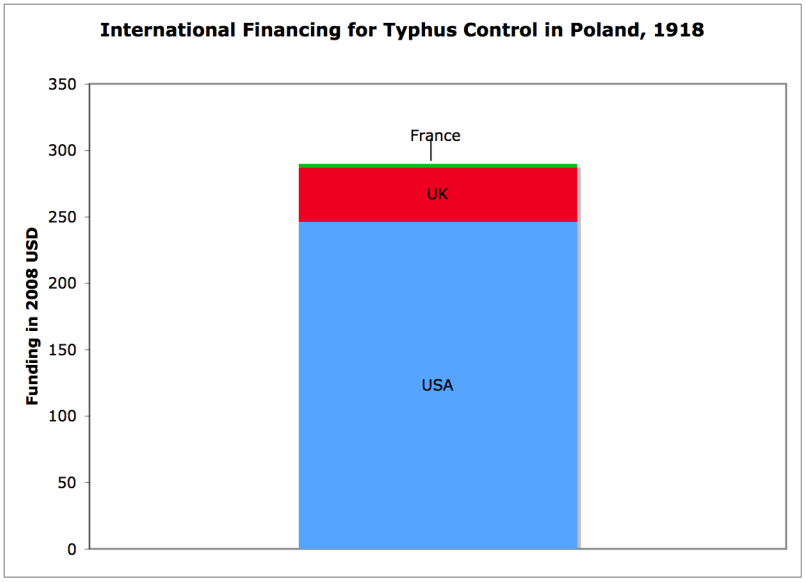


Figure 4.3 International financing for typhus control, by donor.

Donor	1918 Funds	2008 USD (millions)
USA	17.5 million dollars	246.47
UK	0.6 million pounds	40.84
France	1.3 million Francs	1.96
Total		289.97

Table 4.1 International funding for typhus control. Note that 1 1918 UK pound was equivalent to 4.83 1918 USD, based on a peg to the gold standard. For conversion from 1918 Francs, see http://www.insee.fr/fr/themes/indicateur.asp?id=29&type=1&page=achatfranc.htm Source: Marta Balinska, 'Assistance and not mere relief: the Epidemic Commission of the League of Nations, 1920 - 1923'

Explaining international cooperation on typhus

While the contagion thesis would expect cooperation on typhus, this explanation may not be complete. As we will see in the following section, the threat of contagion, and the economic benefit of cooperation, would have been much greater for smallpox and pandemic influenza. Yet, typhus control became the first example of international collective action on health. The assessments of international cooperation here has been substantially informed by Marta Balinska's work on the history of typhus control in Poland, detailing the international efforts from Polish, Soviet and French historical archives.[7]

Contagion is a key driver for cooperation on typhus

[7] Ibid.

There were obvious international externalities associated with the spread of typhus. With a breakdown in sanitation, and migration of prisoners after the War, typhus was spreading to countries that neighboured Poland. Typhus not only threatened the health of populations, but typhus also threatened political ideology. Soviet leader Lenin stated the externalities of typhus more clearly than any health economist could: 'either the louse will defeat socialism or socialism will defeat the louse.'[8] Lenin was not alone in recognising the geopolitical importance of typhus control. The United States, Britain, and France had already organised to support the control of typhus in Poland.

The League made the logic of contagion explicit in designing international efforts against typhus. The League's typhus appeal asked countries like Germany, which faced a high risk of contagion due to their proximity, to pay many times more than the United States, which faced a low risk of contagion.[9] Ultimately, these appeals were unsuccessful, leading the League's Epidemic Commission to scale back on their plans. Notably, economists have since demonstrated that the relative wealth of a state may be more important than its geographic location in determining its incentives for cooperation.[10] In the end, instead of an effort to control typhus throughout Poland, efforts focused on the creation of a 'sanitary zone.' This zone consisted of a series of control stations across a 1000 km line that would identify and control typhus among migrating Polish and Bolshevik prisoners of war and refugees. Thus, the design of the international strategy for typhus control focused on preventing spread of the disease along borders.

Leadership of powerful actors drives coordinated action on typhus

This determination among powerful states to address typhus, and their initially uncoordinated interventions, spurred them to create an institution to coordinate their actions. As already discussed, in 1918, the United States, Britain and France put forth unprecedented funding for

[8] Ibid. P. 82
[9] Ibid.
[10] D. G. Arce M & T. Sandler, 'Health-promoting alliances', European Journal of Political Economy, (2003) vol. 19, pp. 355-75.

the control of typhus in Poland. In July of 1919, the British Minister of Health called for a conference in London to discuss what role the League of Nations would take in addressing typhus and other health matters. The meeting was held in London in April 1920, 'with a view to protecting all of Europe against the spread of this terrible sickness toward the West.[11]' At this meeting, the European health ministers recognised both that Poland did not have the resources to adequately fight typhus, and that the OIHP did not have the staff or the funds to take action. The Ministers had been influenced by a February 1920 appeal from Arthur James Balfour (later Lord Balfour) urging them to give aid to the Polish government to combat typhus.[12] In London, the Ministers decided to create a League of Nations Typhus Commission, which would soon become the League of Nations Epidemic Commission, to address the epidemic in Poland. Chief Commissioner of the Typhus Commission, Norman White said, 'It would be preferable, and cheaper, to defeat the disease in Eastern Europe than to fight it in our midst.'[13] His statement reflects the view that powerful actors will bear the costs and burdens of cooperation when the benefits are greater than the costs.[14]

Institutions are a product of cooperation on typhus; they do not lead to divergence from contagion

Leadership and financial commitments from powerful states were necessary to spur the creation of an international institution for typhus control. In the aftermath of the First World War, the United States, Soviet Union, Britain and France were independently contributing to typhus control efforts in Poland, and recognized the need for coordinated action towards a shared goal. The new institution arising to facilitate collective action on typhus would become the League of Nations Health Office. Theories of institutional choice posit four options when formalised

[11] Balinska, 'Assistance and not mere relief: the Epidemic Commission of the League of Nations, 1920 - 1923'. p. 84 Note that original quotation in French source.
[12] N. Howard-Jones, 'International Public Health Between the Two World wars - The Organizational Problems', in *History of International Public Health* (Geneva: World Health Organization, 1978). P. 17
[13] Balinska, 'Assistance and not mere relief: the Epidemic Commission of the League of Nations, 1920 - 1923'. p 86
[14] Snidal, 'The limits of hegemonic stability theory'.

cooperation is desired: institutional use, selection, change and creation.[15] In the immediate post-war period, there were two institutions for international cooperation on health: the OIHP and the International Red Cross. Action on typhus required an institution that could both implement programs and facilitate government cooperation. The OIHP was a forum for scientific discussion and government cooperation, with no capacity for implementation. OIHP did not meet until 1926, a delay unacceptable considering the urgency of typhus control. The International Red Cross had successfully cared for wounded soldiers and prisoners during the war, but did not have a mechanism for facilitating collective action through governments. Lacking a focal institution, and with dismal prospects for institutional change, a tactic of institutional creation was selected in order to implement an emergency intervention for the control of typhus. It was the success of this new institution that led the League of Nations Health Office to emerge as a competitor to OIHP, and as we will see in the next chapter, as the predecessor to the World Health Organization.

The League of Nations Health Office grew directly out of typhus control efforts in Poland. The leader of the League's typhus control efforts in Poland, Ludwick Rajchman, was asked to become the first director of the League of Nations Health Office when it was founded in 1922. Rajchman was a Polish physician who had trained in France's Pasteur Institute and worked as researcher at London's Royal Institute of Public Health, at King's College during the war. Even after taking charge of the League's Health Office, he remained in Poland to oversee the work of the typhus commission. In 1922, he organized a major international health conference in Warsaw. At Warsaw, states agreed on aid to Russian and Ukranian health authorities, regulations on the notification of infectious disease, and a mutual recognition of medical degrees.[16] The observation that limited efforts at coordination on a single disease would gradually expand to more robust coordination on a variety of diseases seems to fit Mitrany's functionalist arguments, as success in one area of cooperation leads to augmentation.

---

[15] Jupille & Snidal, 'The Choice of International Institutions: Cooperation, Alternatives and Strategies'.
[16] Balinska, 'Assistance and not mere relief: the Epidemic Commission of the League of Nations, 1920 - 1923'.

However, the efforts to sustain cooperation within Poland, and to expand beyond Poland, failed. The League's Epidemic Commission was shut down while typhus epidemics still raged in Africa, Asia and South America. Historians noted that Members of the League's Health Committee recognised that if member states were reluctant to support efforts in Poland, they would be especially reluctant to support efforts in non-European countries, affirming the contagion thesis in their conclusions, and raising doubts about the role of the League in expanding cooperation beyond contagion.[17]

International cooperation on cholera, plague and yellow fever

Throughout the interwar period, OIHP continued to facilitate international regulations and reporting on cholera, yellow fever and plague.[18] Through agreements reached in the late 19th century, states agreed to required international reporting of all cases of these diseases, and they agreed to testing of vessels for these diseases in international waters. Unlike the League of Nations, which had expanded the range of health issues on which cooperation could occur, OIHP continued to work narrowly on these three diseases. In his analysis of the development of the International Sanitary Conventions in the 19th century, Cooper notes that shared interests and a scientific consensus were critical in driving cooperation on cholera, plague and yellow fever.[19] He ends his careful analysis in 1917. By the 1926 meeting of the OIHP, the shared interests persisted, but were no longer as compelling (as we will see below), and the scientific consensus was maintained, but was forged on false beliefs. Nonetheless, cooperation on cholera, plague, and yellow fever continued to be the focus for OIHP, perpetuated by the creation of this formal institution.

Contagion does not explain inter-war cooperation on cholera, plague and yellow fever

---

[17] Ibid.
[18]. The 1926 meeting was the last Sanitary Conference in which decisions on priority areas were discussed, as the final meeting in 1938 dealt only with administrative questions.
[19] Cooper, 'International Cooperation in Public Health as a Prologue to Macroeconomic Cooperation'.

Many of the threats to international trade posed by cholera, plague and yellow fever, which had existed in the 19th century, subsided by the 1920s. The Portuguese representative explained at the 1926 OIHP meeting, that

> 'the 'old triad' – plague and cholera, which had made the Old World tremble, and yellow fever, which had raged in the New – had been robbed of the superstitious terror that they inspired. These pestilences had been tamed. Cholera had become easily manageable; it could be said that yellow fever was almost extinct as a disease; only plague struck ports with a certain insistence outside its endemic foci.'[20]

While the minimal contagious threat of cholera and yellow fever were agreed to in the 1926 meeting, there was some debate on plague. Plague was put on the agenda of the 1926 OIHP meeting, driven by an outbreak in north-eastern China (Manchuria) that took 50,000 lives in 1911.[21] However, concern about plague importation was limited, and by 1931 League of Nations document reveal that public health experts believed cholera and plague were no longer regular threats within Europe. The report explains, 'in Europe, plague and cholera are rare diseases, and in Russia, they have only gained ground as a result of war and revolution.'[22] With the near elimination of yellow fever and the mosquitoes that carry it, and the ability to easily control and contain outbreaks of cholera in rich countries, the contagion thesis would predict limited incentives for cooperation on these diseases. Nonetheless, cooperation on the 'old triad' persisted, and international institutions can best explain the persistence of this cooperation.

Institutions explain cooperation that outlives the threat of contagion

The minor threat of cholera and yellow fever in the interwar period would unlikely warrant the costs the creating international agreements and regulation. Indeed, during the interwar period, this 'old triad' was less disruptive of international trade than typhus, which was spreading from Eastern Europe; smallpox, which could be reintroduced to populations; and even malaria, which persisted in Southern Europe and the United States. But, the existence of an institution for

[20] N. Howard-Jones, 'The scientific background of the International Sanitary Conferences, 1851-1938', in *History of International Public Health* (Geneva: World Health Organization, 1975). P. 95
[21] Ibid.
[22] League of Nations, 'League of Nations Health Organization', (Geneva: Information Section, Leauge of Nations, 1931). P. 8

cooperation makes this continuity inexpensive, and cooperation on these diseases outlasted the threat of real contagion.

Incorrect scientific consensus maintains cooperation on cholera and yellow fever

International cooperation on cholera, plague and yellow fever was facilitated by scientific consensus during the inter-war period, consistent with Cooper's arguments about the pre-war era. Yet, for cholera and yellow fever, this scientific consensus was nearly dead wrong.[23] The conference's committee on cholera had great praise for cholera vaccination. The committee concluded that 'anticholera vaccination is of a certain and well-established efficacy.'[24] One participant added that public health efforts should be based entirely on vaccination, which is 'easy to apply, harmless, and perfectly efficacious.'[25] These beliefs were supported by article 34 of the convention. We now know that cholera vaccination at the time was ineffective.[26] Despite the 1926 proclamation, the search for a vaccine continues today.[27] Meanwhile, the spread of cholera has been sharply curtailed by the provision of clean water and the safe disposal of human waste – neither of which were recommended by OIHP. For yellow fever, the 1926 conference affirmed the identification of a specific bacteria causing yellow fever. We now know yellow fever to be a viral (not bacterial) disease. The false confirmation of a bacterial cause of yellow fever, like the affirmation that vaccination was the primary strategy against cholera, may have undermined control strategies. Yet, this false scientific consensus left cooperation on cholera and yellow fever undisturbed.

Unlike cholera and yellow fever, the conference reached a consensus on the cause and control of plague that was correct. The conference determined that rat control was the key measure, agreeing that 'in the absence of rats a case of bubonic plague on board [a ship] had no

[23] Stern & Markel, 'International efforts to control infectious diseases, 1851 to the present'.
[24] Howard-Jones, 'The scientific background of the International Sanitary Conferences, 1851-1938'. P. 96
[25] Ibid. P. 96
[26] 'Cholera vaccines', Wkly Epidemiol Rec, (2001) vol. 76, no. 16, Apr 20, pp. 117-24.
[27] While an oral cholera vaccine has been created, it is of limited efficacy and, at the time of writing this thesis, it is not recommended for use.

epidemiological significance.'[28] During the interwar period, limiting the threat of plague importation from trading ships originating in Eastern countries was a key objective for OIHP.

Scientific consensus, even when wrong, was important in facilitating interwar cooperation on health. Indeed, while there was much debate on control strategies for cholera, plague and yellow fever before the First World War, there was a relative absence of debate that allowed a false scientific consensus to develop in the interwar period. The fact that cholera and yellow fever were nearly absent in Europe, and relatively easy to control, may have made these misguided approaches tolerable and uncontroversial. In an analysis of how science enters the political formulation of policies, Ezrahi suggests that when state interests converge on a certain policy, then disagreements within the scientific community will be overlooked; whereas when there are divergent state interests, disagreements within the scientific community will be highlighted.[29] The absence of interwar debate on cholera and yellow fever is a case in point. As proposed in the health cooperation thesis in Chapter 2, disagreement among scientists could have disturbed the existing cooperation on cholera, plague and yellow fever.

4.2 NON-COOPERATION ON SMALLPOX AND PANDEMIC INFLUENZA

While historians have devoted attention to the cooperation that was observed in the interwar period, a more revealing story is told by the expected cooperation that was not observed. The decision not to cooperate on smallpox and influenza, at a time when these diseases were spreading and claiming lives throughout Europe, defies the contagion thesis. After the elimination of smallpox in many European states in the 1920s, the risk of contagion would be expected to drive international cooperation on the disease. There was (and is) no treatment for smallpox, and there were high costs to vaccinating the population to prevent a pandemic. As mentioned, pandemic influenza had claimed between 20 and 100 million lives from 1918 to

[28] Howard-Jones, 'The scientific background of the International Sanitary Conferences, 1851-1938'. P. 96
[29] Ezrahi, 'Utopian and pragmatic rationalism: The political context of scientific advice'.

1920, and the pandemic had hit working-aged people especially hard (maximising its economic impact).[30] The contagion thesis cannot explain why cooperation on smallpox and pandemic influenza failed to emerge during the interwar period.

Failing to cooperate on smallpox

A proposal for international smallpox reporting was rejected at a major 1926 meeting. The Japanese proposed, at the 1926 OIHP meeting, that smallpox be brought into the Convention so that international notification of smallpox would be mandated, but the Swiss disagreed. The Swiss representative explained,

> '[smallpox] has, in reality, no place in an international convention. It is not a pestilential disease in the proper sense of the term; it is, in effect, a disease that exists everywhere: There is probably not a single country of which it can be said that there are no cases of smallpox …'[31]

Months after the Swiss representative made this decisive statement, Switzerland eliminated endemic smallpox, preceded by the elimination of endemic disease in many of its European neighbours (see Figure 4.1). [32] In the end, it was agreed that *epidemics* of smallpox (and typhus), would be reported, while countries agreed to report the *first confirmed cases* of cholera, plague or yellow fever. There was no clear definition of what constituted an epidemic, and in turn, no reliable reporting of disease.

Though reporting was not mandated by OIHP, there were three forms of limited international cooperation on smallpox control. Technical assistance was delivered to Greece through the League, reporting was required only in the Far East, and international research was limited to questions about individual (rather than population) health. Greece was the only European country in which a smallpox vaccination program was launched with assistance from an international institution. In 1922, The League of Nations Epidemic Commission was asked by the Greek Ministry of Health to coordinate a mass vaccination campaign against smallpox (in

[30] Murray*, et al.*, 'Estimation of potential global pandemic influenza mortality on the basis of vital registry data from the 1918-20 pandemic: a quantitative analysis'.
[31] Howard-Jones, 'The scientific background of the International Sanitary Conferences, 1851-1938'. p.98
[32] F. Fenner*, et al.*, 'Chapter 8: The incidence and control of smallpox between 1900 and 1958', *Smallpox and its eradication* (Geneva: World Health Organization, 1988).

addition to ineffective vaccination against cholera). However, even though the League implemented the program, there was no semblance of the collective action that characterised the typhus control efforts in Poland. The League's efforts were funded privately by the gift of Fridtjof Nansen's Nobel Peace Prize money.[33] Nonetheless, the League helped to implement a program of mandatory vaccination in Greece, successfully vaccinating 1.7 million persons.[34]

While Japan failed to change global reporting on smallpox, the Japanese representative to the League successfully advocated for the creation of a 'Far-Eastern Bureau' that required reporting of each case of smallpox. The Japanese had pushed for cooperation on epidemiological surveillance since 1921. In advocating for a bureau in the Far-East, the Japanese representative explained that a regional sanitary convention could emerge, and that a regional effort 'would give a concrete proof that [the League's] work was not limited to European affairs, as unfortunately, the peoples of the Far East seemed more and more inclined to suspect.[35]' This call was met with the creation, in 1925, of a Far-eastern Bureau of the League of Nations Health Office, with an office in Singapore. Regional reporting on smallpox was far more regular and detailed in the Far East than it was within the European headquarters of OIHP and the League of Nations. Unlike OIHP, the League's Singapore Bureau required reporting of the first occurrence of smallpox (along with cholera and plague). The Bureau communicated the extent and seriousness of any infection with all countries that may have been in contact by daily cable, and sent weekly updates to all countries in the region (and those in contact with affected countries). The reach of the Far-Eastern Bureau would extend to East Africa and the Middle East. While a formal entity of the League, for the first five years, the Bureau received the

[33] Nansen was a Norwegian who organized famine relief and the repatriation of displaced persons in the Soviet Union, for which he was awarded the 1922 Nobel Peace Prize.
[34] Balinska, 'Assistance and not mere relief: the Epidemic Commission of the League of Nations, 1920 - 1923'. P. 100
[35] League of Nations, 'Provisional Health Committee. Minutes of the meeting of the Fourth Session, Geveva, 14-21 August 1922', (Geneva: 1922); Lenore Manderson, 'Wireless wars in the eastern arena: epidemiological surveillance, disease prevention and the work of the Eastern Bureau of the League of Nations Health Organisation, 1925-1942', in Paul Weindling, ed., *International Health Organisations and Movements, 1918-1939* (Cambridge: Cambridge University Press, 1995).

majority of its funding from the Rockefeller Foundation, which had made epidemiological intelligence a priority.[36]

In health research the League made some efforts. A small research commission established by the League of Nations studied the occurrence of encephalitis (an inflammation in the tissue surrounding the brain) after smallpox vaccination in children. The Commission reported that encephalitis was rare, and was less likely if children were vaccinated before they reached one year of age.[37] However, the League's sponsored research did not extend into questions of population health.

Explaining the failure to cooperate on smallpox

As defined in Chapter 2, a cooperation failure is said to occur on smallpox because there was a clearly demonstrable unrealised benefit.[38] While there were limited efforts to control smallpox in Greece, to mandate reporting in the Far East, and to sponsor research on the effects of vaccination on children, these were small in scale and excluded from the central efforts focused on reporting of cholera, plague and yellow fever. Below, I seek to explain why states failed to control externalities and deliver public goods.

Contagion thesis would expect robust cooperation on smallpox

The eradication of smallpox from Europe during the 1920s and 1930s should have increased the incentives for cooperation on the disease. While a vote was never taken within the committee, the minutes from the 1926 OIHP meeting show that the Swiss rejection of the Japanese proposal to report all cases of smallpox was not a subject of debate among European countries.[39] Before 1920, only a few Northern European countries had eliminated the disease, including Iceland, Norway, Sweden, and Denmark. In the 1920s and 1930s, endemic disease was eliminated

[36] Manderson, 'Wireless wars in the eastern arena: epidemiological surveillance, disease prevention and the work of the Eastern Bureau of the League of Nations Health Organisation, 1925-1942'.
[37] See League of Nations, 'League of Nations Health Organization'. P. 23
[38] Barrett, *Why Cooperate?: The Incentive to Supply Global Public Goods*.
[39] Howard-Jones, 'The scientific background of the International Sanitary Conferences, 1851-1938'.

throughout Europe - with the exception of Portugal (Figure 4.2). At the same time, smallpox was spreading in Asia and Latin America. For the first time, European states were vulnerable to the reintroduction of smallpox. The Netherlands had eradicated smallpox before 1900, though there was a mild resurgence in 1928. In Italy, smallpox was eradicated in 1927, but there was resurgence in 1944, before elimination again in 1947. In Greece, smallpox was eradicated in 1934, but there was a resurgence in 1943, followed by elimination again in 1944.[40]



Figure 4.2 Year in which endemic smallpox eliminated in each country, based on 1982 borders. Dates in parenthesis represent initial elimination of endemic smallpox, followed by a return and the final elimination in the year shown. Image reproduced from Fenner, F., D.A. Henderson, I. Arita, Z. Jezek & I.D. Ladnyi, 'Chapter 8: The incidence and control of smallpox between 1900 and 1958', *Smallpox and its eradication*, *History of International Public Health*, Geneva: World Health Organization, 1988, p. 322

[40] F. Fenner, *et al.*, 'Chapter 7: Developments in vaccination and control between 1900 and 1966', *Smallpox and its eradication* (Geneva: World Health Organization, 1988).

While European states had contagion-related incentives for cooperation, the incentives were greater still for Japan. This may explain Japan's forceful insistence on mandatory reporting of smallpox. Japan introduced mandatory vaccination in 1918 and had strong programs in place to eliminate the disease. Despite these efforts, smallpox was reintroduced from neighbouring countries. The epidemic was at its worst in Asia, where vaccination campaigns were very limited, or in the case of Tibet, completely absent until 1940, resulting in the total depopulation of some areas.[41] Throughout China, vaccination was largely available only to those who could afford it until 1949 (it was not publicly financed). The Indian subcontinent experienced an unrelenting smallpox epidemic that lasted throughout the interwar period and beyond. In 1930, all Indian port cities contained endemic smallpox, resulting in restrictions on Indian shipping. It was not until 1958 that endemic smallpox began to be eradicated in some areas of India. It was amid this poorly-controlled Asian epidemic that Japan's attempts to eliminate the disease were flustered. Notably, Japan's desire for mandatory reporting and greater cooperation on smallpox control were prescient. During the Second World War, Japan experienced a major resurgence of smallpox after vaccination program were disturbed.

In the Americas, as in Africa, smallpox control and monitoring lagged far behind, and so too did the incentives for cooperation. Contagion could not drive international cooperation where smallpox was not controlled domestically. Endemic smallpox was introduced to the United States in 1896 in Florida, and it spread to the rest of the country over the next four years. Endemic smallpox was not eliminated from the United States until 1949, from Canada in 1943 and Mexico in 1951. Endemic smallpox was introduced to Latin America, via the United States in 1910. The disease spread throughout the Americas with major epidemics in the 1940s, and no major eradication efforts until the 1950s.[42] Throughout Africa, smallpox was endemic in the interwar period. There were occasional outbreaks, especially in East Africa owing to trade with India throughout the interwar period, and later in North Africa during the Second World War.

[41] Fenner, *et al.*, 'Chapter 8: The incidence and control of smallpox between 1900 and 1958'.
[42] Ibid.

Based on the contagion thesis we would expect that countries that had eliminated endemic smallpox within their borders would favour international efforts to eliminate the disease. In the interwar period, European states were vulnerable to smallpox re-introduction, and states maintained expensive domestic vaccination programs to mitigate their sensitivity to endemic disease. Furthermore, as Scott Barrett has shown, European and non-European countries had a financial interest in the international control of smallpox, as the annual vaccination costs would far exceed the costs of an international effort.[43] Despite these obvious externalities and economic interests, international cooperation on smallpox would not occur until 1966, 40 years from the meeting at which a proposal on mandatory reporting of confirmed cases was rejected.[44]

Considering that European countries were both sensitive and vulnerable to a reintroduction of smallpox, and that the costs of international cooperation would be less than the costs of continued vaccination, contagion appeared ready to drive cooperation by the 1930s.[45] Yet, within the international health institutions with global reach, smallpox received little attention. So, in the case of smallpox in the interwar period, it appears that there were some unmet conditions for cooperation that explain the relative lack of international efforts. These factors, explored below, may explain international inaction on smallpox, and elucidate the necessary conditions for international cooperation on smallpox.

Leadership from powerful states was absent on smallpox

A lack of leadership from powerful states may explain the absence of cooperation on smallpox. Unlike typhus control, powerful states were not willing to bear the costs of implementing an internationally agreed solution. As suggested in Chapter 2, one possible barrier to cooperation

[43] Barrett, 'The Smallpox Eradication Game'.
[44] Notably, there were some – limited – international smallpox control efforts through colonial relationships. Vaccination programs were launched in the major cities of many European colonies. Between 1920 and 1940, the French distributed 10 million doses of freeze-dried vaccine per year to their colonies. By 1937, the Dutch had eradicated smallpox from the Netherland's East Indies (now Indonesia)[44].
[45] Barrett, *Why Cooperate?: The Incentive to Supply Global Public Goods*.

may be unequal relative gains between cooperating states (Table 2.6). It may have appeared that developing countries would benefit more from the elimination of smallpox than industrialised countries. While the benefits of smallpox control were not quantified during the interwar period, the estimates from the 1960s smallpox campaign are likely to reflect the relative distribution of benefits well, as the epidemiology of the disease did not shift sharply between the two periods. It was projected in the 1960s that developing countries would benefit 1,070 million dollars annually from smallpox eradication, while industrialised countries would benefit 350 million dollars annually.[46] The largest beneficiary would be India, whose share was 722 million dollars annually. In comparison, the United States would enjoy a total annual benefit of 150 million dollars annually. These figures, and the analysis of them by Barrett and others will be revisited in the next chapter.

Institutions are unable to address smallpox control

International institutions were not transformed to allow for the inclusion of smallpox in cooperative arrangements. Smallpox control appears to have been excluded by a 'bounded rationality' within these institutions that limited the 'zone of acceptability' for cooperation (Table 2.4). The OIHP, which rejected calls for mandatory smallpox reporting, had only included cholera, plague and yellow fever in its mandate. The organization's institutional history, and the committee structure organised around these three diseases may have contributed to a reluctance to expand the mandate of the institution to include smallpox. However, the OIHP was not the only institution available for cooperation in health during the interwar period. The League of Nations had expanded cooperation to include typhus, and as we will see, nutrition, standard-setting in medical products, medical education, and to a limited extent, malaria. Yet, cooperation on smallpox was not pursued through the League of Nations globally. The League's efforts were limited to a privately funded vaccination program in Greece, and a Commission investigating encephalitis related to vaccination. Japanese requests for global mandatory

[46] F. Fenner*, et al.*, 'Chapter 31: Lessons and benefits', *Smallpox and its eradication* (Geneva: World Health Organization, 1988). See also, Barrett, *Why Cooperate?: The Incentive to Supply Global Public Goods*. P. 51

reporting of smallpox were met with the creation of a separate Bureau in the Far-East in which reporting could be required and regular.

Another reason for the failure of cooperation on smallpox may be that the international institutions of the interwar period lacked universal membership. The financial benefits of halting national vaccination programs could only be realised with total eradication. Total eradication would require universal participation. While the League of Nations Health Office and OIHP covered the majority of the world's population (80 percent for the League), they stopped short of being complete. No institution for cooperation on health would have universal membership during the interwar period. Barrett notes that, with smallpox, each country had an incentive to play its part 'once assured that all other countries would play their part.[47]' Such an assurance, which would facilitate cooperation, requires an institution with universal reach and membership.

Finally, it may be that the absence of a smallpox crisis made it difficult to alter or create institutions for cooperation on the disease. Theories of institutional choice describe a process that begins with an institutional status quo, which is challenged by a transformational event or trend, then followed by battles to shape cooperation through an existing institution, change an institution, or create an institution.[48] However, there was nothing transformational about a disease that persisted or declined around much of the world during the interwar period. Thus, there was no crisis that empowered the epistemic community to reshape cooperation. Haas describes crises as 'probably necessary' in empowering epistemic communities to shape major change, while Haggard points to the role of crisis in demonstrating the failure of status quo, facilitating learning and changing preferences.[49] [50] However compelling an explanation this is, it is insufficient. While a smallpox crisis would never come, cooperation on smallpox, as

[47] Barrett, *Why Cooperate?: The Incentive to Supply Global Public Goods*. P. 4
[48] Jupille & Snidal, 'The Choice of International Institutions: Cooperation, Alternatives and Strategies'.
[49] Haas, 'Introduction: Epistemic Communities and International Policy Coordination'.
[50] Haggard, 'Interests, Institutions, and Policy Reform'.

described in the next chapter, would become the greatest example of international cooperation and collective action on health.

Knowledge communities lack consensus on control strategy and fail to demonstrate externalities

A lack of consensus within the scientific community on the strategy for controlling smallpox may have delayed cooperation. Richard Cooper, in his analysis described earlier, demonstrates that a lack of scientific consensus delayed international cooperation on cholera and plague for several decades. He notes that in addition to shared objectives, a consensus on 'means-ends relationships,' was critical in allowing cooperation on health to occur.[51] During the interwar period, there was consensus that smallpox was caused by a virus, transmitted from person to person, and that individuals could be protected by vaccination. Yet, there was not consensus on the success of population-level vaccination for eradication efforts, as reflected in the comments from the Swiss representative quoted at the start of this discussion.

The debate on whether smallpox was a 'pestilent disease' or a 'disease that exists everywhere' was fundamentally about the possibility of population-level eradication. This debate was fuelled, and complicated, by differences in the two types of smallpox virus. Variola major is the more severe form of the virus, and killed nearly 30 per cent of persons infected. People infected with this virus were likely to excrete more virus (making them more contagious), and the virus could overcome the immunity conferred by vaccination. Variola minor is less severe, killing 2 to 3 per cent of persons infected.[52] People infected excreted less virus than those infected with variola major, but were more likely to be in contact with many persons as they were not bed-ridden. In populations where vaccination rates were high, variola minor could not spread, and outbreaks were due to variola major – usually brought in by international importation. In populations with strong health services, but without compulsory vaccination

[51] Cooper, 'International Cooperation in Public Health as a Prologue to Macroeconomic Cooperation'.
[52] Fenner, *et al.*, 'Chapter 7: Developments in vaccination and control between 1900 and 1966'.

(the United States), outbreaks of variola major were contained by isolating a case and vaccinating all possible contacts. Meanwhile, these countries could allow variola minor to remain endemic without too much attention. Endemic variola minor also was more difficult to control, resulting in the Swiss view that smallpox was a 'disease that exists everywhere.'[53]

Opposition to international cooperation on smallpox control emerged from national experiences and attitudes to the control of the two types of smallpox virus.[54] A major 1921 outbreak of variola major in the Swiss city of Basle was controlled within months, while it required a 6-year effort to eliminate variola minor from Switzerland.[55] Variola minor was difficult to identify as it sometimes presented with minimal symptoms. Both viruses often existed together in a population, and public health officials were more tolerant of variola minor in countries where both occurred. This tolerance of variola minor made international notification of confirmed cases less urgent. For example, variola major was virtually eliminated from the United States by 1927. Even domestically, an absence of outbreaks of variola major fuelled an anti-vaccinationist sentiment, leading 4 states to make compulsory vaccination illegal, and many others deciding to allow local legislation on vaccination or none at all. Only 10 states in the United States required vaccination in 1928. These vaccination policies contributed to the presence of endemic variola minor in the United States until 1949. Reporting was also less than stringent: it was only in 1944 that mandatory reporting of cases began in the United States.[56] These complacent attitudes towards the domestic control of variola minor could explain the reluctance to join international efforts for vaccination, or to mandate the international reporting of disease. As Mattli and Büthe demonstrate, the national institutional legacies of powerful

[53] Howard-Jones, 'The scientific background of the International Sanitary Conferences, 1851-1938'. p.98
[54] Fenner*, et al.*, 'Chapter 8: The incidence and control of smallpox between 1900 and 1958'.
[55] Ibid.
[56] Notably, the variation in vaccination laws across the United States allowed for a clear demonstration of the benefits of compulsory vaccination. Between 1919 and 1928, states with compulsory vaccination laws had 6.6 cases per 100,000; states with local options for laws had 51.3 cases per 100,000; states with no laws on vaccination had 66.7 cases per 100,000; and those where compulsory vaccination was prohibited had 115.2 cases per 100,000. See Fenner*, et al.*, 'Chapter 8: The incidence and control of smallpox between 1900 and 1958' p 332

states have a powerful, and unanticipated effect on later international standards.[57] The standards in place for declaring an outbreak, and in turn, the requirements for mandating reporting were weak in the United States and some European countries (including Great Britain and Switzerland), contributing to an absence of mandatory international reporting of smallpox cases in the interwar period.

Also contributing to a lack of cooperation on reporting and vaccination was the failure of knowledge communities to demonstrate the international externalities associated with smallpox. Discussion on international smallpox control was not linked to even the most proximal issues relating to the costs of vaccination programs, or the spread of the disease by trade. It was assumed that as the disease was universally present, vaccination would be a perpetual cost and that new epidemics would not emerge from trade. Most importantly, in both OIHP and the League of Nations, the knowledge community did not frame, propose or identify new international regulations. The only serious proposal for regulation emerging in any of the cooperative institutions for health during this period was that put forth by the Japanese for mandatory reporting of all cases.

Furthermore, the lack of knowledge about the success of eradication efforts internationally contributed to inaction on smallpox. States did not know the status of eradication campaigns, or details on eradication efforts in other nations. Global epidemiological knowledge, and communication about successful national eradication, may have facilitated international cooperation. It is noteworthy that the League of Nations may have been placed to provide this global data, as from 1923 to 1925, the League promoted the standardisation of morbidity and mortality statistics, and in 1925 agreed to common rules on the registration of the cause of

[57] W. Mattli & T. Büthe, 'Setting International Standards: Technological Rationality or Primacy of Power?' World Politics, (2003) vol. 56, no. 1, pp. 1-42.

death.[58] Nonetheless, states failed to share knowledge about the success of smallpox eradication campaigns.

Failing to cooperate on pandemic influenza

As surprising as the failure to cooperate on smallpox, was the failure to cooperate on the control of pandemic influenza after the deadly influenza epidemic at the end of the First World War. At the 1926 International Sanitary Conference, the first since the 1918 pandemic, it was decided to take no international action on the control of influenza. The 1918 pandemic was arguably the greatest international health crisis of the 20th century. It is surprising then, that such an overwhelming display of contagion and crisis did not result in the institutional change needed for cooperation on influenza.

The contagion thesis would posit pandemic influenza as an example, par excellence, demonstrating the conditions under which states would be expected to cooperate. The thesis predicts cooperation on diseases that are not universally present, when they pose a viable threat of harming the population, and when there are financial costs to non-cooperation. The 1918 influenza was a new infection that spread internationally to devastate societies. Little could be done to mitigate or counter the effects of the virus, as there was neither treatment nor cure for the ailment. Furthermore, the pandemic was financially costly as deaths were concentrated in young adults, with the greatest concentration of those killed between the ages of 25 and 29.[59] These young persons were the most economically productive segment of society. Perhaps no other disease in the interwar period was associated with such negative international externalities.

[58] League of Nations, 'League of Nations Health Organization'. P. 11

[59] There are many competing explanations for this observation. A leading explanation is that exposure to a related – and less lethal – virus earlier in the century provided immunity to the elder population. This thesis is supported by the observation that in a few countries, this age-related pattern of death did not exist. Another explanation is that the immune response to the virus was lethal, and young and healthy persons were able to mount this robust, and deadly, response.

The League of Nations neither opened substantive discussion, nor undertook any work on the control of pandemic influenza. In 1920, in the wake of the influenza pandemic, the League of Nations convened an urgent international heath conference in London. France, Great Britain, Italy, Japan, and the United States participated.[60] It was at this conference that typhus control in Poland was selected as a priority for action. In addition, this conference recommended the creation of a permanent international health organization of the League.[61] A 1931 report detailing the work of the League's Health Office makes no mention of pandemic influenza, while describing the League's work on a variety of issues. These ranged from the coordination of scientific research and the standardisation of statistics to technical work on malaria and tuberculosis. A review of a 237-page index of all the technical work conducted by the League of Nations from its inception until its dissolution in 1945 reveals no mention of pandemic influenza.[62] The absence of pandemic influenza is especially noteworthy given the breadth of the League's work.

At the 1926 OIHP Conference, it was decided not to cooperate on influenza. The OIHP had put out a questionnaire to all member countries prior to the conference to assess the toll of pandemic influenza.[63] From these questionnaires and other assessments, it was determined that the influenza pandemic had claimed 15 million lives. With this understanding, a new subcommittee on epidemiology (the same subcommittee which rejected the proposal for mandatory reporting of smallpox cases), debated whether and how to bring influenza into the provisions of the convention. While there was 'substantial support' for bringing influenza into the convention, members recognized the 'the impracticability of international quarantine measures against this disease.'[64]

---

[60] Belgium and Brazil were invited but did not attend.
[61] Howard-Jones, 'The scientific background of the International Sanitary Conferences, 1851-1938'. P. 93
[62] 'Bibliography of the technical work of the Health Organization of the League of Nations, 1920-1945', Bulletin of the Health Organization, (1945) no. 11, pp. 1-237.
[63] OIHP, 'Questionnires [sic] on the Influenza pandemic of 1918-1919', in *L'Office International D'Hygiene Publique* (Geneva: World Health Organization Archives, 1920).
[64] Howard-Jones, 'The scientific background of the International Sanitary Conferences, 1851-1938'. P. 97

The dismal 1926 assessment of quarantine was not unfounded. A recent analysis reinforces the idea that quarantine efforts failed on a large scale.[65] Quarantine efforts delayed the spread of the flu in Australia, but did not prevent it. Only American Samoa seems to have been protected by a strict quarantine.[66] The representatives at the 1926 International Sanitary Conference had no tangible proposals for the control of pandemic influenza beyond the failed strategy of quarantine. The earliest International Sanitary Conference was initiated in the mid 19th century because unregulated and unilateral quarantine was inefficient, costing dearly in international trade. With pandemic influenza, if unilateral quarantine measures failed to prevent the spread of disease, there seemed to be no scope for international cooperation to improve the efficiency or efficacy of the strategy. The scientific community could not put forth an alternative policy or strategy.

Explaining the failure to cooperate on pandemic influenza

Countries throughout the world were sensitive and vulnerable to the new and costly threat of pandemic influenza. It seemed that this disease would be ripe for cooperation. It is surprising that pandemic influenza was not mentioned in the League of Nations. Meanwhile, the OIHP decided to take no cooperative action, rejecting even the inclusion of influenza as a reportable disease. Even if existing institutions did not address pandemic influenza, theories related to epistemic communities and institutional choice would predict that this dramatic crisis would empower scientists to change or create institutions.[67] Given the strong contagious drivers for cooperation, it appears that for pandemic influenza there were, like with smallpox, some unmet preconditions that may explain the lack of international cooperation.

---

[65] Murray*, et al.*, 'Estimation of potential global pandemic influenza mortality on the basis of vital registry data from the 1918-20 pandemic: a quantitative analysis'.
[66] Ibid.
[67] Jupille & Snidal, 'The Choice of International Institutions: Cooperation, Alternatives and Strategies'.; Haas, 'Epistemic Communities and the Dynamics of International Environmental Co-operation'.

Contagion does not drive cooperation

One reason for an absence of cooperation on pandemic influenza may be the asymmetrical interdependence created by the virus, where poor populations were more threatened than rich populations.[68] This asymmetry existed for two reasons. First, there was a false perception that the 'Spanish Flu' was originating in Europe and spreading to the rest of the world.[69] Second, the disease caused a greater relative increase in deaths in poorer, non-European communities. The excess mortality attributable to the 1918 influenza has been recently calculated for populations across the globe. Excess mortality is a calculation of the percentage of the population that died because of the influenza virus. In Denmark, excess mortality was 0.2% while in India it was 4.4%.[70] Within India, there was a large variation in pandemic mortality, ranging from 2.1% in the region that is now Bhutan, to 7.8% in the poorest areas. Thus, there is a 39-fold variation between flu deaths in Denmark and the poorest parts of India. The perceived trajectory of spread from Europe to the rest of the world, and the higher mortality in poor populations, created an asymmetric interdependence that may have hindered cooperation.

The idea that asymmetrical interdependence may hinder cooperation stems from the 'relative gains' arguments of realists, discussed in Chapters 1 and 2. With the perceived origin of the epidemic in Europe, and the death toll greatest outside of Europe, cooperation would provide greater relative gains to non-European countries. Neoliberal institutionalists have responded that relative gains are likely only to matter on positional goods, like status.[71] Influenza prevention is not a positional good. More importantly, the analysis on which the relative gains arguments are founded are based on states of comparable wealth or stature in competition with one

[68] Keohane & Nye, *Power and interdependence*.
[69] While the 1918 influenza is referred to as the 'Spanish Flu,' scientists now believe the 1918 influenza virus is likely to have originated in Southeast Asia. Price-Smith suggests that the influenza was termed 'Spanish Flu' because Spain, neutral in World War I, was the only European country not to censor reports of the disease. See Price-Smith, *Contagion and Chaos: Disease, Ecology, and National Security in the Era of Globalization*.
[70] Murray*, et al.*, 'Estimation of potential global pandemic influenza mortality on the basis of vital registry data from the 1918-20 pandemic: a quantitative analysis'.
[71] Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy*. P. 54

another. If France were to object to cooperation on pandemic influenza because of a concern for relative gains, it would more plausibly do so because of the gains of Germany than India.

Concerns about unequal relative gains from cooperation on influenza are unsubstantiated among competing powers. Andrew Price-Smith has demonstrated, based on an assessment of German military health records, that the pandemic influenza hit Germany and Austria before reaching the Allied Powers, compromising their strategic positions in the War.[72] However, the total excess mortality due to pandemic influenza showed no significant difference between the Central and Allied Powers (Table 1). In turn, there would not be major differences in relative gains from cooperative measures to prevent influenza among the competing powers. Thus, the explanations based on self-interest do not provide a convincing explanation for the failure to cooperate on pandemic influenza.

	Country	Excess Mortality[73]
Central	Germany	0.76
	Austria	1.61
	Hungary	NA
	Turkey	NA
	Bulgaria	NA
Allied	Britain	0.34
	France	0.75
	Italy	1.38
	United States	0.39
	Russia	NA
British Dominions	India	4.39
	Canada	0.63
	Australia	0.29
	New Zealand	0.63

Table 4.3 1918-1920 Pandemic influenza excess mortality by First World War alliance.
P Source: Murray, C. J. L., A. D. Lopez, B. Chin, D. Feehan & K. H. Hill, 'Estimation of potential global pandemic influenza mortality on the basis of vital registry data from the 1918–20 pandemic: a quantitative analysis', *Lancet*, (2006) vol. 368, no. 9554, pp. 2211-18.

Knowledge

The leading reason for an absence of cooperation on pandemic influenza was the lack of a technology or strategy for stopping the spread of pandemic influenza. The scientific community

[72] Price-Smith, *Contagion and Chaos: Disease, Ecology, and National Security in the Era of Globalization*.
[73] Exess mortality data from, Murray, *et al.*, 'Estimation of potential global pandemic influenza mortality on the basis of vital registry data from the 1918-20 pandemic: a quantitative analysis'.

was unable to come up with any reasonable policy alternatives to the failed strategy of unilateral quarantine. We can again ask Haas's questions about how well the epistemic community was able to explain cause and effect, demonstrate issue-interlinkage, and frame, propose and identify regulations.[74] Regarding the science of the disease, the virology of influenza was not well understood. As late as 1944, concepts of 'soil theory' (a belief that disease originates in soil) were still being supported by German representatives.[75] These beliefs did not find resonance at the International Sanitary Conference, but a sophisticated scientific understanding of influenza was absent. There was however, a consensus that the public health strategy of quarantine had failed; this consensus is supported by analysis at the time, and validated by modern assessments. More importantly, knowledge communities did not link influenza to national security or financial well-being. Finally, and most critically, there were no policy alternatives proposed by scientists meeting to discuss the international response to pandemic influenza. Mandatory reporting could be used to activate quarantines when necessary, but if quarantine were ineffective, such agreements on reporting would provide little practical benefit.[76] The absence of policy alternatives left a critical pre-condition for cooperation unmet.

4.3 INTERNATIONAL COOPERATION ON STANDARDS SETTING

Beginning in 1921, the League of Nations facilitated the development of international standards on biological products, including standardised units for immunological serums, diagnostic tests, and hormones and vitamins to be used therapeutically.[77] After the economic crisis of 1929, concerns about under-nutrition in Europe led the League to broaden its efforts in standards

[74] Haas, 'Introduction: Epistemic Communities and International Policy Coordination'.
[75] Howard-Jones, 'The scientific background of the International Sanitary Conferences, 1851-1938'.
[76] Even with the inclusion of pandemic influenza into the coverage of the successor to the International Sanitary Conventions in 2005, the practical utility of mandatory reporting continues to be questioned, as discussed in Chapter 6.
[77] Another institution for international standards on biological products also existed during the interwar period: The Inter-Governmental Conference on Biological Standardization. As noted by McCoy, this group only met once, and 'adopted, without appreciable modification, the standards established by the [League of Nations Health Office's] Permanent Standards Commission.' See G. W. McCoy, 'International Standardization of Biological Products by the League of Nations', American Journal of Public Health, (1936) vol. 26, Dec 1936, pp. 1215 - 18.

setting to include minimal dietary requirements and measures of social deprivation. These standards were not agreed upon to prevent the spread of contagious disease. Instead, the creation of international standards led to cooperation on a range of different diseases, from diabetes to malnutrition and hormonal disorders. Appendix 4B contains a listing of all international biological standards adopted during the interwar period. The contagion thesis fails to predict cooperation on international standards for biological products during the interwar period. The emergence of these standards challenges explanations of standards setting in international relations, and elucidates some of the drivers for international cooperation on health.

Explaining international cooperation on standards-setting

In their analysis of the emergence of international standards, Mattli and Büthe note that until the 1980s, standards setting was a domestic matter, as 'each country produced its own standards without much regard for what others were doing.'[78] They acknowledge a few earlier standards, like the thickness of credit cards, but posit that technological changes and rapid economic integration since the 1980s gave rise to international standards setting. As shown here, wide-reaching internationals standards on biological products often preceded domestic standards, and they preceded international standards in other sectors by half a century. [79]

Contagion

War and travel created a demand for international standards on biological products. The First World War threatened to disrupt access to the standard for diphtheria antitoxin, which was kept in Frankfurt. Were it not for a subsidiary standard in Washington, the head of the London's National Institute for Medical Research worried that most of the world would have lacked

[78] Mattli & Büthe, 'Setting International Standards: Technological Rationality or Primacy of Power?'
[79] The only four biological products in use during the interwar period and during the Second World War for which international standards did not exist were hyaluronidase, d-Tubocurarine chloride, dimercaprol, and Joint Canadian-British oxophenarsine. These products were newly developed during this period, and were not standardised in Britain until 1948-1950. For a listing of the British Biological Standards, see A. A. Miles, 'Biological standards and the measurement of therapeutic activity', British medical bulletin, (1951) vol. 7, no. 4, pp. 283-91. P. 286

access to the standard, causing 'confusion and discrepancy between the units used in different countries.'[80] The director of the State Serum Institute at Copenhagen, noted that the lack of international standards on biological products had caused many wartime deaths. He wrote,

> 'many deaths could have been averted if the sera used during the war had been assayed in relation to a single standard. Doctors would not have been betrayed by the unitage given on foreign ampoules into injecting quantities of serum which they had good reason to regard as sufficient, but which were in fact inadequate, since the assay had been effected in terms of a unit of lesser potency than that to which they were accustomed.[81]'

The need for standards stemmed from the fact that biological products could be imported from abroad, or that these products might need to be used abroad by soldiers and travellers. Explaining the need for standards on the recently discovered treatment for diabetes, insulin, the leader of an institute responsible for setting international standards commented, 'the travelling victim of diabetes had a poor prospect, indeed, of obtaining the immense benefits of this new treatment with safety and regularity, as he wandered from one country to another.'[82] The lack of standards could result in a person taking a dose that was either inadequate or toxic. The lack of international standards for biological products began to threaten the lives of soldiers and travellers and created dangers in using imported products. While cooperation did not rise to stop the spread of disease, the negative international externalities associated with a lack of regulation on biological products threatened lives. These externalities partially explain the early emergence of international standards on biological products.

Competition among powerful actors, and private industry, drives standards-setting

Powerful states, including those recently at war, shared an interest in setting standards on biological products. States sought to model international standards to favour their domestic industries, attempting to make their benefits from cooperation higher than their costs. It is perhaps a testimony to these interests that a meeting and agreement on international standards on biological products occurred so soon after the war. The 1921 meeting convened by the

---

[80] Henry Dale, 'Biological Standardisation', in *Address at Annual General Meeting, National Institutes for Medical Research* (London: 1939). P. 559
[81] T. Madsen, 'The Scientific Work of the Health Organization of the League of Nations', Bulletin of the New York Academy of Medicine, (1937) August. P. 455-456
[82] Dale, 'Biological Standardisation'.

League of Nations Health Organisation in London to discuss standards was the 'first occasion for the meeting, in friendly discussion, with the express object of practical agreement on a scientific matter, of experts from the different countries so recently at war.'[83] The immediacy of action on international standards demonstrated the interest states took in this issue.

The interest of powerful states in standard setting has been explained by the observation that the state to shape international standards has 'first mover advantage' while others pay the costs of switching standards.[84] Put simply, since standards create winners and losers, states seek to promote their own domestic standards in an international forum so they can be among the winners. One testimony to these interests is that the United States was extensively involved in discussions on standards in the League of Nations, even though it was not a member. The Director of the U.S. National Institutes of Health explained the American involvement,

> 'The question naturally arises as to how the United States came to participate in the League of Nations Conferences on Standardization while not a member of the League. The answer is that our State Department was equal to the task of deciding promptly when the matter was presented to it […][85]'

He went on to explain in 1936 that 'standards originating in America have fared very well with the international commission.'[86] As shown below, the United States sought to convince members of the League of Nations to adopt American standards on tetanus anti-toxin. In addition, the US succeeded in promoting its standards for arsphenamine (a drug used to treat syphilis), pneumoccocus serum (used to treat pneumonia) and perfingins antitoxin (used to treat gangrene).[87]

The process of creating standards was often fraught with discord, as countries sought to promote their own domestic standards. At the 1922 meeting on standards setting, a heated debate took place on the creation of an international standard for tetanus antitoxin. This meeting pitted the 'old' German unit against the American unit. The two units enjoyed roughly

---

[83] Ibid. P. 560
[84] Mattli & Büthe, 'Setting International Standards: Technological Rationality or Primacy of Power?'
[85] McCoy, 'International Standardization of Biological Products by the League of Nations'. P. 1215
[86] Ibid.
[87] Ibid.

equal global use at the time of the meeting. The German unit was about 66 times the size of the American unit, and many regarded the unit as inconveniently large. During negotiations – which lasted nearly six years – the German authorities adopted a new unit, which was approximately half of an American unit. The League adopted the new German unit, despite protests from the American representative.[88] The Director of London's National Institute for Medical Research, called this a 'gratuitous' change, lamenting the intrusion of such political considerations into a technical process.[89] A 1934 letter from Sir Henry Dale, who was Director of National Institutes for Medical Research in London (one of two major collaborating centres for the League), to the UK Minister of Health stated some of the frustrations in the process of standards setting. He wrote, 'Germany is out [it left the League in 1933]; France never had the slightest intention of co-operating; America has been aloof and suspicious of anything except straightforward adoption of American units and practice.[90]' These episodes of contestation had discouraged many of the technocrats that saw standards-setting as a laboratory-based scientific process.

Contestation in standards setting was, however, more limited than might be expected since international standards on biological products often came before domestic standards. The 'first-mover advantage' requires a pre-existing national standard (formal or informal) in order to have any salience. Most of the hormones and vitamins being standardised were just being discovered during the interwar period. They had not made their way out of the laboratory before scientists conferred to create an international standard. For example, animal insulin was first discovered to be a potential therapy for diabetes by scientists in Canada in 1921. One of the scientists who made this discovery gave an emotional interview explaining his distress that the earliest supplies of insulin had to be used for the creation of a standard, rather than for the treatment of

[88] Ibid. P. 1216
[89] Dale, 'Biological Standardisation'. p. 560
[90] A. F. Bristow, T. Barrowcliffe & D. R. Bangham, 'Standardization of biological medicines: the first hundred years, 1900–2000', Notes and Records of the Royal Society, (2006) vol. 60, Sept 8, pp. 271-89.

patients.[91] The discovering scientists recognised that if insulin were not standardised, it would not be safe to use. Too much insulin would put patients in a stupor, and insufficient doses would not control the effects of diabetes. Since there were no national standards in most circumstances (and no institutions for their creation), scientists proceeded directly to the creation of an international standard through the League of Nations. For example, in London, only in 1927 was the National Institute for Medical Research given responsibility for preparing and providing domestic standards, six years after the League had begun to do so.[92] Scientists discovering a biological product appealed directly to an international institution, usually without an intermediary national institution.

Where powerful states had uncertain or unfavourable cost-benefit calculations associated with cooperation on standards setting, a powerful private actor was able to bear the costs. The Rockefeller Foundation contributed approximately 2 million dollars to the LNHO from 1922 to 1934 through Rockefeller's International Health Board and Medical Sciences Division.[93] The Foundation financed the salaries of 15 of 42 of the League's technical officers.[94] Rockefeller funding was used to develop public health elites around the world, and to support standards setting initiatives. Having eschewed the idea of funding efforts to relieve famine or health crisis in the aftermath of the War, the Foundation saw the 'building up of public health elites' as the key to advancing 'the health of the people of all lands.'[95]

Powerful actors had an interest in promoting their domestic standards at the League of Nations because of the economic benefits to their industries, the avoidance of adjustment costs, and the prestige it brought to their scientific communities. These interests often made the benefits of cooperation exceed the costs for the most powerful actors. For states that did not promote their

[91] David Hockley, Jane Robinson & Roland Gleck, 'Biological Standards: measureing the potency of biological medicine', Biologist, (2004) vol. 51, no. 3.
[92] Dale, 'Biological Standardisation'. P. 565
[93] P. Weindling, 'Philanthropy and World Health: The Rockefeller Foundation and the League of Nations Health Organisation', Minerva, (1997) vol. 35, no. 3, pp. 269-81. P 272
[94] Ibid.
[95] Ibid. P. 271.

own domestic standards, they often had few costs associated with cooperation since international standards preceded domestic standards, industrial production, and trade for most biological products.

Institutions give legitimacy to cooperation on standards

The League of Nations Health Office was able to drive cooperation on standards-setting, in part, because of its broad membership. The greatest testament to this is the participation of states in the Health Office that were not members of the League of Nations, and the participation of states before or after their membership in the League of Nations. As mentioned, the United States, which never joined the League, participated fully in the League of Nations Health Office throughout its existence. Germany had participated in the League's Health Office since 1921, five years before Germany joined the League of Nations. Similarly, Russia had participated in the League's Health meetings since 1926, eight years before joining the League.[96] The fact that representatives were appointed on a personal (rather than representative) basis facilitated Soviet cooperation with the Health Office. Japan participated in the League's Health Office until 1939, six years after withdrawing from the League. Even after terminating its involvement with the League Health Committee, Japan continued to provide epidemiologic information to the League Health Office's Far Eastern Bureau.[97] What made participation in the League possible without formal membership was the financial support of the Rockefeller Foundation. However, leaders at the Rockefeller Foundation worried that they were undermining the League's governance – based on state membership and dues – by providing over a quarter of the overall budget for the Heath Office, leading them to terminate funding in 1934.

The institutional mandate, independence and autonomy of League of Nations Health Office, run by scientists and bureaucrats, helped to drive cooperation away from contagion. The League's focus on international standards setting may be due in part to the to fact that the League had

[96] Allen, 'World Health and World Politics'.
[97] Ibid.

been explicitly barred from facilitating cooperation on the 'classic triad' of cholera, plague and smallpox. At the 1926 OIHP meeting, while the group did agree to share epidemiological intelligence with the League, they added an article to the agreement excluding the League from any involvement in the International Sanitary Convention that governed the 'classic triad.'[98] In addition, the League's standards setting work was facilitated by two affiliated research centres that supported its work. The State Serum Institute in Copenhagen was responsible for work on all immunological serums and antitoxins (used to fight infectious diseases), while the National Institute for Medical Research in London was responsible for hormones and vitamins (this would be a much larger portfolio). Countries were willing to give authority to the League, sometimes at the cost of their own autonomy on standards setting, because of the perceived neutrality and scientific excellence of the League's efforts.

CONCLUSIONS

In examining variation in cooperation during the interwar period, three trends stand out. First, cooperation persisted on diseases – like cholera and yellow fever – that no longer pose any real threat to European countries. Second, states failed to cooperate on pandemic influenza and smallpox – two infectious diseases that demonstrate the risks of international contagion exceptionally well. And third, international standards were agreed to for biological products that remedy and prevent a wide range of, largely, non-contagious diseases. Each of these trends seems to violate the contagion thesis.

Nonetheless, contagion has been shown to drive some cooperation on health in the interwar period. In particular, cooperation on typhus control was driven by a concern about importing the disease through migration after the First World War. To some, typhus was seen as a threat to the political viability of socialism. The control of typhus was loaded with international

[98] Article 7 of the 1926 International Sanitary Convention effectively prohibited the League from addressing topics addressed by the Convention. For more, see Howard-Jones, 'International Public Health Between the Two World wars - The Organizational Problems'. P. 61

externalities, and states cooperated to minimise these negative externalities. Similarly, less obvious externalities shaped interest in cooperation on standards setting on biological products, as the sale and use of products internationally could be harmful. The most striking observation about contagion's explanatory role is that during the interwar period, contagion appears to explain cooperation in the form of international financing, as only typhus control received substantial funding. As demonstrated in the Chapter 7, this finding is inconsistent with that in later time periods, where contagion does not appear to explain international financing.

In looking at the drivers of cooperation beyond contagion, the leadership of powerful actors, international institutions, and knowledge communities each played an important role. Powerful actors, making their own cost-benefit calculations decided to finance cooperation on typhus, as described above. But, they also participated in cooperation on international standards setting as they realised that the benefits of participation (especially early participation) would exceed the adjustment costs of new international standards, so long as they could promote their own domestic standards. Notably, in place of a powerful state to provide some of the funding where cost-benefit calculations on standards were less favourable, the Rockefeller Foundation provided core financing to facilitate standards setting that preceded domestic standards and industries.

In the inter-war period, powerful actors also obstructed cooperation, driven by concerns about relative gains. The limited evidence shows that asymmetry in the benefits of cooperation, a classic 'relative gains' argument of Realists, may have hindered cooperation on both smallpox and pandemic influenza. Even though all states would benefit from smallpox and pandemic influenza control, poor states would benefit most. Where new cooperation did emerge, on typhus, neighbouring countries were asked to make financial contributions based on their proximity, and in turn their relative benefit from control. With few exceptions, new cooperation on international standards benefited all equally, as these international standards largely preceded the creation of national standards and industries. Notably, some of the concerns about relative

gains may have been partially overcome by international institutions, which through their independence and information-sharing, may have decreased asymmetry and facilitated cooperation on health.

International institutions drove cooperation beyond contagion as their broad membership and legitimacy allowed cooperation that would not have occurred without that forum (including cooperation on standard-setting). In addition, the permanence of institutional rules allowed some cooperation, like that on cholera, plague and yellow fever, to persist despite diminishing contagious threats. Institutions are not, however, divorced from contagion. In the interwar period, contagion contributed to creating international institutions. In particular, the League of Nations Health Office was created to respond to the typhus epidemic in Poland. However, once created, the League's Health Office was used for purposes its founders would not have imagined: it facilitated cooperation on standards for nutritional requirements and biological products.

Institutions may have also obstructed cooperation in the interwar period. Even though the threat of contagion was high, and states had shared interests that favoured cooperating on smallpox, smallpox cooperation was outside of the 'zone of acceptability' for international institutions. In addition, the permanence of institutional rules on cooperation on the 'classic triad' of cholera, plague and yellow fever, inhibited the expansion of cooperation to other contagious threats. Thus, institutions also explain the absence of some cooperation that would have been expected by contagion.

Knowledge communities were key drivers of international cooperation in the interwar period, often acting in synergy with international institutions. The development of new technologies, including the capacity to produce anti-toxin serums for a variety of infectious diseases, and the discovery of the therapeutic uses of insulin and other hormones, created new international externalities. Knowledge communities, with the support of the League of Nations and the

Rockefeller Foundation, successfully communicated these externalities, allowing them to alter the cost-benefit calculations of states to favour international cooperation. In addition, knowledge communities facilitated cooperation by developing a consensus on strategies for controlling the externalities associated with typhus in Poland (the idea of a 'sanitary zone' was conceived by scientists). Knowledge communities also maintained an entirely incorrect consensus on how to address cholera and yellow fever, allowing cooperation to persist despite the misguided strategy.

At other times, knowledge communities inhibited international cooperation during the interwar period. The absence of consensus on approaches to controlling smallpox delayed cooperation. Similarly, the absence of suitable alternatives to failed quarantine policies prevented cooperation on pandemic influenza. Further, knowledge communities failed to capitalise on the crisis generated by pandemic influenza to call for greater monitoring and reporting of infectious disease.

This assessment of cooperation on health during the interwar period has yielded some insights into the drivers and conditions for international cooperation on health. Many of these insights have challenged the contagion thesis. By comparing the trends in cooperation on health during the interwar period, to the trends observed subsequently, we will be better able to explain variations in international cooperation on health.

Chapter 5: 1948-1976 – International Cooperation to Eradicate Malaria and Smallpox

International cooperation on health after the Second World War was characterised by international campaigns focused on specific diseases and the creation of new forums for international cooperation. Increasingly, foreign aid to improve health was seen as a strategy to support stable governments, create or affirm cold war alliances, assert colonial claims, and reap the economic benefits of having healthier neighbours. During this period, campaigns were launched to eradicate malaria and smallpox, gaining unprecedented levels of international financing. These campaigns both targeted contagious diseases that posed the risk of spreading internationally. As measured by the contagion index, smallpox posed a much greater threat than malaria. This chapter seeks to explain why cooperation on smallpox failed to emerge until 1967, and to explain the drivers of international cooperation on smallpox and malaria that extend beyond contagion. Rational self-interests may explain some of the regional focus of international cooperation on health during the period following the Second World War, but they offer – at best – an incomplete explanation of variations in cooperation between disease areas.

The period after the Second World War saw the development of institutions for cooperation on the global economy, the development of the United Nations System, and a sharp increase in foreign aid. It has been argued that this new zeal for foreign aid was a product of Cold War hostilities and the competition for influence in the Third World. These arguments hold that the Cold War was necessary 'to generate the domestic political support in the donor countries necessary to sustain foreign assistance for more than four decades.'[1] Aid from OECD countries doubled between the first five years of the 1950s, and the latter five years of that decade. Annual OECD aid for the second half of the 1950s was approximately 43 billion in 2008 dollars

[1] K Griffin, 'Foreign aid after the Cold War', in Stuart Corbridge, ed., *Development: Critical Concepts in the Social Sciences* (London: Routledge, 2000). p. 204

(for comparison, in 2008 annual OECD aid was approximately 120 billion dollars).[2] Global foreign aid continued to increase steadily throughout the Cold War.[3]

Throughout the Cold War, the United States used development assistance for health to support stable governments, establish Cold War alliances, and strengthen the position of the United States military. A 1952 report from the public health division of the American Economic Co-operation Administration mission to Cambodia, Laos and Vietnam stated the goals of aid in promoting international stability, 'these programmes are not only contributing to the welfare of the countries in which they operate, but, through their effect in bolstering the economic and health standards of the participating nations, are aiding in the establishment of stable governments.'[4] President Kennedy's 'Alliance for Progress' would continue to use the foreign aid to foster policy reforms. The strategic importance of international health is reflected in the observation that in 1976, the United States Department of Defense funded 23.4 per cent of all US-sponsored international health research. Some health issues, like malaria, received almost all of their funding from the Department of Defence.[5]

United States engagement in international health after the Second World War was also driven by the expansion of American business. During the war, penicillin was first used widely and a chemical, DDT, was found to be effective in killing the mosquitoes that transmit malaria. These discoveries helped a new medical industry emerge after the War. This industry would produce the products that became central to efforts against disease, altering the incentives for international cooperation in the process. U.S. firms exported 865.5 million dollars worth of

---

[2] Ibid. See also OECD, *Development aid at its highest level ever in 2008* (2008 [cited 20 November 2009]); available from http://www.oecd.org/document/35/0,3343,en_2649_34487_42458595_1_1_1_1,00.html.

[3] S Radelet, 'A primer on foreign aid', Center for Global Development Working Paper, (2006) no. 92, July. P. 4

[4] E Braff and W Winklestein, 'Field Treatment of Trachoma in North Vietnam,' Public Health Reports, Vol 67, No 12, December 1952, p 1233, as cited in H. Cleaver, 'Political Economy of Malaria De-Control', Economic and Political Weekly, (1976) vol. 11, no. 36, September, pp. 1463-73. P. 1467

[5] The remaining funds were allocated almost evenly between USAID and the Department of Health, Education and Welfare. The White House, 'New Directions in International Health Cooperation: A Report to The President', ed. Peter G. Bourne (Washington DC: 1978). P. 145

pharmaceutical products and medical supplies in 1963. Exports expanded quickly to 3940.2 million by 1974.[6] Low and middle-income countries accounted for about one-third of US exports of medicine and medical supplies in 1976.[7] The growth of the market for medical products gave US firms a keen interest in international health. At a 1950 gathering of industry leaders at the Harvard School of Public Health, Fred Soper, the leader of the Pan American Sanitary Bureau, highlighted the benefits for businesses in promoting improved health abroad, 'It is good business for industrial concerns working abroad to foment in every way possible the development of local, national and international health services.'[8] The United States made efforts to employ American business in the fight against communism and disease.

Strategic and economic interests during the Cold War could explain some of the geographic focus for cooperation. Indeed, this chapter shows that major cooperative initiatives, like the Malaria Eradication Campaign, largely excluded Africa, focusing instead on Europe, the Middle East, and the Americas. It might be expected that the geographic focus could, in turn, explain some of the variations in cooperation between disease areas, the central question of this thesis. However, as I show in the analysis of cases in this chapter, an interest-based account alone is incomplete. The end of the Second World War and the Cold War also saw the development of new institutions for cooperation on health, and new knowledge and technical consensus about health interventions. This chapter will examine the role that these institutions and knowledge communities may play in explaining the observed variations in cooperation.

Major developments in international health institutions

At the end of the Second World War, there was no clear focal institution for cooperation on health. The OIHP and the Pan American Sanitary Organization continued to act as regional organizations for cooperation in Europe and the America's respectively. The League of Nations

[6] Ibid. P. 134
[7] Ibid. p. 131. Data from Bureau of International Economic Policy and Research, Domestic and International Business Administration, United States Department of Commerce
[8] Fred Soper, 'History and Present Problems', Industrial and Tropical Health, Vol 1, 1950, p 95 as quoted in Cleaver, 'Political Economy of Malaria De-Control'. P. 1472

Health Office had effectively dissolved with the League of Nations. WHO was not the unquestioned leader in international health at the end of the war. UNICEF, which had inherited the budget of the United Nations Refugee Relief Agency, was a rival to WHO, seeking to implement health programs, while WHO was limited to coordinating programs. However, with major campaigns against malaria and smallpox from the 1950s to the 1970s, WHO emerged as a focal institution in international health.

The cooperation observed on health in the period examined here differed at least as sharply from the stated goals of the World Health Organization as it did from the contagion thesis. WHO's 1946 constitution states that the goal of the organisation is 'the attainment by all peoples of the highest possible level of health.'[9] WHO was initially created as a coordinating agency that would promote cooperation, based on concepts of justice and equality, to all nations. However, as has been chronicled by others, the agency's early work was focused on aggressive campaigns targeting a few specific diseases.[10]

WHO's founders did not intend for the organisation to be focused on targeted disease campaigns. WHO's constitution defines health as 'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.'[11] This definition drastically expanded – at least in rhetoric – the scope of cooperation in health, to include social well-being. The first WHO Director General noted in a 1951 essay, 'health is defined in much wider terms than ever before and WHO given responsibilities never before laid on an international health agency.'[12] In fact, WHO's founding documents call for international action on health that exceeded many national programs, including that of the United States. As the editor of the American Journal of Public Health wrote in 1951, 'the inclusion of mental hygiene, nutrition, housing, accident prevention, and medical care represents a sound and constructive

[9] WHO, 'Constitution of the World Health Organization', (1946).
[10] Kelley Lee, *The World Health Organization (WHO)* (New York and Abingdon: Routledge, 2009).
[11] WHO, 'Constitution of the World Health Organization'.
[12] B. Chisholm, ' The role of WHO, past, present, and future', American journal of public health and the nation's health, (1951) vol. 41, no. 12, Dec, pp. 1460-3.

vision of the public health of the future which is substantially in advance of the actual practice of most health departments of the United States.'[13] The WHO founding principles and rhetoric were based on the understanding that 'the key barriers to health were political and social, not technical.'[14] WHO's founding documents called for work that was well beyond the scope, in both geography and disease, of previous arrangements for cooperation on health.

The incongruence between WHO's broad and idealistic constitution and WHO's narrow operations may be due, in part, to the need for the organization to appeal to the interests powerful states. Unlike the previous institutions for international cooperation on health, which had been created by Italy, France, the United States, and Great Britain – all powerful states, the creation of the World Health Organisation was championed in 1945 by Brazil and China at the United Nations Conference in San Francisco.[15] While many developing and emerging countries helped to draft the constitution in 1946, delays in ratification by powerful states meant that the organisation did not begin its work until September 1948. During this two-year period, an 'Interim Commission' operated, seeking explicit and quick demonstrations of the benefits of cooperation to promote ratification of the charter in key nations. Seeking a quick demonstration of its utility, WHO's activities began to resemble those inherited from regional and infectious disease focused organizations.[16]

Contagion and the interests of powerful states appear to have driven the ratification of the WHO constitution, and shaped WHO's early work. A cholera outbreak from September 1947 to February 1948 led to a surge in ratifying countries.[17] WHO, seeking the support of the United States, was pressed to demonstrate its value and utility, thereby adopting focused programs with quickly anticipated results, shaping priorities in alignment with interests in the United States.

---

[13] C. E. Winslow, 'International health. l. Introductory remarks', American journal of public health and the nation's health, (1951) vol. 41, no. 12, Dec 1, pp. 1455-9. P. 1457
[14] Chisholm, ' The role of WHO, past, present, and future'.
[15] Jacobson, 'WHO: Medicine, Regionalism, and Managed Politics'.
[16] C. S. Ascher, 'Current Problems in the World Health Organization's Program', International Organization, (1952) Jan 1.
[17] Lee, *The World Health Organization (WHO)*. P. 15

This parallels trends in the creation of many of the cooperative institutions emerging after the Second World War, heavily influenced by United States preferences.[18] Writing in 1950, Ascher notes the incentives to pursue focused programming: 'Statesmen of health believed further that these 'impact' programs were necessary to gain ratification of WHO's constitution by parliaments – in particular, the Congress of the United States.'[19] Ascher continues to describe the Interim Commission's success in quickly stopping a cholera epidemic in Egypt, 'by transoceanic telephone WHO summoned United States Army plans from Asia and Soviet planes from Moscow with life-saving return.'[20] Notably, this action was impossible for the United States to undertake alone, thus acting through the Organisation allowed collaboration with the Soviet Union. The rapid success of targeted campaigns against infectious diseases further contributed to this focus. WHO's earliest campaign was to contain yaws, and with a simple dose of penicillin, the organisation enjoyed spectacular success improving lives of millions in Africa and the Caribbean. This 'magic bullet' approach would shape subsequent campaigns targeting tuberculosis, malaria, smallpox and polio with varying degrees of success.

The forms of cooperation, like the priorities for cooperation, were shaped during the period of the Interim Commission, by the most powerful states. The United States stipulated that the World Health Organization would not provide medical supplies, but would instead focus on advisory assistance.[21] A disease-focused organizational structure was adopted from the United States Public Health Service. Under pressure from the American Medical Association, the United States delegates expressed resistance to the provision of supplies and advice on the health insurance systems, citing concern that such activities may lead to 'socialised medicine.'[22] [23] The US had asked that all matters of health insurance be left to the International Labour Organization. In compromise, it was agreed that WHO could only provide analysis, and could not offer assistance on plans to pay for health services. The US desire to limit the activities of

[18] Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy*.
[19] Ascher, 'Current Problems in the World Health Organization's Program'. p. 29
[20] Ibid. p. 29
[21] Jacobson, 'WHO: Medicine, Regionalism, and Managed Politics'.
[22] Ibid.
[23] Allen, 'World Health and World Politics'.

WHO to disease surveillance stemmed in part from a desire to protect the independence of the Pan American Health Organization, based in Washington DC and managed largely by the United States.[24] With guarantees that WHO would not provide advice on health insurance, and with the addition of clauses allowing the United States to withdraw from the Organization and excluding the United States from enacting any specific legislation emerging from WHO, the United States ratified the WHO constitution in 1948. The American concerns reflected a broader Cold War tension between biomedicine (USA), focused on infectious diseases, and social medicine (USSR), focused on the social determinants of health.

Major variations in cooperation, 1948-1976

The goals of WHO's broad charter, including social well-being, mental health and other non-contagious disease, bear little resemblance to the observed cooperation from 1948 to 1976, which focused on malaria and smallpox. The Malaria Eradication Programme, launched in 1955 and terminated in 1969 was, in its time, the greatest cooperative undertaking in international health ever. The international efforts on malaria, coordinated by WHO and largely paid for by the United States, cost approximately 880 million dollars over the course of the campaign (over 6 billion in 2008 dollars) (Appendix 5B). According to my calculations, international financing covered over half of the total expenditure for malaria eradication from 1957 to 1967 (880 of 1,339 million dollars). This finding is reinforced by a study of malaria financing, from 1955 to 1986, which found that international funding provided about 44% of the costs of malaria control and eradication efforts.[25] As malaria eradication efforts slowed, smallpox eradication efforts were born (see Appendix 5B for annual budgets for malaria and smallpox eradication). WHO's Intensified Smallpox Eradication campaign was launched in 1967. Endemic smallpox was eliminated by 1976, and the last case was detected and contained in 1977. The total cost of smallpox eradication, including national expenditure, was approximately 300 million dollars (1.6 billion in 2008 dollars); international financing covered

[24] Lee, *The World Health Organization (WHO)*. P. 14

[25] Anne Mills, Yoel Lubell & Kara Hanson, 'Malaria eradication: the economic, financial and institutional challenge', Malar J, (2008) vol. 7 Suppl 1, Jan 1, p. S11. Note that after the MEP terminated, the international contributions to malaria control slowed.

one-third of the total costs[26]. The efforts to eradicate malaria and smallpox defined international cooperation on health from 1948 to 1976 (See Figures 5.3 and 5.4).

There are two early deviations from the focus on malaria and smallpox that are worthy of attention. Immediately after the war, UNICEF inherited 40 million dollars in funding from the United Nations Refugee Relief Agency to improve nutrition in war-affected countries.[27] And, in 1948, UNICEF with its Scandinavian Partners provided 4 million dollars in an attempt to prevent the spread of tuberculosis in Europe (2 million) and the rest of the world (2 million).[28] Notably, the tuberculosis efforts centred entirely on the provision of a vaccine that was later found not to be effective in preventing the spread of disease.[29] These were single grants, and, at the time, these were the most generously funded international cooperative efforts on health (Figure 5.2). While work on nutrition and tuberculosis continued at a low level, the commitments to these diseases were eclipsed by the cooperative efforts that emerged on malaria and smallpox.

[26] Levine, 'Eradicating Smallpox'.
[27] J Gillespie, 'International organizations and the problem of child health, 1945-1960', Dynamis, (2003) Dec 31.
[28] Niels Brimnes, 'BCG vaccination and WHO's global strategy for tuberculosis control 1948-1983', Soc Sci Med, (2008) vol. 67, no. 5, Aug 31, pp. 863-73.
[29] Even after evidence demonstrating the BCG vaccine was not effective in preventing TB, use of the vaccine continued. As Brimmes notes, BCG is a story of 'medical uncertainty, institutional inertia' and 'strategic obduracy.' See Brimnes. 'BCF vaccination and WHO's global strategy for tuberculosis control 1948-1983'.

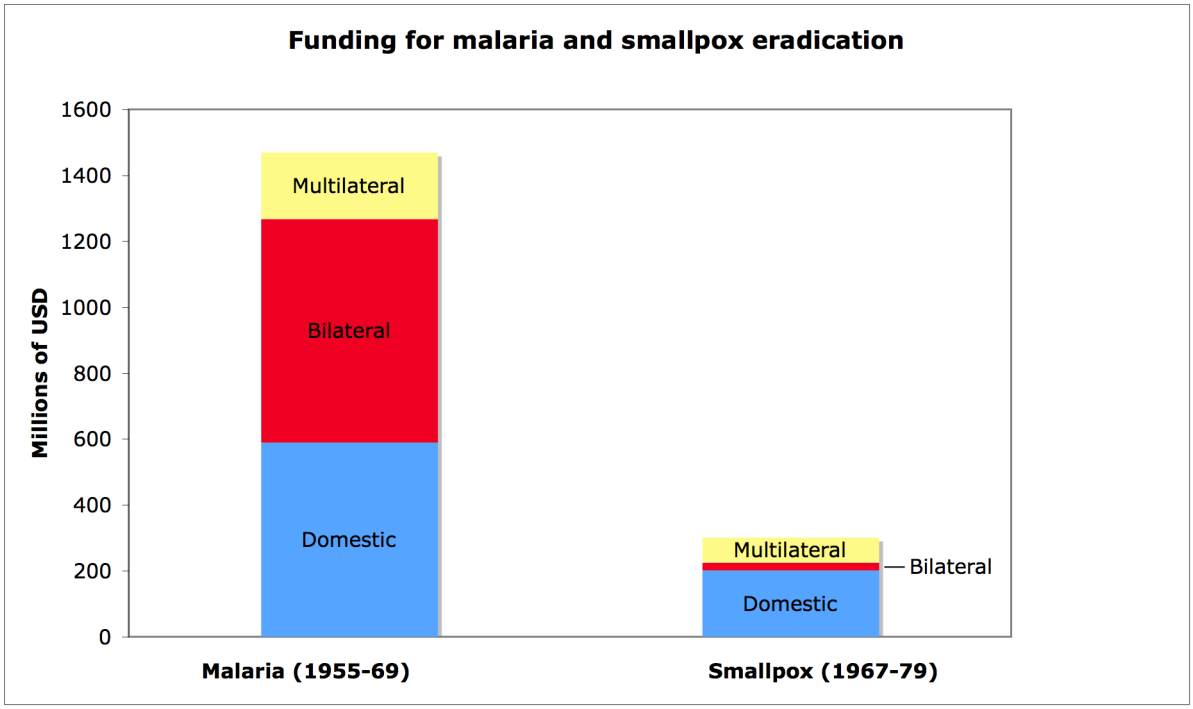


Figure 5.1 Funding for malaria and smallpox eradication campaigns. For source data see Appendix 5B.

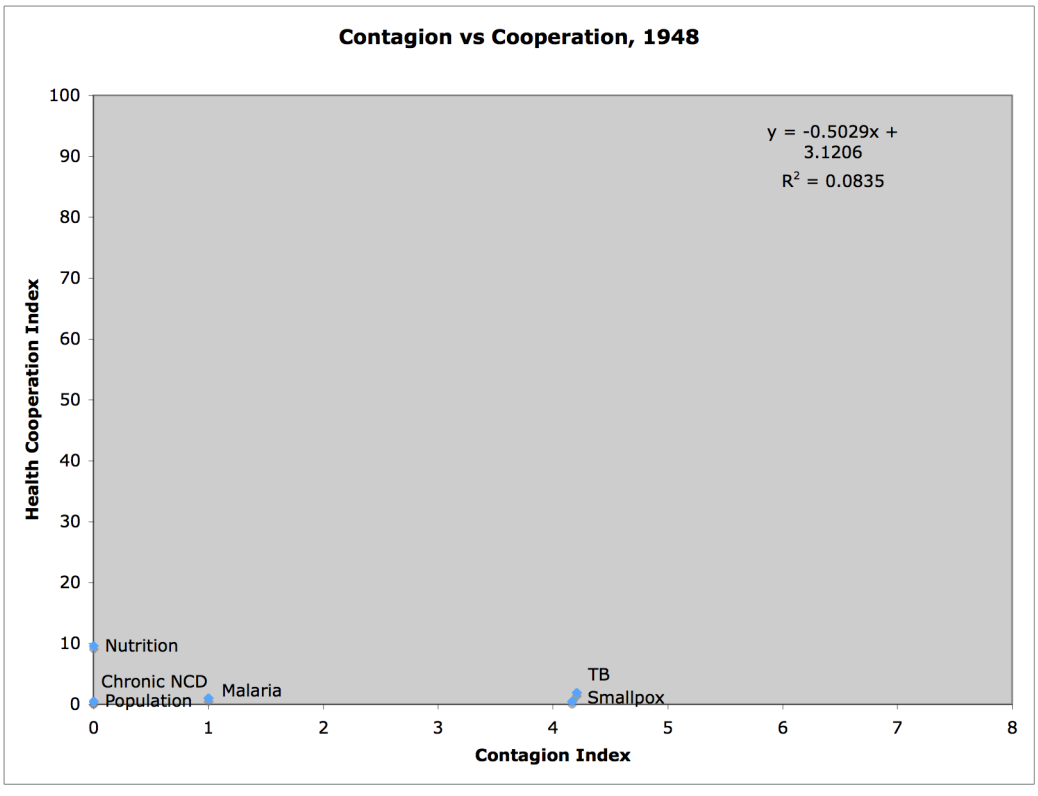


Figure 5.2 Contagion versus Cooperation, 1948

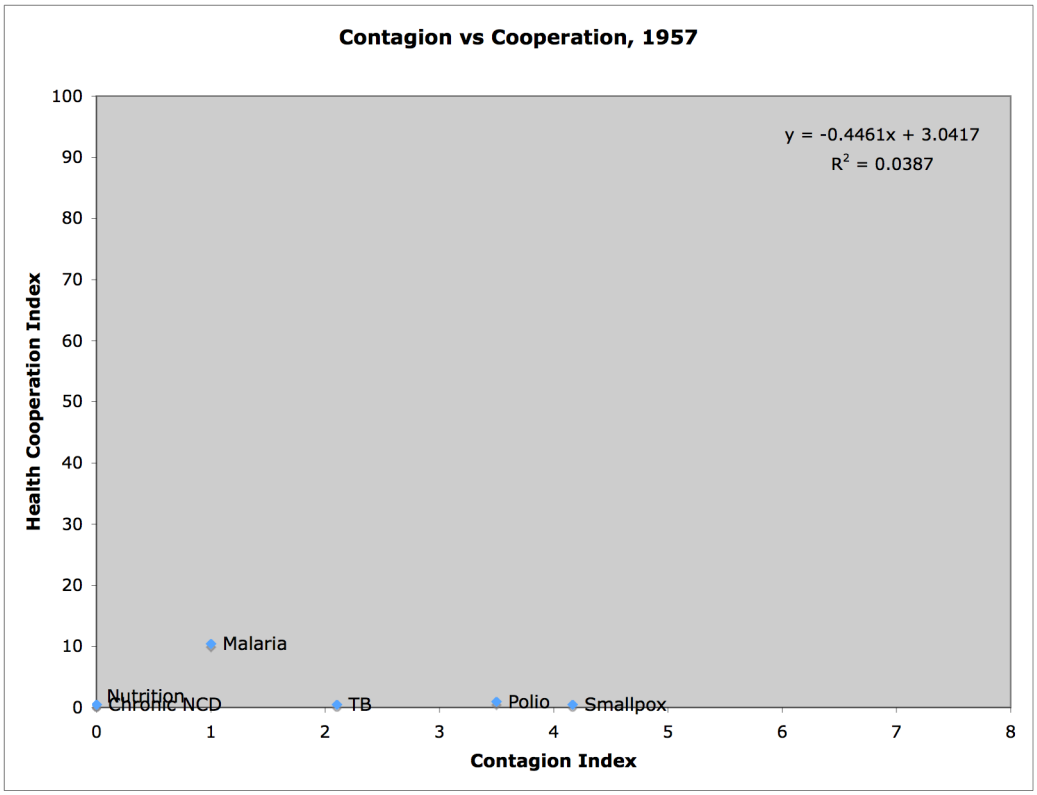


Figure 5.3 Contagion versus Cooperation, 1957

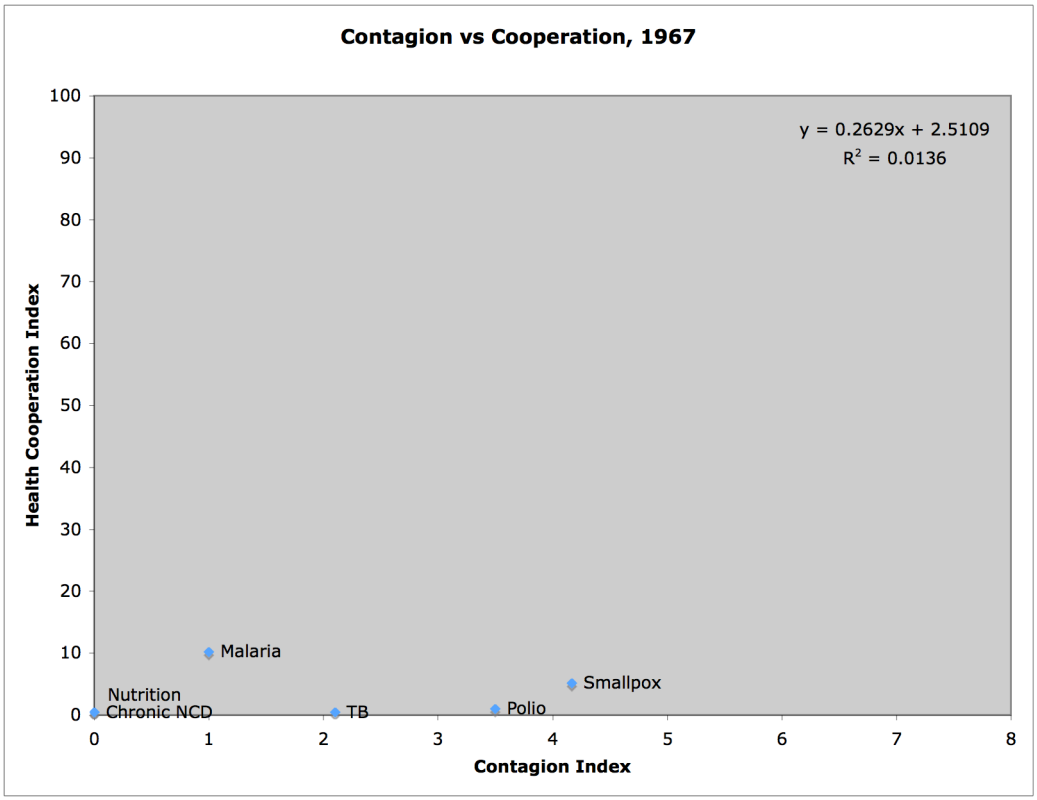


Figure 5.4 Contagion versus Cooperation, 1967

As we can see from the figures above, there are some cases in which contagion and cooperation were sharply disconnected from 1948 to 1976. The two largest international cooperative efforts

during this time period were the malaria and smallpox eradication campaigns. Addressing both of these public health problems is consistent with the contagion thesis. However, the termination of the malaria eradication campaign in the late 1960s, and the delay in international cooperation on smallpox cannot – at first glance – be explained by the contagion thesis.

The variation in cooperation, favouring malaria and smallpox from 1948 to 1967, reflects a focus of international financing and regulation on these infectious diseases (see Appendix 5A and 5B). In contrast, international research and surveillance was more inclusive of a wider range of diseases. While mental health, maternal health, diarrhoeal disease and tuberculosis received very little international financing, they composed a substantial portion of internationally sponsored research (Table 5.1 and Table 5.2). The scale of this research is not included in the contagion index due to a lack of comparable data for the time periods examined. However, it is clear that from 1948 to 1966, WHO sponsored research reached well beyond contagion.

Disease	**Number of WHO Projects, 1958-67** [30]
Chronic NCD	45
Influenza 1968 (seasonal)	<10
Malaria	504 [31]
Mental Health	80
Nutritional deficiency	87
Plague	0
Polio	0
Smallpox	59
TB	132
Tobacco	<10
Yellow Fever	156

Table 5.1 WHO Projects by disease area, 1958 to 1967 (Note that figures from 1948 to 1958 are not available)

[30] Data collected from WHO, *The Second Ten Years of the World Health Organization*. P. 361
[31] These figure include environmental health (315 projects), which consisted almost entirely of vector control projects

Disease	1948-56 WHO fellowships (per cent)[32]	1957-66 WHO fellowships (per cent)[33]
Chronic NCD	30 (.40)	83 (.47)
Diarrhoeal Dz[34]	498 (7.79)	1245 (7.16)
Influenza	NA	NA
Malaria	318 (4.97)	1362 (7.83)
Maternal and perinatal conditions	601 (9.39)	892 (5.13)
Mental Health	361 (5.64)	533 (3.06)
Nutrition	132 (2.06)	281 (1.62)
Polio	NA	NA
Smallpox	NA	NA
TB	487 (7.61)	591 (3.40)
Yellow Fever	NA	NA

Table 5.2 WHO research fellowships by disease area. Fellowships were given by WHO to sponsor research on diseases throughout the world. This is a partial listing of fellowships, including those that fit disease-specific categories. 6396 total fellowships were awarded from 1948-1956, and 17396 fellowships were awarded from 1957-1066.

5.1 COOPERATION ON MALARIA

Unlike viruses, which spread from person to person, without regard to climate or geography, malaria spreads through mosquitoes, and depends highly on local environments. In turn, endemic malaria could be controlled at the national level, with DDT spraying that involved minimal recurring cost and effort. DDT is a pesticide that reliably killed – and even eradicated – mosquitoes with bi-annual spraying. DDT put mosquito control, and malaria eradication, within reach for many countries, even acting unilaterally.[35] Preventing an imported smallpox epidemic would require continued vaccination of the entire population, and smallpox eradication would require the extinction of the virus. In contrast, malaria eradication could effectively be achieved by eradicating the mosquito vector (rather than the disease). While there was no treatment for smallpox, treatments did exist for malaria during this time period, though access to treatments was costly and access to the East Asian sources of quinine needed to create these treatments was threatened. Mainly because of these differences in disease prevention and treatment, malaria posed less international threat (and thus had a lower

[32] Data collected from WHO, *The First Ten Years of the World Health Organization* (Geneva: World Health Organization, 1958). P. 517
[33] Data collected from WHO, *The Second Ten Years of the World Health Organization*. P. 362
[34] Figures here represent the fellowships given for sanitation
[35] The decision to pursue a strategy of mosquito control (with DDT), rather than a strategy of treatment with anti-malarials had an economic rationale. Treatment would have higher costs as the population became less dense since it required the creation of health services. On the other hand, DDT costs remained stable regardless of population density.

contagion index) than smallpox (Appendix A and Figures 5.2-5.4). Nonetheless, the Malaria Eradication Programme was a central focus of international cooperation on health from 1955 to 1969.

The scale of the Malaria Eradication Programme was unprecedented in international cooperation on health. Experts had estimated that between 1.34 billion (US Government estimates) and 1.806 billion (WHO estimates) dollars would be needed for eradication. Given the 1.4 billion dollars invested (over half from international sources), almost all funding was ultimately provided (Appendix 5B). The international efforts, financed primarily by the United States Government, UNICEF and WHO, succeeded in eliminating malaria from 35 countries, 16 of which received direct WHO assistance (Table 5.3).[36]

Yet, the Malaria Eradication Programme was neither global in scope, nor did it enjoy universal support. The campaign excluded Africa, the continent most burdened by malaria. The Malaria Eradication Programme came to a stop in 1969, amid rising costs and controversy about the use of the pesticide, DDT, the central weapon of the campaign. International cooperation on malaria slowed, and by 1976, international funding for malaria was at 42% of 1966 levels (and at 20% of 1966 levels accounting for depreciation).[37] The analysis that follows, on the start and stop of the Malaria Eradication Programme, demonstrates that contagion and interests alone provide an incomplete explanation for cooperation on malaria.

Cooperation on Malaria: The Story of the Malaria Eradication Programme

International cooperation on malaria predates the Malaria Eradication Programme. The League of Nations had made malaria control a key priority, though cooperative efforts were hindered by scientific disagreement among the two possible strategies: the treatment of affected persons with anti-malarials and efforts to kill anopheline mosquitos (and the larva from which they

[36] WHO, *The Second Ten Years of the World Health Organization*. p. 165
[37] Siddiqi, *World health and world politics : the World Health Organization and the UN system*. P. 181-182

emerge) which carry the disease. Despite this disagreement, the League took a number of measures to facilitate international cooperation on malaria from 1924 to 1932, many in the domain of health research and surveillance. The League sponsored investigation of epidemics and control strategies, development of new methods for reducing costs of treatment, training of physicians, engineers and agriculturalists on strategies to reduce malaria, technical advice to governments on campaigning against malaria, and scientific research on anti-larval measures. The Interim Commission, which existed from 1946-1948 while WHO's plans and constitution awaited approval from member states, identified malaria as a priority. The Commission led investigations on the use of DDT for the control of malaria.

From its infancy, WHO began leading global cooperation on malaria. By 1953, WHO declared the goal of 'eliminating malaria from the world as a public health problem.'[38] The qualifier, 'as a public health problem,' distinguishes a strategy of malaria control from malaria eradication.[39] With malaria eradication, the endpoint was not the elimination of malaria as a public health problem, but rather 'the ending of the transmission of malaria and the elimination of the reservoir of infective cases in a campaign limited in time.'[40] Thus, WHO had first endorsed malaria control, a much less ambitious goal than eradication. The next year, 1954, the Pan-American Sanitary Council (PASC) passed a resolution calling for states to, 'join efforts with the international organizations to face the enormous task of eradicating malaria from this hemisphere.'[41] One year later, WHO passed a resolution calling for governments to replace control programmes with eradication campaigns. The 1955 resolution read, 'the World Health Organization should take the initiative, provide technical advice, and encourage research and co-ordination of resources in the implementation of a programme having as its ultimate

[38] Ibid. P. 176
[39] WHO defined malaria control as the reduction of the disease until it is no longer a major public health problem' (178, History 10)
[40] WHO, *The First Ten Years of the World Health Organization*. P. 177 See also WHO (1963) *Terminology of malaria and of malaria eradication*
[41] Siddiqi, *World health and world politics : the World Health Organization and the UN system*.

objective the world-wide eradication of malaria.'[42] The resolution authorised the Director-General to obtain financial contributions and establish a Malaria Eradication Special Account. With this resolution, the WHO Malaria Eradication Programme was launched.[43]

The Malaria Eradication Programme (MEP) celebrated early success in fundraising and in eradicating the disease. The MEP consumed one-third of the WHO regular budget during the years of its operation, and employed 391 professionals by 1967.[44] No other disease until HIV/AIDS would dominate the organization with this magnitude. As noted at the start of this chapter, the United States government, UNICEF and WHO put previously unparalleled financial resources into the eradication effort, with the best estimates placing the total figure at over 800 million dollars in the 1950s and 1960s. By 1963, 22.6 per cent of populations living with malaria were in regions that had successfully eradicated the disease; 48.6 per cent of previously malarias regions were covered by eradication programs (Table 5.3).[45] By 1966, a WHO Expert Committee on Malaria noted that 60% of populations in originally malarious areas were 'living in areas where malaria had been eradicated or was no longer a major public health problem.'[46]

However, the MEP's success in eradication was achieved and maintained only in Europe and the Americas. In Europe, malaria had been prevalent in 19 countries; by 1967, it had been eradicated from 13 countries, and by the end of the decade, it had disappeared from continental Europe.[47] WHO records show that the only three countries nominally included in the European

---

[42] WHO, 'Handbook of Resolutions and Decisions of the World Health Assembly and the Executive Board, Volume 1: 1948-1972', (Geneva: WHO, 1973).
[43] While WHO led the initiative, it did so in coordination with UNICEF and USAID. These groups coordinated malaria programmes through the Joint Committee on Health Policy, meeting in 1959, 1961, 1963 and 1967 to formulate a policy of assistance. See WHO, *The Second Ten Years of the World Health Organization*. P. 170
[44] Lee, *The World Health Organization (WHO)*. see also WHO, *The Second Ten Years of the World Health Organization*. P. 163. Note that Lee reports that the MEP employed 500 persons, while the WHO documents show that the program employed a high of 391 people in 1967.
[45] Siddiqi, *World health and world politics : the World Health Organization and the UN system*. P. 155
[46] WHO, *The Second Ten Years of the World Health Organization*. P. 160. See also WHO Technical Report Series 1967, #357
[47] Ibid. p. 167

region where malaria remained in 1967 were Turkey, Algeria and Morocco. All three of these countries continued to have WHO supported malaria eradication programs even as momentum and funding for the MEP halted. Similarly, the Americas received a larger portion of funding and enjoyed greater success in malaria control than Africa, Asia or the Eastern Mediterranean. 43 per cent of international financial assistance for malaria was distributed to the Americas, leading 42 per cent of the originally malarious areas of the Americas to achieve eradication.[48] In contrast, in Africa, no countries claimed malaria eradication, and only 2 of 44 malarious countries had eradication programmes supported by WHO. In South-East Asia, no countries claimed eradication, while in the Eastern Mediterranean 4 of 23 countries claimed eradication (Table 5.3). To put this regional disequilibrium in another perspective, two-thirds of the countries claiming eradication of malaria were in Europe and the Americas, and none were in Africa or Southeast Asia.

Region	Originally malarious	WHO Official Register as eradicated	Eradication claimed, but not registered	Eradication Programmes assisted by WHO	Eradication Programmes not assisted by WHO	With other WHO assisted anti-malarial project	No anti-malarial project
Africa	44	0	0	2	3	12	27
Americas	35	6	7	21	1	0	0
South-East Asia	8	0	0	7	0	1	0
Europe	19	5	8	1	3	2	0
Eastern-Mediterranean	23	1	3	9	0	3	7
Western Pacific	19	1	4	5	2	4	3
Total	148	13	22	45	9	22	37

Table 5.3: 'Programme Status of Countries with Originally Malarious Areas, By Region, at 31 December 1967' Adopted from (176, History 2)

[48] Siddiqi, *World health and world politics : the World Health Organization and the UN system*. P. 183

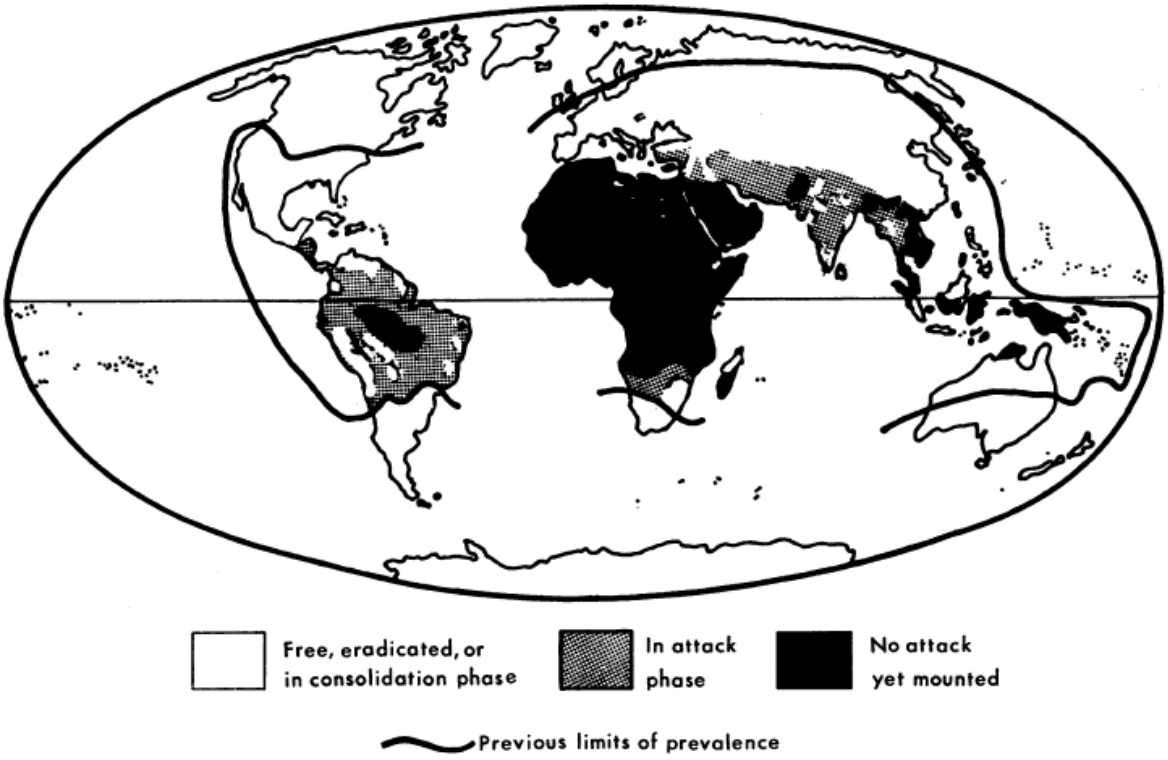


Figure 5.4. Progress of malaria eradication through 1963. Figure adopted from MacDonald, George, 'Eradication of Malaria', *Public Health Reports*, (1965) vol. 80, no. 10, October, p 875

While eradication was not achieved outside of Europe and the Americas, South Asia saw dramatic, though temporary, improvements in areas that had malaria eradication programs. In South Asia, the global annual direct mortality from malaria had fallen from 2.5 million, before the MEP, to less than one million by 1968. The Indian sub-continent saw the greatest fall in the incidence of the disease. In India, the annual number of new cases fell from 750,000 in the 1950s to 1,500 by 1967. Eradication programs in India were supported largely by the government, costing 380 million dollars in national financing during the campaign. However, the gains from these investments would be short-lived. By 1969, India had 349,000 new cases, and 4.2 million by 1957.[49] Similarly, Pakistan had only 9,500 new cases in 1968, and then leaped to 10 million in 1974. These dramatic increases in the incidence of malaria were attributed to the termination of DDT spraying programs, and also to the development of resistance to DDT in mosquitoes in some areas. By the 1980s, malaria also became the leading

[49] Ibid.p. 157

cause of death among children under age 5, responsible for 25 percent of their deaths.[50] Eradication programmes had stopped, pesticide spraying had greatly slowed, and while malaria was a scourge for Asia and Africa, Europe and the Americas continued to enjoy the benefits of malaria eradication.

In 1969, WHO abandoned the strategy of malaria eradication, and began advising member-states on control programmes instead. With the termination of the eradication programme, international funding fell precipitously. There is some disagreement as to why international cooperation on malaria came to a halt. Kelley Lee has argued that in the 1970s, malaria funding fell 'corresponding with an increase in drug prices and shipping costs.'[51] This is a widely accepted position.[52] A 1967 WHO resolution suggested that a key obstacle in obtaining funding for malaria was the lack of precise information on the socio-economic effects of the disease.[53] The contagion thesis expects that if malaria no longer posed a threat of spreading to powerful non-malarious countries, the incentives for cooperation would diminish. Does the elimination, from Europe and much of the Americas, of malaria and the mosquito that carries it, explain the demise of global cooperation on malaria? That is, could the success of the program, rather than its shortcomings or rising costs, explain its termination?

Explaining international cooperation on malaria

International cooperation on malaria eradication enjoyed great success and political support in Europe and the Americas from 1955 to 1969. How can we explain the start, the geographic focus, and the termination of international cooperation on malaria eradication? In this section, I assess the drivers and barriers to international cooperation identified in Chapter 2 with reference to the malaria eradication programme. The rational interests embedded in contagion and leadership were the key drivers of malaria eradication, and may explain the geographic focus of

[50] R. W. Snow, *et al.*, 'Estimating mortality, morbidity and disability due to malaria among Africa's non-pregnant population.' Bull World Health Org, (1999) vol. 77, pp. 624-40.
[51] Lee, *The World Health Organization (WHO)*. P. 49
[52] Siddiqi, *World health and world politics : the World Health Organization and the UN system*.
[53] WHO, Committee on Programme and Budget, 20th World Health Assembly (1967) (See Indian J. Pediatrics 34: 267, 1967)

the cooperative efforts. However, these explanations do not fully explain cooperation, nor do they explain the termination of the malaria eradication efforts. Perhaps most critically, the cost-benefit calculations for leading actors shifted during the course of the campaign. This was largely driven by a shift in cost-benefit calculations after the reduction of disease in Europe and the Americas, and by a shift in knowledge (not always scientific) about emerging resistance to DDT and the environmental impact of the pesticide. Knowledge played a central role in driving, then obstructing cooperation on malaria, while international institutions have little explanatory power for either the start or stop of the malaria eradication efforts.

Contagion drives early cooperation on malaria

It was recognized in the 1950s that international cooperation was necessary to control the spread of malaria. The observation that the presence or absence of anopheline mosquitoes alone did not predict malarial prevalence demonstrated that malaria could neither be controlled with national action alone, nor was it confined to being a disease of tropical climates. For example, there was no malaria in the Pacific Islands, because there were no anopholines mosquitoes there. Parts of England and other areas in continental Europe, had anopheline mosquitos, but no malaria.[54] A WHO history states, 'the growth of international air traffic favours accidental dissemination of anophelines, a problem demanding vigilance.'[55] So, while there is little concern for the spread of malaria to continental Europe or the United States today, such concerns were very real at the time of the initiation of the MEP.[56] It should be noted that in the present era, malaria is seen as a potential future risk to Europe and the Southern United States that may develop with global warming.[57] In 1955, mosquito populations in Europe meant that malaria was a true threat.

WHO made the logic of the contagion thesis explicit in the initial proposals for the Malaria Eradication Programme. WHO estimated a cost of 600 million dollars for first five years of the

[54] WHO, *The Second Ten Years of the World Health Organization*.
[55] Ibid. P. 173
[56] Notably, some analysts have suggested that with global warming, malaria could indeed be introduced into these non-tropical regions as there would be an expected surge in the populations of anopheline mosquitoes.
[57] Martens*, et al.*, 'Potential impact of global climate change on malaria risk.'

MEP, predicting that after 1962, costs would diminish annually and the financial burden shared more widely as 'it would be in the interest of countries freed from malaria to help others to achieve eradication.'[58] The contagion thesis posits that cooperation will emerge on diseases that are not universally present, when they pose a viable threat of harming the population or when cooperation produces demonstrated financial benefit. The proposals put forth by WHO shows that the organization, and the technocrats involved in modelling and costing the programme, expected those countries no longer afflicted by malaria to drive cooperation.

The threat that access to quinine – the key drug in the treatment of malaria – would be disrupted after the Second World War created incentives for cooperation on malaria control. In the contagion index, the severity of disease is mitigated by treatment; losing access to this drug would heighten the contagious threat posed by malaria. The Japanese occupation of the Dutch Indies during the Second World War meant that the major source of quinine was lost to the Allies.[59] It should be noted that in the 1930s, the United States was by far the largest importer of quinine, even though its malarial burden was very low.[60] The loss of access to quinine, and the phenomenon of 'military malaria' among returning soldiers created an incentive for the United States and European nations to cooperate on malaria.

While treatment of malaria was threatened, a new tool – DDT – was developed that could be used in the prevention of malaria. However, experts expected that this tool could only be used for a few years before it became ineffective. In the contagion index, the epidemic potential is mitigated by the availability of prevention tools; losing this prevention tool would heighten the contagious threat posed by malaria. DDT put the prevention of malaria within reach of many

[58] Siddiqi, *World health and world politics : the World Health Organization and the UN system*. p. 148
[59] Ibid. P. 129. See also Fred Soper, 'General Principles of the Eradication Programmes in the Western Hemisphere', Journal of the National Malaria Society, (1951) vol. 10, p. p.185.Soper (1951) General Principles, p. 185 and Fred L. Soper, 'Some aspects of the WHO's programs in the Americas', American journal of public health and the nation's health, (1951) vol. 41, no. 12, pp. 1464-8.
[60] According to WHO records from 1930, the United States, imported 163,288 kg of quinine in 1930. The United States imported several times more quinine than the next largest importers: Greece (12,400 kg), Turkey (6,600 kg), Ceylon (6,100 kg), Syria and Lebanon (5,800 kg), and Italy (4,500 kg). See League of Nations, 'League of Nations Health Organization Malaria Commission', (Geneva: League of Nations Health Organisation, 1932).

countries. If the new technology alone would not drive cooperation, the realisation that the benefits of this technology could be short-lived did drive international cooperation. At a 1956 conference on malaria in Athens, discussions focused on the concern that anopheline mosquitoes were developing resistance to DDT. By 1958, 4 of 60 known mosquito types were DDT resistant. Scientists projected that DDT would be ineffective in five to ten years.[61] The limited time to make use of this potentially powerful weapon created an incentive to pursue an aggressive campaign.

Another aspect of contagion, the economic burden of disease and the financial benefits of cooperation, would further drive cooperation on malaria. Malaria disables many, compromises the workforce, yet kills few of the persons it infects (almost all deaths occurring in children). There were potential economic benefits to cooperation on malaria control, recognized in the 1950s. WHO reported that in 120 out of 210 countries and territories in 1955, malaria hindered economic development.[62] The high economic burden of malaria was not due to mortality alone, even though it was a leading killer of children. Rather, as early WHO documents reported, 'the importance of malaria consists mainly in the chronic invalidism it produces.'[63] Persons afflicted with malaria became non-productive dependents, and this was perceived to exact a high price on economic progress. WHO's early statements on malaria's role in hindering economic development were recently substantiated by John Gallup and Jeff Sachs' finding that from 1965 to 1990, countries with intensive malaria grew 1.3 per cent less per person per year.[64] They noted that a 10 per cent reduction in malaria is associated with 0.3 per cent higher growth. The economic growth that could be achieved through malaria eradication could have created international economic benefits.

---

[61] See WHO, *A plea for health*, p. 10. And Siddiqi, *World health and world politics : the World Health Organization and the UN system*.
[62] Ibid. P. 147, see also WHO (1966), 'proposed study for the socio-economic evaluation of malaria eradication programmes.' ME/68.6
[63] WHO, *The First Ten Years of the World Health Organization*.p 172
[64] Gallup & Sachs, 'The economic burden of malaria'.

The initial cost-benefit calculations showed malaria eradication to be a good investment; however the historical record shows a mixed picture. For India, a 10-year campaign for malaria eradication was initially costed at 12 times the annual cost of control, which would need to continue indefinitely.[65] Allowing for discounting and population growth, the per capita costs of control and eradication were modelled to be the same over the short-term. Historically, it appears that there was, in fact, little economic benefit for countries that achieved the near-eradication of malaria. A recent macro-economic analysis of the attempts at malaria eradication in the 1950s and 1960s shows that the near eradication of malaria from Sri Lanka was accompanied by positive economic impact in the first decade, followed by population growth which dissipated the economic benefits, as measured by growth in per capita income.[66] To compound this, malaria eradication and control consumed a large portion of health spending. Malaria eradication was one third of the total health expenditure for India (excluding family planning, water and sanitation) and 20-25% of the total health expenditure in Nepal during the 1960s.[67] At the national level, malaria eradication was not always the sound financial investment projected by early estimates.

Internationally, the economic case for cooperation on malaria eradication was not entirely clear-cut. First, it is not clear that the countries financing international cooperation would reap economic benefits that exceeded their contributions. As noted previously, over half of the nearly 1.4 billion dollars for eradication was financed from international sources, mainly from the United States. As discussed in the section below, initial estimates showed potential financial benefit to the United States. Later in the campaign (as disease burdens decreased, especially in Europe and the Americas), costs began to exceed the financial benefits of cooperation.

---

[65] Mills, Lubell & Hanson, 'Malaria eradication: the economic, financial and institutional challenge'.
[66] Ibid.
[67] E J Cohn, 'Assessing the costs and benefits of anti-malaria programs: the Indian experience', Am J Public Health, (1973) vol. 63, no. 12, Dec 1, pp. 1086-96.

Leadership of the United States drives cooperation on malaria

With the eradication of malaria, sponsoring countries stood to benefit financially from increased trade with nations whose economies would no longer be hampered by malaria. Since the United States provided more than 80% of the international financing for malaria eradication (including US contributions to multilateral efforts), it is most telling to look at the cost-benefit calculations of the United States (Appendix 5B). Reports from the United States government demonstrate that financial benefits exceeding the cost of cooperation were expected. A 1956 report explains that the global burden of malaria 'constitutes a hidden malaria tax of more than a third of a billion dollars paid annually by the United States on its imports.'[68] Based on these figures, with the eradication of malaria (or the near-eradication, since these figures depend on disease burden and not prevention costs), the United States would recoup its investment in about 3 years.[69] Dr. Paul Russell, of the Rockefeller Foundation, argued that although malaria is no longer a problem in the US, 'it is of tremendous importance to the American businessmen, as 60 per cent of our imports come from and 40 per cent of our exports go to countries in which it is a problem.'[70] Based on expert estimates of the impact of malaria on the United States' international trade, the United States stood to benefit more than it invested in bearing the costs and burdens of cooperation on malaria.

Financial benefits were critical in driving the American support for malaria eradication, but other interest-based drivers may have been as important. The United States had three reasons, inter-related, to bear the costs and burdens of international cooperation on malaria. First, as already discussed, the eradication of malaria would benefit American businesses, which imported raw materials heavily from areas where malaria was endemic. Second, malaria control efforts presented an opportunity to counter Soviet aid efforts in the Third World, and to

[68] IDAB, 'Malaria eradication: report and recommendations of the International Development Advisory Board', (Washingtonn DC: IDAB, 1956); Jeremy Shiffman, Tanya Beer & Yonghong Wu, 'The emergence of global disease control priorities', Health Policy and Planning, (2002) vol. 17, no. 3, Sep 1, pp. 225-34. P. 228

[69] GAO, 'Malaria Control in Developing Countries: Where Does it Stand? What is U.S. Role', ed. Frank Conahan (Washington DC: U.S. General Accounting Office, 1982). In addition, the United States sponsored 181 million dollars in research on malaria from 1950 to 1981.

[70] Cleaver, 'Political Economy of Malaria De-Control'. P. 1468

win strategic alliances by demonstrating the altruism of the United States. And third, malaria in Central and South Americas posed a threat of spreading to the United States. This threat was magnified through trade, travel, and the operations of the United States military. For these reasons, it is no surprise that United States leadership emerged conclusively to support international cooperation on malaria. For the same reasons which the United States would support international cooperation on malaria, the regional focus on the Americas and Europe, and the neglect of Africa (with which the US had little trade and military operations), can be understood.

Competition with the Soviet Union for influence in the Third World provided incentive for the United States to bear the costs of cooperation on malaria. The benefits to be won from this competition, which defy quantification, stemmed from the influence that the United States would gain from shaping political ideology in nations burdened by malaria. The initial proposals for malaria eradication were developed by the United States International Development Advisory Board in response to a request from President Eisenhower to 'come up with new American foreign aid programmes which could help counter the recent expansion of Soviet aid efforts in the Third World.'[71] Malaria was selected from among other health issues and international development initiatives not because of the magnitude of the problem, the promise of known solutions, nor its positive economic impact. But instead, because malaria control was unique in facilitating frequent contacts between governments and peasants. According to the report, 'No service establishes contact with every individual home at least twice a year as the DDT service does unless it be the collection of taxes.'[72] The report to President Eisenhower noted the impressive success enjoyed by the governments of India, Thailand, the Philippines and Indonesia in using malaria control programs to 'build political strength and combat Communist infiltration.'[73] Cleaver notes that this report led President Eisenhower to throw his support behind malaria eradication, first by funding international

[71] Ibid. P. 1467
[72] Ibid. p. 1467
[73] Ibid. p. 1467

efforts in 1956, then by declaring his support for malaria eradication in his State of the Union address in 1958.

In declaring support for international malaria eradication, President Eisenhower made it explicitly clear that this support was driven by factors beyond contagion. As the President stated in the 1958 State of the Union address,

> '[…] we now have it within our power to eradicate from the face of the earth that age-old scourge of mankind: malaria. We are embarking with other nations in an all-out five-year campaign to blot out this curse forever. We invite the Soviets to join with us in this great work of humanity.
>
> Indeed, we would be willing to pool our efforts with the Soviets in other campaigns against the diseases that are the common enemy of all mortals—such as cancer and heart disease.'[74]

By grouping malaria with cancer and heart disease, the most prevalent non-contagious diseases, President Eisenhower expressed that it is not the threat of spreading epidemics that drove his government's support, but rather, an assessment based on the human and economic burden of disease. The President's words are consistent with the language of the reports from the International Development Advisory Board that recommended action on malaria.

The third (and arguably least important) means by which the United States could benefit from international malaria eradication is the prevention of disease. From 1947 to 1950, the United States implemented a 'National Malaria Eradication Program' that sprayed homes throughout the South-eastern United States with DDT. At the start of the campaign, in 1947, 15,000 malaria cases were reported in the United States. By the completion in 1951, malaria was considered eradicated from the United States.[75] However, the elimination of endemic disease in the United States was not accomplished by the total eradication of the anopheline mosquito. Therefore, malaria could potentially spread again in the United States if introduced into an area

---

[74] Dwight D. Eisenhower, *Annual Message to the Congress on the State of the Union, January 9, 1958* (1958 [cited 10 February 2010]); available from http://www.eisenhowermemorial.org/speeches/19580109%20State%20of%20the%20Union.htm.
[75] CDC, *Eradication of Malaria in the United States* ([cited 10 February 2009]); available from http://www.cdc.gov/malaria/history/index.htm#eradicationus.

that continued to have anopheline mosquitoes. Indeed, there was a minor outbreak in California in 1952 after a soldier, infected with malaria acquired in Korea, camped in a busy park.[76] The risk of spread was perhaps most acute in transportation and trade with malaria-endemic regions of Central and South America. During the Second World War, transportation links to procure raw materials for the war effort had been developed throughout the Americas. It is not surprising then, that the United State was a vocal proponent of a declaration for regional eradication at the Pan-American Sanitary Council (PASC).[77] After the PASC resolved to eradicate malaria from the Western hemisphere in 1954, the United States provided about 40 per cent of the funds for the effort. All 35 countries of the Americas adopted a policy of eradication soon after the WHO resolution.[78] The efforts to prevent military malaria, and the efforts to eradicate malaria from the Americas could be explained, in part, by an interest in preventing the introduction of malaria into the United States.

By the mid 1960s, the United States financial interests in malaria eradication began to dissipate, precisely because malaria eradication efforts were succeeding in Europe and the Americas. The threat of contagion came primarily from these regions, but more importantly, these were the primary regions from which the United States was importing goods and materials. Previously, the United States had calculated that it paid a 'malaria import tax' of over 300 million dollars annually in higher import prices from malarious regions. With sharp decreases in the incidence of malaria in the regions the United States imported from, this financial incentive for cooperation ceased to exist, and the costs of cooperation began to exceed the benefits. In addition, new knowledge on the environmental effects of DDT, and the trends in resistance to DDT, (discussed in the section on knowledge below) contributed to making cost-benefit calculations of the United States even more unfavorable towards cooperation.

---

[76] Jean-Paul Chretien*, et al.*, 'The importance of militaries from developing countries in global infectious disease surveillance', Bull World Health Organ, (2007) vol. 85, no. 3, Mar 1, pp. 174-80. P. 175. See also citing Brunetti R, Fritz RF, Hollister AC. An outbreak of malaria in California. Am J Trop Med Hyg (1953) vol 3:779-88

[77] Siddiqi, *World health and world politics : the World Health Organization and the UN system*. p. 141

[78] Ibid. p. 134

In the early malaria eradication campaign, the United States financed international cooperation on malaria in order to benefit financially, to influence Third World nations, and to prevent the spread of malaria to the United States. By the end of the campaign, the financial interests in cooperation reversed, the threat of disease spread was minimised, and consensus in knowledge communities began to favour the minimal use of DDT.

International institutions play a limited role in explaining cooperation on malaria

Do international institutions, namely WHO and its regional offices, matter in explaining cooperation on malaria, or was their existence merely incidental to the cooperation which the United States was prepared to lead? To answer this, I ask a series of subsidiary questions, as outlined in Chapter 2, related to the autonomy, membership, formal rules, and permanence of institutions that allows them to facilitate cooperation beyond contagion. It is clear that WHO made malaria eradication an institutional priority. WHO dedicated a third of the regular budget and hundreds of staff toward the effort. However, this institutional commitment was a result of United States leadership and not in itself a driver of cooperation. In short, international institutions play a minimal role in explaining international cooperation on malaria.

International cooperation on malaria eradication began in the Americas, and was adopted by WHO for two reasons. First, there was a promise of US funding for a WHO led malaria initiative. The United States was quick to provide support, giving 150 million dollars in the first five years of the Malaria Eradication Programme through direct assistance to 28 countries and contributions to the WHO Special Malaria Fund.[79] Second, the Director General, Dr. Candau, wanted to preserve central control of WHO at its headquarters in Geneva. If major eradication efforts continued to be led from the regional office in the Americas (PAHO), that would divert attention and funding from WHO headquarters. As a former Assistant Director of PAHO, and a malariologist himself, Dr. Candau understood the threat that these efforts posed to the vitality of the young organization he led. The dual promise of financial support for WHO, and reduced

[79] Ibid. p. 143 See also WHO/mal/265, 30 May 1959, p 24

competition with regional offices led the organization to adopt malaria eradication as a priority. These influences demonstrate the lack of autonomy and independence of the organization.

WHO's formal decision-making apparatus was side-stepped in making malaria eradication the central priority for the organization. Neither WHO's membership nor WHO's rules guided the decision to pursue malaria eradication. The transition from malaria control to malaria eradication was led instead by a search for United States funding. While malaria control would need low levels of permanent funding, malaria eradication would demand a burst of short-term funding. The promise that this funding would be available from the United States led the WHO to shift the institutional priority. As a WHO expert wrote, a reason 'for proceeding at once to nation-wide eradication is the fact that international aid monies are available not to assist in such projects but may not be obtainable in later years.'[80] WHO acknowledged that the United States government favoured the language of eradication, and WHO adopted the goal in pursuit funding from the United States.

Furthermore, the pursuit of a disease-specific campaign was outside of the formal mandate of WHO, as understood at the time, and as described in WHO's constitution. As Siddiqi explained, WHO had a 'horizontal mandate' but 'disease-specific weapons such as DDT seduced it from that path.' [81] WHO was not intended to be an implementing agency, but rather a coordinating agency. UNICEF and other organizations were responsible for implementing public health programs, but WHO agreed to serve as a forum for coordinating efforts on malaria. The expansion into the implementation of malaria eradication programmes was another deviation from WHO's rules and mandate.

Perhaps the only aspect of malaria eradication efforts where WHO clearly served to drive international cooperation was in facilitating the modest support of Soviet countries. The

[80] Ibid., citing a WHO report: Russell, Advisability and Practicability of Eradication, 1956.
[81] Ibid. p. 195

malaria eradication programme was launched after eight socialist countries, including the Soviet Union, returned to WHO after their 1949 withdrawal. Notably, the Soviet Union did not make any financial contributions to the voluntary fund for malaria, but funding from the Soviet contribution to the general budget was directed towards malaria eradication. This is a minor commitment to malaria eradication, and does not change the overall assessment that international institutions played a minor role in driving cooperation on malaria eradication.

Perhaps the clearest demonstration of the failure of WHO to drive and shape cooperation is the exclusion of Africa from the Malaria Eradication Programme. This exclusion was a contradiction of WHO's global scope, and its decision-making based on expert authority and broad membership. Africa had been included in planning for malaria control and eradication, but the continent was excluded from implementation. A major 1950 meeting in Kampala discussed malaria eradication in Africa, 5 years before a strategy of malaria eradication, that essentially excluded Africa, was endorsed by WHO. Even during the eradication campaign, experts at a 1959 technical meeting on malaria eradication in Africa reaffirmed the feasibility of African eradication, reporting that 'If the administration and financial difficulties could be overcome, however, malaria eradication should be technically feasible in the African region.[82]' WHO's failure to facilitate cooperation on malaria in Africa demonstrated the institution's inability to drive cooperation on malaria eradication beyond the limits of contagion and the interests of the most powerful states.

Knowledge is an early driver and then a barrier to cooperation

In the 1930s, treatment with quinine – the only available drug for malaria – was described in a classic text as 'a time-honored resource with a history of 300 years of constant defeat.'[83] Mosquito elimination, a strategy for prevention of malaria that had previously been dismissed, gained attention during the War. This attention stemmed from the finding that a new pesticide,

[82] Litsios, *The Tomorrow of Malaria*. p. 117
[83] G. M. Jeffery, 'Malaria control in the twentieth century', Am J Trop Med Hyg, (1976) vol. 25, no. 3, May 1, pp. 361-71. p. 362, citing L. W. Hackett, *Malaria in Europe* (London: Oxford University Press, 1937). p. 20-21

DDT, which was used by militaries to eliminate mosquitoes, was leading to dramatic reductions in malaria.[84] Between 1944 and 1945, production of DDT in the United States increased 30-fold, with almost all of the supply for military use.[85] Despite this promise, the widespread use of DDT to control malaria did not prove to be an immediately compelling strategy. Among the obstacles to cooperation on malaria control was the observation that 'where malaria rates were decreasing significantly, such as in North America and in some areas of Northern Europe, there was little evidence that the specific efforts at malaria control were primarily responsible.'[86] This trend, combined with the observation that variation in the incidence of malaria could not be explained by variations in the control of the anopheline mosquito would slow scientific consensus on the use of the new pesticide by several years.

Seeking to resolve the debate on malaria control, one of the earliest efforts of the World Health Organization was the creation of 'demonstration teams' in 1949 that would seek to control malaria in seven communities in Asia. These seven teams demonstrated the success of regular spraying with DDT in eliminating the anopheles mosquito and, in turn, the transmission of malaria in these seven areas. The teams led to the emergence of a consensus that DDT would be the central tool in controlling malaria around the world. As Fred Soper, who would later lead the WHO's MEP, wrote 'for the first time there exists a single efficient and economical method of attack on malaria which can be standardized and applied with confidence to almost all malarious areas.' [87] By the early 1950s, a consensus emerged that DDT would be an essential tool in the battle against malaria. The international scientific community developed a global consensus on the use of DDT through publications, training programs, and numerous meetings of experts. WHO created international malaria eradication training centres, in Jamaica, Cairo,

[84] DDT is dichlorodiphenyltrichloroethane, a synthetic compound developed late in the 19th century, though its use as a pesticide was only discovered in 1939. Paul Müller won the 1948 Nobel Prize in Physiology or Medicine for his discovery of these pesticidal properties. See: WHO, 'DDT and its Derivatives', in *Environmental Health Criteria* (Geneva: World Health Organization, 1979).
[85] Ibid. In 1944, 4366 tonnes were produced in the USA; In 1945, 15,079 tonnes were produced.
[86] Jeffery, 'Malaria control in the twentieth century'. P. 361
[87] Siddiqi, *World health and world politics : the World Health Organization and the UN system*. p. 126

Belgrade, Lagos, Manila and Lome, and coordinated research activities on resistance to antimalarials and DDT at malaria reference centres in the United States, India and England. [88]

The development of DDT, and consensus about its use, would change cost-benefit calculations and redefine state interests. As stated in a classic text on malaria control, the development of DDT meant that 'for the first time it is economically feasible for nations, however underdeveloped and whatever the climate, to banish malaria completely from their borders.[89]' This scientific development fundamentally changed what was possible in international efforts to control malaria. Instead of futile control efforts, effective and proven measures could be implemented for relatively little cost throughout the world. The interests of the United States were, as described in the discussion on leadership, defined by the understandings about the cost and efficacy of DDT in controlling and eradicating malaria.

A sense of urgency developed for malaria eradication with a 1957 consensus that emerging resistance of the mosquitoes to DDT would make it ineffective in five to ten years. This consensus, reached at a meeting of scientists in Athens, created a perception of crisis. The best weapon against malaria was facing a quick expiry. As discussed in the section on contagion, these assessments were an important driver for immediate and aggressive international cooperation on malaria.

However, just as knowledge was a key driver in the rise of malaria eradication and international campaigns based on DDT, knowledge would emerge as a barrier to cooperation. The knowledge that put malaria eradication in jeopardy came from two sources. First, there was an emerging consensus that continued widespread use of pesticides would increase resistance among mosquitoes.[90] This created a reversal of state interests. While eradication was initially driven by the expectation that DDT would be ineffective in five to ten years; by the late 1960s,

[88] WHO, *The Second Ten Years of the World Health Organization*. P. 171
[89] PF Russell, *Man's Mastery Over Malaria* (Oxford: Oxford University Press, 1955).
[90] Marcos Cueto, 'Cold war, deadly fevers: malaria eradication in Mexico, 1955-1975', Johns Hopkins University Press, (2007) Jan 1, p. 264.

it appeared that the aggressive use of DDT would diminish the ability of the United States to control domestic outbreaks. Here, scientific developments changed cost-benefit calculations, leading rational self-interest to oppose cooperation.

Second, a non-scientific consensus developed within advocacy communities about the environmental harm caused by DDT. This consensus had its origin's in a series of reports originally published in the *New Yorker*, titled *Silent Spring*.[91] These articles depicted a nameless American town where all life, from human children to birds and fruit, had been 'silenced' by the effects of DDT. Scientists criticized the reports. These scientists held that the adverse effects on animals which Carson pointed to were due to the dramatically higher quantities of DDT necessary to use it as an agricultural insecticide; much lower levels were required for anti-malarial spraying. Nonetheless, the report and the public outcry that followed created a sense of crisis, which again redefined state interests. The report led President Kennedy to order an investigation into the use of the DDT, and ultimately to ban the use of DDT. It was the first time that industry was regulated in order to protect the environment.[92] With this ban on domestic use of DDT, the supply of DDT became more scarce, the cost higher, and the norms against selling or sponsoring the use of DDT internationally were reinforced. Thus, the consensus that DDT harms the environment led directly to the rising costs, and the slowing of the international malaria eradication programme.

Concluding thoughts on the rise and fall of malaria eradication

International cooperation on malaria eradication emerged shortly after the end of the Second World War. Cooperation was driven by the threat of malaria spreading to United States military and civilian populations, the loss of access to quinine for malaria treatment, the economic burden created by malaria throughout the world (and the impacts of this burden on US trade),

[91] Rachel Carson, 'Silent Spring I - III: a reporter at large', New Yorker, (1962).
[92] It has been suggested that this episode gave rise to modern environmentalism.

and new tools for preventing malaria (DDT) that scientists believed would cease to be effective in 5 to 10 years, due to emerging mosquito resistance.

By the mid-1960s, there were two sharp shifts that explain the end of the malaria eradication program. First, the program was largely effective in reducing the incidence, and in turn the economic burden of malaria, in the Americas and Europe (there was temporary success in Asia). American financial interest in cooperation on malaria had been driven by the increased cost of imports from regions afflicted by malaria (a 'malaria import tax'). The European and American regions accounted for the bulk of US imports, and as malaria disappeared from these regions, so too did the international economic externalities of malaria. The burden of malaria in Africa was responsible for very little of the costs incurred by the United States in international trade. Thus, for the United States, the costs of malaria eradication began to exceed the benefits as soon as the campaigns in Europe and the Americas had achieved success. Second, a new scientific consensus made the cost-benefit calculations even more unfavourable for the United States. A new consensus emerged in the popular press and among policy-makers, that DDT was harmful to the environment, and posed a threat to all life. In addition, scientists argued that continued widespread use of DDT would breed resistance, maintaining that the pesticide could remain effective if used sparingly. This new consensus, along with the precipitous drop in malaria in the United States' trading partners, was decisive in ending the malaria eradication programme.

5.2 COOPERATION ON SMALLPOX, 30 YEARS LATE

On 26 October 1977, a young Somali hospital cook, who had also worked as a smallpox vaccinator, Ali Maow Maalin, became the last person in the world to be diagnosed with endemic smallpox.[93] The disease, chronicled since the days of Ancient Egypt, had decimated history's great armies, disrupted order in Empires, and killed many millions of people.[94] In

[93] D.A. Henderson, *Smallpox: the death of a disease: the inside story of eradicating a worldwide killer* (Amherst, New York: Prometheus Books, 2009). P. 239
[94] Price-Smith, *Contagion and Chaos: Disease, Ecology, and National Security in the Era of Globalization*. P. 46

May 1980, WHO formally certified that smallpox had been eradicated.[95] This success has been hailed as the greatest in the history of international cooperation.[96]

Smallpox eradication is widely celebrated as a great success, yet cooperation neither came quickly nor on a large scale. By the mid 1930s, many European countries had eliminated smallpox, and by the early 1950s, the Soviet Union was calling for WHO to eradicate the disease. But, as of 1966, less than two million dollars in international financing had been made available for global eradication. Funding for the initiative turned quickly in 1967, and a total of 98 million dollars (approximately 468 million in 2008 dollars) in international funding was provided for eradication from 1967 to 1977, when last case was detected and contained in Somalia. The contagion thesis predicts the emergence of cooperation on smallpox, given the high epidemic potential, the lethality of the disease, the cost of preventing the disease at the national level and the impossibility of treating the disease. However, cooperation would have been expected by the contagion thesis nearly three decades before it was observed, when smallpox was eliminated from most of Europe. What explains the delay in international cooperation? More importantly, what are conditions and drivers that made the emergence of cooperation possible in the post-war period? The analysis in this chapter shows that contagion provides an incomplete explanation for cooperation on smallpox.

Cooperation on Smallpox: The history of smallpox eradication

The history of smallpox eradication can crudely be broken into two time periods: before and after 1967. On 1 January 1967, the 'Intensified Smallpox Eradication Programme' was launched by WHO with the goal of eradicating the disease within 10 years. Prior to 1967, cooperation on smallpox was haphazard and not supported with meaningful funding, staff, or international authority. Here, I provide a brief account below on the history of cooperation on

[95] Since samples of the virus remain in laboratories in the United States and Russia, the disease has not been 'eradicated,' however it has been 'eliminated.' Elimination means that the disease is controlled 'to a level sufficient to ensure that the disease is no longer endemic.' See Barrett, 'The Smallpox Eradication Game'. p. 181

[96] Barrett, *Why Cooperate?: The Incentive to Supply Global Public Goods*.

smallpox, and then explain the drivers of cooperation. An official and thorough (1400 page) history of the eradication effort has been written by leaders of the WHO campaign, including Fenner, Henderson, Arita and others.[97] Henderson has recently published a more personal account of the campaign.[98] Among the many secondary sources available on smallpox eradication, Ruth Levine's clear and succinct account of the campaign's successes,[99] and Scott Barrett's analysis of the incentives for cooperation on smallpox are particularly useful.[100]

A brief timeline of international cooperation on smallpox allows us to identify the events leading to the intensified campaign in 1967 (Figure 5.4). International efforts at smallpox eradication began in 1950, with an American regional eradication programme. The programme did not assist countries with the execution of smallpox eradication, leaving full responsibility to governments (unlike the approach with malaria). Financial support was modest, and PAHO contributed an average of just under 47,000 dollars annually to the efforts from 1953 to 1966.[101] In 1953, WHO's first Director General proposed a smallpox eradication program to the World Health Assembly that was rejected two years later as unrealistic.[102] In contrast, by 1955, WHO approved a much more expensive and complex effort to eradicate malaria that has just been chronicled.[103] In 1958, the USSR formally proposed global cooperation on smallpox eradication, and set a detailed plan for completing the effort in 10 years. In 1959, WHO promised to undertake smallpox eradication, though deviating from the USSR proposal, it did not allocate funding or staff for the initiative and demanded a five-year timeline. From 1959 to 1966, WHO focused its funding and attention to malaria, giving smallpox very little funding (Figure 5.3 and Appendix 5B).

---

[97] F. Fenner*, et al.*, *Smallpox and its eradication* (Geneva: World Health Organization, 1988).
[98] Henderson, *Smallpox: the death of a disease: the inside story of eradicating a worldwide killer*.
[99] Levine, 'Eradicating Smallpox'.
[100] Barrett, 'The Smallpox Eradication Game'.
[101] As calculated based on 'Expenditure by PAHO for smallpox eradication, 1953-1966' in Fenner*, et al.*, *Smallpox and its eradication*. P. 391
[102] Ibid.p. 366 (See WHA Resolution, 1955, 8.38)
[103] This decision-point is revisited in the section exploring the role of leadership in explaining cooperation on smallpox.

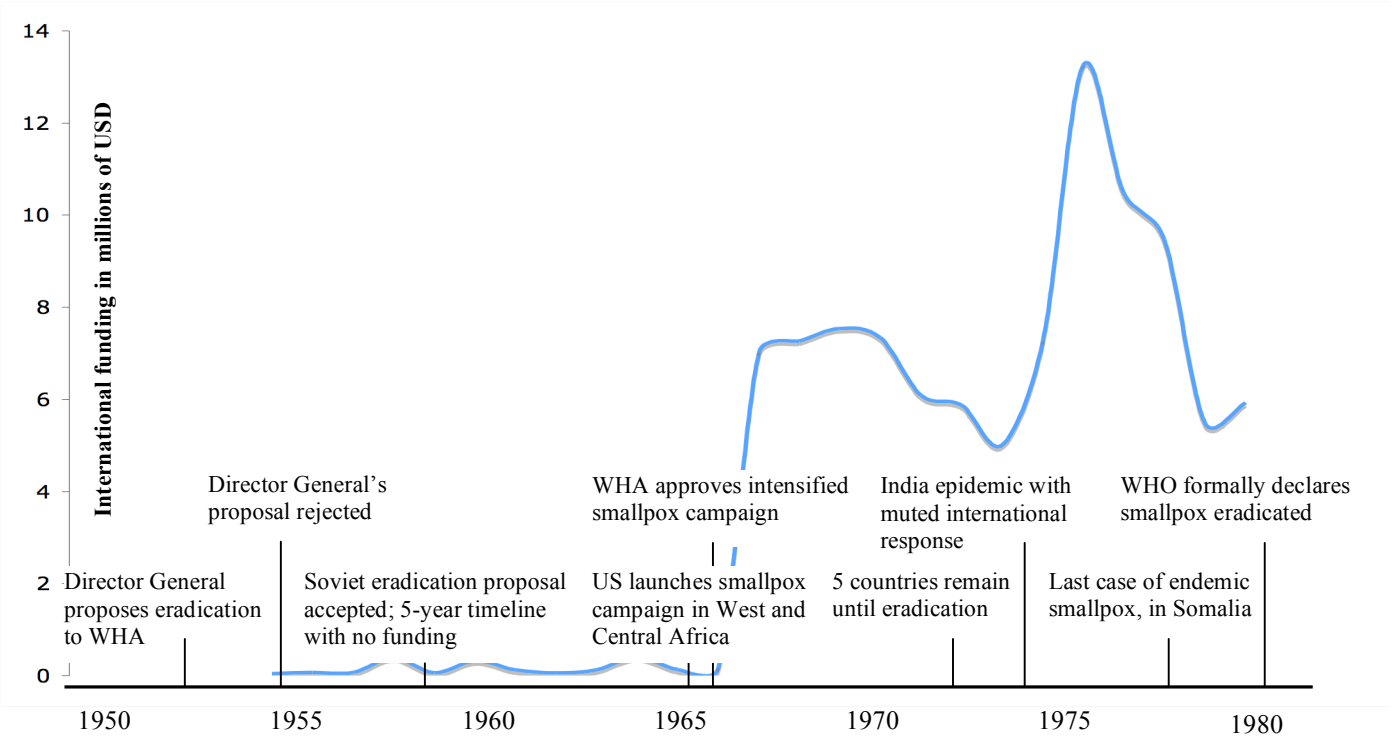


Figure 5.5 Timeline of Smallpox Eradication: key events and international funding by year. For detailed funding data, see Appendix 5B.

Smallpox eradication remained under-funded and out of reach from 1959 through 1966. During this period, WHO committed increased funds for malaria, with little increase in funding for smallpox. From 1959 to 1966, malaria received 27.2% of all funds from WHO's integrated international health programme, while smallpox received only 0.6% of WHO's funds (Appendix 5C). WHO allocated 137 million dollars to malaria eradication from 1955 to 1966, while allocating only 2.03 million dollars to smallpox eradication during this same time period.[104] WHO had created a 'Special Account for Smallpox Eradication' in 1959 to collect voluntary contributions to the campaign. This account received less than 40,000 dollars by 1963. While there were 1.7 billion people living in smallpox endemic countries in 1959, WHO succeeded in acquiring only 32 million vaccines by 1964.[105] By any measure, international cooperation on smallpox was falling short.

[104] These figures reflect the 'integrated international health programme' budget in the Official Records of the WHO. These figures include the regular budget, the technical assistance component of UNDP, and other funds administered by WHO.
[105] Fenner, *et al.*, *Smallpox and its eradication*. p.393.

In 1965, the United States announced a plan to eliminate smallpox from 20 contiguous countries in West and Central Africa. With this promise of American leadership, in 1966, the World Health Assembly agreed that increased resources for smallpox were required. The Assembly voted to provide 2.4 million dollars to smallpox eradication. With this vote to provide increased resources for smallpox, the intensified Smallpox Eradication Programme was launched in 1967, with the goal of eradicating the disease in 10 years.

Financing for smallpox greatly increased from 1967 to 1979. WHO's special account for smallpox eradication received 66.9 million dollars from 1967 to 1979 (Appendix 5B). The largest contributor was the United States, putting forth approximately 25 million dollars (17 million of this in bilateral support). Sweden contributed 15 million dollars, virtually all in cash to WHO, and the USSR contributed 8.8 million dollars, mostly in supplies. The Netherlands and Canada gave 2.8 and 2.5 million dollars respectively.[106] The special account for smallpox also received private donation from parties with an interest in eradication. Notably, ranking sixth among all contributors was the Japan Shipbuilding Industry Foundation, which gave 1.8 million dollars to WHO. These funds allowed WHO to implement an aggressive campaign with support for teams to conduct surveillance and containment of smallpox outbreaks anywhere they occurred. By 1977, this strategy was effective in eliminating endemic smallpox.

Explaining cooperation on smallpox

Political scientists have provided some explanations for the emergence of cooperation on smallpox. Scott Barrett has demonstrated the overwhelming shared interest that favored international cooperation on smallpox.[107] However, his analysis – based on demonstrating the overwhelming incentives for cooperation – does not explain the delays in cooperation on smallpox. Why does self-interest not lead to cooperation much earlier? Can the historical variation in cooperation be explained by factors beyond contagion?

[106] Ibid. P. 464
[107] Barrett, 'The Smallpox Eradication Game'.

Contagion drives cooperation on smallpox, but 30 years late

Contagion was, without a doubt, important in driving cooperation on smallpox. Smallpox had a high potential for creating an epidemic, and the disease was fatal in nearly a quarter of cases (Appendix 5A). The prevention of disease required expensive and regular vaccination (which was sometimes accompanied by medical complications from the vaccine), and there was no treatment for the disease. Fenner et al described how smallpox fit the contagion thesis, writing that 'its severity and ability to spread in any part of the world commanded both the attention and the concern of health authorities everywhere.'[108] Smallpox posed a risk of spreading internationally, making it a concern to all countries, and especially those that had eliminated the disease. All countries would benefit financially from the global elimination of smallpox. Countries where the disease was endemic faced the cost of caring for the infected, while countries that eliminated the disease invested in vaccination programmes and in costly quarantine to prevent importation. The tremendous financial benefits, and the relatively low costs, of a global eradication effort should have led cooperation on smallpox well before it emerged, and far more robust than observed.

The importation of smallpox into the United States and the Soviet Union in the 1950s provided some impetus for both countries to take international action against the disease. In 1947, an infected visitor arrived in New York by bus from Mexico leading to an outbreak of nine smallpox cases in New York.[109] This New York outbreak launched a 'chaotic' month long vaccination campaign, where 6.3 million persons were vaccinated and 6 died of complications from the vaccine. And, the outbreak caught the attention of Dr. Fred Soper, director of the Pan American Sanitary Organization (PASO).[110] Dr. Soper argued that a pan-American eradication

[108] Fenner, *et al.*, *Smallpox and its eradication*. P. 1345
[109] I. Weinstein, 'An outbreak of smallpox in New York City', American Journal of Public Health, (1947) vol. 37, pp. 1376-84.
[110] The Pan American Sanitary Organization (PASO) became the Pan American Health Organization (PAHO) in 1949. Its secretariat remains known as the Pan American Sanitary Bureau (PASB)

program would benefit USA and it would 'demonstrate the value of PASO as an international health agency.'[111]

Like the United States, the USSR's interest in smallpox eradication began in 1950 because of the importation of disease. Between 1950 and 1957, there were 537 cases of smallpox in the Central Asian Republics, all related to importation from Afghanistan and Iran.[112] In 1958, the Soviet Union proposed to WHO a detailed plan to eradicate smallpox from the globe within 10 years, based on compulsory vaccination – the strategy used by the USSR to eliminate smallpox throughout its territories. The Soviet proposal came with a promise of 25 million vaccine doses, and assurances to the WHO Executive Board that the USSR would be prepared to assist Burma, Cambodia, Ghana, Guinea, India, Indonesia, Iraq and Pakistan with smallpox eradication.[113] The Soviet proposal passed in 1958 with the modification that the program would be complete in 5 years (despite the analysis concluding it would take 10 years).[114] However, the resolution did not provide for the staff, central funding, or the timeline of the proposal, leading to further Soviet efforts pushing WHO to take action on smallpox. In 1963, Russian leadership urged WHO to define which countries were endemic, and which were not. For the fist time, in late 1963, WHO reported that there were then '44 endemic countries, of which 14 were conducting eradication programmes, 22 had programmes on paper but were not yet implementing them, and 8 had so far done nothing at all.'[115] The USSR's Deputy Minister of Health, Professor Zhdanov, who authored the smallpox eradication proposal, appealed directly to all non-endemic countries at the World Health Assembly He wrote, 'the countries which are free from smallpox[…] make considerable efforts and spend large sums on vaccinating and revaccinating the population

[111] Fenner*, et al.*, *Smallpox and its eradication*. P. 391 At the time, PASO was resisting efforts to fully integrate into WHO and such an initiative would provide an opportunity to demonstrate its relevance and autonomy.
[112] Ibid.
[113] WHO, 'Smallpox eradication: Minutes of the twenty-third session of the Executive Board', (Geneva: World Health Organization, 1959).
[114] WHO, 'Handbook of Resolutions and Decisions of the World Health Assembly and the Executive Board, Volume 1: 1948-1972'. See 1958 WHA Resolution 11.54
[115] Fenner*, et al.*, *Smallpox and its eradication*; World Health Organization, 'Smallpox eradication programme. Report by the Director-General.' in *Official Records of the World Health Organization* (Geneva: WHO, 1963).

in order to provide constant strong immunity against this disease.'[116] The financial case for cooperation would prove to be the strongest, and the most influential.

The financial incentives favouring cooperation can be calculated, using assessments of the costs and benefits of cooperation from the period in which decisions were made.[117] In short, industrialised countries and developing countries both had strong financial incentives for cooperation. The estimates for industrialised and developing countries are based on extrapolations from the United States and India, respectively. With the most conservative estimates, industrialised and developing countries would recoup the costs of their investment within about two months. These figures offer a more sober assessment of the rational cost-benefit calculations for cooperation than those offered by Barrett, Brilliant, and other analysts who suggest costs of international cooperation would be recouped in days.[118] Barrett reports a cost:benefit ratio of 1:483 for the international expenditure on smallpox, assuming a 3% discount rate.[119] That calculation is based on knowledge of the long-term success of the campaign and the end cost. Below I include a range of cost-benefit ratios, based on the knowledge available at the time of decisions (Table 5.4). Nonetheless, I agree with previous analyses that international cooperation on the elimination of smallpox was in the clear rational self-interest of all states.

With such obvious self-interest, questions about the failure of cooperative financing become more pressing. As Fenner et al wrote, 'The benefits to all countries of eradicating smallpox would appear so great and so clear that it is difficult to understand why there were problems in obtaining the requisite resources and political commitment.'[120] Fenner et al attribute the failure in financing to the reliance on voluntary funds, and point to the lack of a WHO staff person to

[116] Fenner*, et al.*, *Smallpox and its eradication*. P 366
[117] This is not the first analysis to consider these figures. See Barrett, 'The Smallpox Eradication Game'.
[118] Ibid. and Larry B Brilliant, *The Management of Smallpox Eradication in India: A Case Study and Analysis* (Ann Arbor: University of Michigan Press, 1985).
[119] See Barrett, 'The Smallpox Eradication Game'. p. 51. In this analysis, the total annual benefit to all countries of 1,420 million is divided by the discount rate (.03), then divided by the total cost estimates for eradication. Therefore, the benefit is assumed to be 33 times the annual benefit.
[120] Fenner*, et al.*, 'Chapter 31: Lessons and benefits'. P. 1364

solicit contributions, and to WHO staff lacking 'political contacts.' The reliance on voluntary funds can better be conceived as a demonstration of failure in cooperative financing, rather than an explanation for this failure. Barrett points his explanation to domestic politics instead. Since the benefits of eradication are diffuse, no single interest group would benefit from the effort. Scholars have demonstrated that no commercial interest group sought to benefit or lose from eradication of smallpox.[121] Also, the current generation, already vaccinated, would not stand to benefit from eradication, thus deferring all benefits to future generations. Barrett suggests that a 'congruence of interests' may be required for public goods to be financed, for example favourable cost-benefit ratio and an advantage for industry. In the analysis that follows, I look at factors beyond contagion and the global financial benefits of cooperation to include the self-interest of leading actors and the role of international institutions and scientific consensus and advances.

[121] Pierre-Yves Geoffard & Tomas Philipson, 'Disease Eradication: Private versus Public Vaccination', The American Economic Review, (1997) vol. 87, no. 1, Mar 1, pp. 222-30.

	Annual costs of smallpox, 1967 (millions of USD) → become benefits of eradication	**Annual costs of eradication, 1967-1979 (millions of USD)**	**Annual Cost:Benefit ratio (Assuming costs of smallpox as benefit with eradication)**
Industrialised countries	46.7 [122] to 350 [123]	7.5 [124]	1:6.2 to 1:46.6
USA	20[125] to 150[126][127]	2.4 [128]	1:8.3 to 1:62.5
Developing countries	133 [129] to 1070 [130]	15 [131]	1:8.9 to 1:71.3
India	91[132] to 722[133]	17 [134]	1:5.4 to 1:42.5

Table 5.4 Annual costs of smallpox, costs of eradication and cost:benefit ratios for industrialised and developing countries. Throughout, the distinction is made between 'industrialised' and 'developing' countries, though an alternative distinction is between smallpox endemic and non-endemic countries. Notably, all industrialised countries, and many developing countries were non-endemic; as there were only 21 endemic countries in 1967.

Leadership

For the United States, and indeed many other actors, the benefits of cooperation on smallpox eradication would have greatly exceeded the costs. The United States delegation to WHO may

[122] Based on extrapolations from the estimated annual costs of smallpox vaccination at $20 million. This low figure was raised by US delegates to WHO in 1967 discussions on smallpox financing, though it is well below any expert estimates See Fenner, *et al.*, *Smallpox and its eradication*. P. 415
[123] Based on extrapolations from the estimated annual costs of smallpox vaccination and vaccine-related illness in the United States at $150 million. See Ibid.
[124] Of the $98 million in international financing that went towards the campaign, the sources were: WHO regular budget: 34.2%; WHO voluntary Fund: 38.; UN: 2.5%; Bilateral: 24.8%
[125] See the first footnote related to this table.
[126] These costs are broken down as follows - vaccination: $93.5 million; lost economic productivity due to medical complications of vaccination: $42.2 million; surveillance of international trade: $14.5 million. For a discussion on costs to USA see JD Sencer & NW Axnick, 'Cost benefit analysis', Proceedings of the International Symposium on Vaccination against Communicable Disease, (1973) vol. March, pp. 37-46.
[127] N.W. Axnick & J.M. Lane, 'Costs associated with theprotection of the United States against smallpox', (Geneva: WHO, 1972).
[128] See Appendix 5B for details on financing. This estimate based on relative portion of US financing. Barrett notes the initial US contributions in 1967: $6 million cash, $1 million in kind, $1 million mandatory contribution; on top of initial bilat donation and mandatory contributions
[129] This figure does not include the lost economic productivity due to smallpox, and it is calculated based on Indian estimates of smallpox deaths, whereas higher figures from WHO assume 2% of smallpox deaths are reported. See T.J. Ramaiah, 'Cost-benefit analysis of the intensified campaign against smallpox in India. ' National Institute of Health Administration and Education bulletin, (1976) vol. 9, pp. 169-203.
[130] These costs have been broken down as follows: vaccination, $50 million; care for smallpox patients, $20 million; lost economic productivity due to smallpox, $1000 million. Estimate for vaccination cost assumes that 20% of 2.5 billion residents in developing countries being vaccinated, consistent with WHO estimates.
[131] This figure is based on the $200 million that developing countries spent on smallpox eradication during the 13 year intensified campaign. Note that the figure is based on extrapolations from data from Bangladesh, Ethiopia, India and Indonesia.
[132] Ramaiah, 'Cost-benefit analysis of the intensified campaign against smallpox in India. '
[133] This higher estimate is based on an assumptuon that only 2% of smallpox deaths are reported. The costs have been broken down as follows: vaccination, $10 million; care for smallpox patients, $12 million; lost economic productivity due to smallpox, $700 million. Fenner, *et al.*, *Smallpox and its eradication*.
[134] Brilliant, *The Management of Smallpox Eradication in India: A Case Study and Analysis*.

have greatly underestimated the annual cost of smallpox to the United States at WHO meetings in 1967. However, even based on these estimates that the annual costs of smallpox were only 20 million dollars, the United States would have quickly recouped its investment (Table 5.4). Later, scholars would estimate the cost to the USA to be 150 million dollars annually. Barrett argues that since total international transfers needed for eradication were less than 100 million dollars, and that the US would benefit 150 million annually from eradication, the United States had a strong incentive to unilaterally fund eradication efforts.[135] In 1967, it was estimated that smallpox eradication would require 48.5 million dollars in international transfers (the actual transfer required would be 98 million), and that it might save the United States 20 million to 150 million dollars annually in costs associated with vaccination. These figures ought to have been favourable to an international cooperative effort on smallpox eradication, even to policy makers with a short time horizon. While figures are unavailable on the annual costs of smallpox to the Soviet Union, they are almost certainly to be high enough to drive the Soviet Union to bear the costs of cooperation alone. It is surprising that no powerful actors sought to bear the costs and burdens of smallpox eradication alone.

Powerful actors were reluctant to finance cooperative efforts to eradicate smallpox. This failure is demonstrated by the vote on the 1967 WHO budget for smallpox eradication. In 1966, WHO estimated an annual need for international assistance of 4.85 million dollars per year for 10 years to achieve eradication. That year, the 1967 budget was approved by a narrow margin and allowed for 2.4 million dollars for smallpox. The United States opposed this provision and had proposed a smallpox budget of 1.45 million dollars. As detailed in the discussion on institutions that follows, this more modest proposal had the support of the wealthiest countries.

The reserved support of powerful actors, including the United States, continued throughout the smallpox eradication campaign, and was most clearly demonstrated by the failure to provide

[135] But, what he calls the 'greed factor' in the provision of public goods (based on Cadsby and Maunes 1998 experiments on corporate takeovers) means that actors would hold back on contributions.

critical funding to India and Ethiopia late in the eradication campaigns. Despite the magnitude of the investments already made, and the proximity to the goal of global eradiation, neither the United States nor the Soviet Union agreed to finance smallpox control in India after a major 1974 epidemic. The number of smallpox cases in India in the spring of 1974 was the largest in two decades, with over 11,000 cases reported per week.[136] While some of the increase might be attributed to more complete case reporting, it was widely acknowledged that there was a new and major epidemic in Northeast India. The Indian government and WHO put out a broad appeal, without success. According to Fenner, this reluctance to contribute was due to 'scepticism about the programme's prospects of success.'[137] Both the United States and Soviet Union had previously supported the smallpox campaign in India, and it seemed that their commitment to the program was wavering. The Indian program was ultimately financed, without American or Soviet support. By good fortune, the Swedish International Development Agency had cancelled another project in India, and had funding available. Swedish representatives were convinced that, despite the epidemic, the Indian campaign was effective and could succeed. Sweden provided 10 million dollars to smallpox eradication in India in 1974, and the Indian government also agreed to increase its contribution, making 13 million dollars available that year.[138] At the time of the Indian outbreak in 1974, smallpox eradication had been successful in much of the world. Indeed, of the 98 million dollars eventually spent on international cooperation on smallpox, 53 million had already been spent. While the contributions of the United States (and to a lesser extent the Soviet Union) had made a global eradication campaign feasible, their reluctance to finance a response to the epidemic in India was a demonstration that hegemonic leadership was not driving cooperation on smallpox.

---

[136] At the height of the epidemic, on 18 May 1974, India tested its first atomic explosive in Rajasthan. International news media covering this atomic test were exposed to local headlines and discussion on smallpox, bringing the Indian epidemic to international headlines.

[137] Fenner*, et al.*, *Smallpox and its eradication*. P. 768

[138] There are many possible explanation for why Sweden may have made this contribution: international good will was a key 'interest,' contributions would provide greater influence in international organizations, and a sense of national pride as Sweden was the first country in the world to eliminate smallpox, in 1895.

Like India, Ethiopia faced a major funding shortfall in 1976, one year before the disease was eradicated. In a letter to the administrator of USAID, WHO's Director General Halfdan Mahler pleaded for the United States to provide 5,800,000 dollars for the Ethiopian campaign. He wrote, that the amount is 'not a large sum of money in the context of bilateral and multilateral assistance programmes and a miniscule sum indeed in relation to the savings to be realised by your own and other countries by the eradication of smallpox.'[139] The Director General expressed to the United States that their benefits would be far greater than their costs in contributing to this cooperative effort. After a visit to Washington, the Director General's plea was largely successful. American funding to Ethiopia was provided with the stipulation that funds could only be used to finance goods and services from 'Free World countries.'[140] The United States only contributed to the Ethiopian campaign after an aggressive intervention from the WHO Director General, and it refused to contribute to the Indian campaign in 1974.

While neither the United States nor the Soviet Union were willing to bear the costs and burdens of cooperation at critical junctures, the smallpox eradication campaign would not have taken off without the persistent advocacy of the Soviet Union at WHO, and the 1965 commitment of the United States to eradicate smallpox from Western and Central Africa. The Soviet Union repeatedly proposed and pressed the World Health Organization to pursue a plan for eradicating smallpox, though it did not offer financial resources to facilitate the effort. The United States had led efforts to eradicate smallpox from the Americas during the 1950s. However, the American enthusiasm for global disease eradication was focused on malaria, and US support for global smallpox eradication was minimal until 1964, when the global campaign against malaria began to falter. In 1964, President Lyndon Johnson selected the eradication of smallpox from Africa as the highlight to his 'International Cooperation Year.' Only after the United States made a significant financial commitment to the eradication of smallpox did WHO endorse

[139] H. Mahler, 'Personal letter to Mr. Daniel Parker, Administrator, USAID. 12 September', (Geneva: 1975).
[140] Philip Burnbaum, 'Action Memorandum for the Administrator: Proposed Africa Regional Project to Provide $2.0 Million to Complete the W.H.O. Ethiopia Smallpox Eradication Program (ESEP)', (Washington DC: USAID, 1976).

intensified plans for eradication of the disease, and create a special account for cooperative financing of smallpox control.

US interest in smallpox eradication was born of a desire for a new Presidential initiative in international cooperation. President Johnson needed a United States initiative demonstrating support for 'International Cooperation Year,' a celebration of the 20th anniversary of the United Nations. Smallpox was not on the list of possibilities for international cooperation presented to the President by USAID. USAID had favoured measles vaccination campaigns. Dr. Henderson, of the United States Centers for Disease Control (CDC) argued that measles eradication would be expensive because of the high cost of vaccine, and made the case that a synergy could be achieved between a program that provided both measles and smallpox vaccines. His proposals were rejected by USAID, though ultimately, this joint measles and smallpox program appealed to President Johnson. As Barrett notes, United States support for international smallpox eradication, 'was made neither for strategic reasons (to get a bandwagon of international assistance going) nor even for reasons of self-interest. It seems rather to have been motivated only for reasons of political expediency.'[141]

The American commitment to global smallpox eradication paved the way for the intensified smallpox campaign since American efforts would be supporting eradication for about one quarter of the population of smallpox-endemic countries.[142] In November 1965 the White House announced 'plans for campaigns to protect 105 million people from smallpox and measles in 18 African countries.'[143] After a consultation with African and WHO officials on the plan, this became the first serious international health effort that the United States had sponsored in Africa. The campaign, conducted in coordination with WHO, was a coordinated campaign of 'mass vaccination, assessment, surveillance, and maintenance activities.'[144] Within three and a

[141] Barrett, 'The Smallpox Eradication Game'. P. 194
[142] Fenner*, et al.*, *Smallpox and its eradication*. P. 407
[143] White House Press Release, 23 November 1965, as quoted in Ibid. p. 407-408
[144] W Foege, J Millar & D.A. Henderson, 'Smallpox eradication in West and Central Africa', Bull World Health Organ, (1975) vol. 52, pp. 209-12. P. 209

half years of initiation, the campaign eliminated smallpox from the 20 countries of West and Central Africa. More importantly, by bearing the costs for vaccinating one-fourth of the world still exposed to smallpox, and signalling support for global eradication, the United States facilitated the creation of a global smallpox eradication effort.

Neither the United States, nor any other leading actor were willing to bear the costs of cooperation on smallpox, despite the fact (known at the time) that the benefits of cooperation would have exceeded the costs for a single actor. The benefits of cooperation dramatically exceed the costs for all industrialised countries considered together, and these countries ultimately financed 1/3 of the total cost of the smallpox eradication campaign. While US initiatives in Africa, and Soviet efforts to spur cooperation at WHO were important, they do not fully explain the emergence of a smallpox eradication campaign in 1967.

Institutions (mostly) drive and (sometimes) obstruct cooperation

The role of institutions in driving cooperation is most visibly demonstrated by their ability to diverge from the interests of their most powerful members. In this regard, WHO can be credited with driving cooperation on smallpox as the members voted for a larger smallpox budget than any of the wealthiest states had favoured. Furthermore, WHO's centralization and independence allowed it to collect surveillance data on smallpox throughout the world, to identify areas needing better control, to standardise vaccines and to communicate eradication strategies.

However, institutions also served as barriers to cooperation on smallpox. WHO was consumed by malaria eradication, and that mission appears to have imposed a 'bounded rationality,' limiting the institution's scope for cooperation by adhering to a narrowly prescribed zone of acceptable priorities for many years. Bureaucratic self-interest led WHO to use funds allocated for smallpox eradication, even at the height of the campaign, for other causes. These episodes,

central to exploring the role of international institutions in explaining the delay and the emergence of cooperation on smallpox are considered here.

Fenner et al note in their seminal history of the smallpox campaign, 'Since smallpox was such a good candidate for global eradication, it is surprising that the commitment to undertake such a programme was so long delayed and, even after being accepted by the World Health Assembly, so ill-supported both within WHO and by most Member States.'[145] When the WHO Director General, Dr. Brock Chisholm, first proposed smallpox eradication in 1953, he called for WHO to go beyond direct assistance to governments, and to lead 'concerted international action.' Dr. Chisholm proposed a 5 year budget, providing 131,000 dollars per year. However, delegates from wealthy non-endemic countries, and poor endemic countries alike expressed the view that smallpox was a regional or local problem.[146] In 1953, the UK delegate suggested that the campaign would be 'uneconomical and would not […] add to the prestige of the Organization.' [147] The next Director General, Dr. Candau sent a letter to all WHO member states offering advice and assistance in the execution of smallpox control programs. His report indicated that most countries, 'do not desire any immediate practical assistance in the control of smallpox. A small number would welcome technical advice and assistance, mainly in connection with the production of reliable [freeze-] dried vaccine. Only two requests were made for consultant services.'[148] In short, there existed little demand for international cooperation on smallpox, and the existence of WHO as a focal institution for cooperation did not immediately increase demand for cooperation.

WHO's success on smallpox is especially remarkable when considering that some of the institution's most powerful members made efforts to obstruct cooperation on smallpox. For about 20 years, they succeeded. There was widespread ambivalence about smallpox eradication

[145] Fenner*, et al.*, *Smallpox and its eradication*. P. 418
[146] These views were expressed by delegates from Australia, Belgium, El Salvador, India, Pakistan, South Africa, the United Kingdom, the USA and Venezuela. See Ibid.p. 392
[147] Ibid. P. 392
[148] As quoted in Ibid. p. 392

in the 1950s, but by 1965, developing countries clearly voiced their strong support for smallpox eradication and argued for large increases in the smallpox budget. These countries, joined by a few Northern European countries, were able to defeat the resistance of the ten wealthiest countries (and thus, those countries that had the largest mandatory contribution to WHO) to approve the intensified smallpox eradication campaign in 1966. The WHO Director General had proposed a budget of 2.4 million dollars for smallpox eradication in 1967. France, opposed to this spending, proposed a budget of 1 million dollars for smallpox, while the United States proposed a comprise proposal of 1.4 million dollars. Ultimately, the Director General's larger budget proposal was passed, by a margin of just two votes.[149] This budget passed because the broad membership of WHO allowed the concerns of weaker members to shape cooperation decisions (Table 5.5).

Proposal	Number of countries in favour	Partial list of countries in favour
French ($1 million)	18	Canada, Italy, Turkey, Soviet Union
United States ($1.4 million)	36	Australia, Austria, Belgium, Germany, Iraq, Japan, Netherlands, Pakistan, United Kingdom
Director General ($2.4 million)	60	Finland, Norway, Sweden, Switzerland, 19 developing countries

Table 5.5. Vote on 1967 Smallpox eradication budget at WHA, 12 May 1966. Adapted from Barrett, S., 'The Smallpox Eradication Game', *Public Choice*, (2006) vol. 130, pp. 179-207. Note that WHO records do not indicate how countries voted, but secondary sources contain some of the information. See Fenner, F., D.A. Henderson, I. Arita, Z. Jezek & I.D. Ladnyi, *Smallpox and its eradication*, Geneva: World Health Organization, 1988, p. 416.

Just like WHO's broad membership allowed developing countries to increase mandatory contributions to smallpox eradication, the near-universal membership was essential to monitoring smallpox eradication. The key benefit of smallpox eradication for non-endemic countries – the termination of vaccine programs – would not be enjoyed without universal participation. The Peoples Republic of China was not a WHO member until 1973. Prior to its membership, the status of smallpox control in China was unknown and undocumented in WHO

[149] Of the 86 present members voting, 60 voted in favour (58 required for two-thirds majority), 26 against and 12 abstentions.

reports. On joining WHO, China reported that it had eliminated smallpox in 1961.[150] In 1978 (nearly two years after the last ever case of endemic smallpox), a WHO team was allowed to visit and confirm elimination of the disease from China, a critical step before declaring victory against the disease.

WHO's centralization and independence were essential in certifying smallpox eradication, identifying areas needing control, standardizing vaccines and communicating eradication strategies. Abbott and Snidal define centralization as 'a concrete and stable organizational structure and an administrative apparatus managing collective activities;' and independence as 'the authority to act with a degree of autonomy, and often with neutrality, in defined spheres.'[151] The most impressive testament to the centralization of international cooperation on smallpox is the fact that over 70 million of the 98 million dollars in international funding were distributed through WHO.[152] About half of this funding was from the WHO's regular budget, and half from the voluntary fund. For all the shortcomings of the organization's response to smallpox, it did provide a stable structure for managing the collective financing of smallpox eradication. WHO's independence is best demonstrated by its work certifying eradication, standardising equipment, and testing the quality of vaccines. A national authority could have acted alone to eliminate the disease. But, for countries to stop vaccinating their populations (and reap the benefits of eradication), certification from an independent international agency was essential. WHO's international commissions of scientists were perceived as neutral and independent as they visited all countries 2 years after the last occurrence of smallpox in order to certify eradication.[153] In addition, WHO had channels of communication with scientific and public health experts throughout the world, allowing the Organization to draw on their scientific authority. The independence and centralization of the smallpox campaign allowed for the

[150] Fenner et al propose that 'had this achievement been known and properly documented, it might have provided encouragement both to WHO and to the endemic countries.' Fenner*, et al.*, *Smallpox and its eradication*. p. 404
[151] Abbott & Snidal, 'Why States Act through Formal International Organizations'. P. 14
[152] Another 3 million went through other UN agencies and 24.2 million went through bilateral aid agencies. See Table 5.X and Fenner*, et al.*, *Smallpox and its eradication*.p. 467
[153] Ibid. P. 1363

pooling of national contributions, the avoidance of gaps in coverage, and the verification of national eradication.

While WHO was essential in allowing smallpox cooperation to emerge in 1967, the organisation also played a role in inhibiting cooperation. A leading reason for the inattention to smallpox eradication was WHO's preoccupation with malaria eradication. While theories of international institutions posit that issue density would reduce the costs of cooperation on adjacent issues, related disease areas seem to have taken on a competitive, rather than synergistic relationship. The deleterious effect of the malaria eradication campaign on smallpox eradication was most pointedly described by the Russian delegate to the 1965 World Health Assembly. He said,

> 'malaria eradication seemed to have been the favorite daughter of WHO, whereas smallpox eradication seemed to have been treated rather as a foster child […] The delegation of the USSR would support any concrete proposal for speeding up the programme, but it wishes for a real programme.'[154]

From 1959 to 1966, WHO put forth 45 times as much funding for malaria as it did for smallpox eradication (Appendix 5B). In 1955, the same year that the WHO approved a costly plan to eradicate malaria without dissent, the organization rejected Dr. Chisholm's for more modest proposal to eradicate smallpox. While malaria occupied one-third of WHO staff, the smallpox eradication was given one medical officer, and one secretary in 1965, after much advocacy from WHO's Director of Communicable Diseases.

The funding and staff demands of malaria eradication limited WHO's efforts on smallpox, and the failure of the malaria eradication campaign would hinder international cooperation on smallpox. While UNICEF provided about half a million dollars in vaccine supplies from 1967 to 1972, it withdrew all support at the height of the campaign because it was disappointed with the lack of progress on malaria and smallpox eradication. The failure of malaria eradication led UNICEF to withdraw all support from another attempt to eradicate a disease. While UNICEF

[154] World Health Organization, 'Report on the smallpox eradication programme.' in *Official Records of the World Health Organization* (Geneva: 1965). And Fenner*, et al.*, *Smallpox and its eradication*. P. 408

has made this logic explicit, other donors may have implicitly been more reserved because of the negative associations between the two eradication campaigns.

Even after the WHA allocated funding for smallpox eradication in May 1966, some WHO leaders took actions to divert these funds away from smallpox. A 10 August 1966 memo, sent by two Assistant Directors-Generals of the WHO to all Regional Offices authorized the use of smallpox funds to meet any basic health need of a country. The memo stated,

> 'The establishment of permanent basic health services should be given the highest priority since it is a prerequisite for the success of the smallpox eradication programme in any area and you should be prepared to consider providing from the smallpox eradication programme resources, such assistance as may be required for developing and strengthening basic health services in the area where the campaign is launched.'[155]

In addition to this release of smallpox funding to the general health budget, in June of 1966, senior WHO staff cut the headquarters smallpox budget to less than 30% of the budget that had been planned and approved (Table 5.6). Staff slashed the research and travel budgets, eliminated 86% of consultancies, and cancelled a scientific meeting on smallpox eradication. This reluctance to pursue the eradication campaign at WHO stands in contrast to the vigor of American smallpox eradication efforts in Central and Western Africa which, by 1966, had hired a full staff of 50 and mobilized all necessary vaccines and financial resources.

	Budgeted May 1966	Budgeted June 1966
Travel	6400	2400
Consultants	23 man-months	3 man-months
Research	30,000	12,000
Scientific meeting	Planned	Cancelled

Table 5.6 WHO leadership cuts funding allocated for smallpox in 1966. Source: P. 417

WHO played essential roles in driving cooperation smallpox, though at times the institution slowed cooperation. As described here, WHO's broad membership allowed the organization to approve a larger budget for smallpox eradication than the most powerful members had desired. WHO's independence and centralization allowed for the pooling of national contributions, the avoidance of gaps in coverage, and the verification of national eradication. These drivers were

[155] Fenner, *et al.*, *Smallpox and its eradication*. P. 417

hindered, though not overcome, by WHO's preoccupation with malaria eradication and the bureaucratic self-interest that led to a release of smallpox funds to basic health services.

Consensus on targeted vaccination and new cost-reducing technologies facilitate cooperation

Technical advances reduced the costs of smallpox vaccination and scientific consensus led to new strategies in measuring and containing epidemics: both had the potential to redefine state interests. Cooperation on smallpox greatly intensified in 1967. Below, I demonstrate that scientific consensus on vaccination strategy may have been necessary for the intensified smallpox eradication campaign to emerge.

There were two major advances in technology related to smallpox control in the 1960s: the development of the jet injector and bifurcated needle. These competing technologies both had the effect of lowering the amount of vaccine required to one-third or one-fourth of the amounts needed before these technologies, thus reducing the cost of vaccination. The jet injector, a device that allowed vaccine to enter the skin at high pressure, was developed by US Army scientists in 1962, and was used in large-scale campaigns in Brazil and in Western and Central Africa. This device had the dual advantage of using one-third the amount of vaccine as older methods, and hugely reduced vaccination time. Using the jet injector, up to 1000 persons could be vaccinated per hour. Despite the promise of the technology, the difficulty of maintaining and repairing the machines, and the development of the competing bifurcated needle meant that the devices were not widely used.[156] An American scientist developed the bifurcated needle in 1965. These needles could be boiled and reused, required one-fourth the amount of vaccine as previous needles, and were easy to use.[157] The bifurcated needle was used for most vaccinations in the intensified smallpox eradication efforts.

---

[156] Ibid. p. 472

[157] Donald A Henderson, 'Smallpox Eradication', in *Encyclopedia of Life Sciences* (Pittsburgh: 2005). See also Levine, 'Eradicating Smallpox'.

While the use of the bifurcated needle became a signature of the intensified smallpox campaign, it is not clear that the cost-savings alone can explain the emergence of cooperation after 1967. After the development of the bifurcated needle, vaccine costs were 25 per cent of what they were before 1965. Since vaccination was approximately one-half the total cost of the campaign, we can estimate that the bifurcated needle brought the cost of smallpox eradication to about 62.5 per cent of what it would have been before the technology existed. While this is a major advance, it is not clear that this alters the cost-benefit ratios convincingly, since they were already so immensely favorable to cooperation. Barrett calculates a cost-benefit ratio of 1:483 for industrialized countries. It is not convincing that a ratio of 1:301 (assuming higher costs without the bifurcated needle) would be so unfavorable as to rationally explain the observed change in cooperation. The link between these advances in vaccine technology and the shift in cooperation is tenuous, especially considering the overwhelming cost benefit ratio that already existed. Furthermore, malaria eradication had been actively pursued even though eradication plans called for more than twenty times the financing needed for smallpox. The bifurcated needle likely had its greatest effect in increasing the supply of vaccine, rather than reducing its cost. Since vaccine supplies had been limited by quality control checks of WHO, it follows that a substantial decrease in the amount of required vaccine would allow the eradication programme to expand more quickly. The development of the bifurcated needle can explain the increased pace of eradication efforts, but not the willingness to finance eradication.

The most significant advancement in knowledge was likely not the development of a new technology, but rather, new scientific consensus on the measurement and strategy of vaccination campaigns. Before 1967, progress on eradication had been measured by the number of vaccinations performed.[158] Since 1967, progress was measured by the annual number of cases detected. This shift from process-based indicators to outcome-based indicators went hand-in-hand with the new methods for discovering cases and containing outbreaks. Vaccination strategy was modified in the early 1970s after a resurgence of smallpox by the movement of

[158] Fenner, *et al.*, *Smallpox and its eradication*. p. 1352

refugees in Bangladesh, Botswana, Ethiopia, Nepal, Iran and Iraq. A new consensus emerged that vaccination campaigns targeting the entire population would not suffice. [159] A new strategy of targeted vaccination was developed whereby teams were sent to search villages, markets and houses for smallpox. When they found a case, they quarantined and vaccinated the surrounding people.

Perhaps most importantly, in order for the benefits of international cooperation to be realised, the eradication campaign needed to eliminate disease from places with weak governments, scarce health services, and intense migration. The strategy of targeted vaccination, and the corresponding measures of the campaigns success based on disease incidence, put these financial benefits of total eradication within reach. Thus, the 1967 consensus on the measurement of progress by disease incidence, and the development of a strategy for targeted vaccination, led to a dramatic shift in cost-benefit calculations and created an incentive for rational actors to support international cooperation.

Concluding thoughts on smallpox eradication

International cooperation on smallpox eradication failed to emerge after many years of contagion, during which the disease posed a risk of spreading to countries that had eradicated it, and nations bore the costs of vaccinating their entire population. International cooperation did not emerge, despite the incredibly favourable cost-benefit calculations of such cooperation, which were overwhelming for powerful actors, including the United States. For nearly two decades, there was little interest in financing global smallpox eradication at WHO. However, in 1966, WHO passed a budget that included smallpox eradication, against the wishes of its most powerful members. Concurrently, a new consensus among scientists was reached on strategies for measuring the success of eradication efforts and an approach to targeted vaccination. This consensus, which increased the confidence that the benefits of smallpox eradication could be realised, and WHO's broad membership, which allowed cooperation to diverge from the

[159] Brilliant, *The Management of Smallpox Eradication in India: A Case Study and Analysis*.

interests of the most powerful states, are most critical in explaining the emergence of cooperation in 1967. The persistence of cooperation after 1967 was facilitated by technological developments which lowered the price, and increased the availability of vaccine, and by the independence and centralization of WHO that allowed for the pooling of national contributions, the avoidance of gaps in coverage and the verification of national eradication. These developments, which occurred with a background of resistance from bureaucratic self-interests, made cooperation more successful, and in turn increased support for cooperation on smallpox eradication.

CONCLUSIONS

The eradication campaigns against smallpox and malaria were closely intertwined. In many ways, smallpox eradication was malaria's opposite. Contagion and rational-self interest would expect cooperation on both diseases. However, for malaria, cooperation was driven by contagion and the interests (financial and strategic) of powerful actors; while for smallpox, cooperation was driven primarily by international institutions and scientific consensus. International institutions, essential to explaining the emergence of cooperation on smallpox, were incidental to cooperation on malaria. Of course, scientific consensus played an important role creating incentives for cooperation on malaria, but consensus played a more important role in ending cooperation on malaria eradication than it did in initiating it. Below, I consider the extent to which cooperation on smallpox and malaria from 1948 to 1976 can be explained by contagion, and by each of the other explanatory categories

Variations in contagion do not appear to explain variations in cooperation on malaria and smallpox. The contagion index for smallpox is much higher during this period than the index for malaria, due to the possibility of preventing and treating malaria at the national level. However, the contagion index is an incomplete reflection of malaria's externalities because it does not capture the threat posed to the tools for prevention (developing resistance to DDT), nor the

threat posed to treatment (inability to access the major sources of quinine in Japanese occupied lands). These new threats gave a critical impetus to cooperation on malaria control. On the other hand, for smallpox, the threats posed by contagion, while great, were essentially unchanged since the 1930s. In considering contagion's role in explaining cooperation, shifts in contagion may be more important than the absolute levels of contagion in explaining international cooperation.

Both malaria and smallpox campaigns promised powerful actors with benefits that exceeded the costs of cooperation. WHO reported that malaria was slowing economic growth in 120 of 210 countries, and the United States calculated that malaria was costing the US over 300 million dollars annually, paid through higher prices on imports from malarious regions. Experts had estimated that malaria eradication would cost 1 billion dollars (though approximately 1.4 billion was spent during this period). Nonetheless, the cost-benefit ratios appeared favourable, even with a short time horizon. Similarly, the cost-benefit ratios were overwhelmingly favourable for smallpox eradication. For several powerful states, even acting alone, the benefits of global eradication would have exceeded the total cost. As illustrated in this chapter, smallpox cost the United States 150 million dollars annually in 1967, due to the costs of vaccination and medical complications from vaccine. Experts estimated in 1967 that eradication would cost 48 million dollars, though the total international expenditure on smallpox was 98 million dollars, and the total cost of eradication (including the national contributions of endemic countries) was approximately 300 million dollars. Given even a short time horizon, the potential benefits of cooperation far exceeded the costs, so long as total eradication would be successful. The support of leading actors, based on benefits of cooperation that exceed the costs of cooperation, may be essential to driving cooperation on malaria and smallpox. However, these calculations remained relatively unchanged throughout the eradication campaigns, and they fail to explain the start and stop of cooperation on smallpox and malaria.

International institutions were incidental to cooperation on malaria, and essential to driving cooperation on smallpox. International cooperation on malaria was nominally based in WHO, though the institution's membership and formal rules exerted no discernable impact on cooperation, and the institution did not create any divergence from the interests of the United States, which sponsored most of the malaria eradication efforts. In contrast, an ambitious eradication program for smallpox was pushed forward by weaker states in the WHO, against the wishes of the most powerful members who favoured a less expensive campaign. Without China's entry into WHO in 1973, and the disease reporting on smallpox that followed, national governments would not have terminated their own vaccination programs, and thus would not have reaped the benefits of international cooperation. International institutions with broad membership and autonomy were essential to driving eradication on smallpox, though they played a minor role in explaining cooperation on malaria.

Consensus on scientific knowledge and advances in technology are important in explaining the initiation, and the timing, of cooperation on smallpox and malaria. For both malaria and smallpox, consensus on strategy and new technologies emerged on the eve of major eradication campaigns. For malaria, DDT was proven as an effective anti-mosquito agent during the War, and shortly after, WHO sponsored large-scale studies successfully determining that DDT was effective in preventing malaria in several Asian countries. For smallpox, 1967 brought a consensus on a strategy of targeted vaccination, making it possible to reach persons in places with weak governments and poor health services, and the development of a bifurcated needle and jet-injector, which greatly reduced the costs of vaccination.

In 1959, when the goal of smallpox eradication was first endorsed by the World Health Assembly, malaria received 209 times the WHO funding as smallpox (Appendix 5B). Both malaria and smallpox were contagious diseases. Both presented greater benefits to cooperation than costs. Yet, the cooperation that emerged differed greatly in scale, nature and timing. As I

have shown here, contagion explains little of the variation in cooperation between smallpox and malaria from 1948 to 1976.

Chapter 6: 1976-2006 – International Cooperation on Nutrition, HIV/AIDS and Tobacco

Today, observers of global health note the overwhelming focus of international financing on infectious diseases. In 2005, over 80 per cent of international health financing was directed toward infectious disease (Appendix 6B). In particular, funding for HIV/AIDS, TB and malaria in 2006 made up just under half of all allocable development assistance for health.[1] As discussed in Chapter 1, these recent observations have driven analysts to suggest that contagion drives cooperation.

However, these trends favouring infectious diseases are new. In the 1990s, less than 20 per cent of international health financing, and only 11.4 per cent of the United States government's international health financing, went to infectious diseases (Appendix 6B).[2] Infectious diseases, including HIV/AIDS, were often neglected in the recent history of international cooperation on health. For the United States and the World Bank, the major financiers of international cooperation on health during this period, nutrition and family planning were the early international priorities. In this chapter, I explore the drivers and barriers to cooperation on nutrition, HIV/AIDS, and tobacco control, demonstrating that explanations based on contagion alone explain little of the observed cooperation on health.

Contagion does not appear to have caused cooperation to emerge on nutrition, HIV/AIDS or tobacco. Cooperation emerged on nutrition when under-nutrition was linked to the under-development of world economies. While economic self-interest played an important role in driving donor states to support cooperation on nutrition, there was never a threat of a spreading pandemic of under-nutrition. Perhaps surprisingly, a compelling case against the contagion

[1] Ravishankar*, et al.*, 'Financing of global health: tracking development assistance for health from 1990 to 2007'. And Department of Error, 'Department of Error', Lancet, (2009) vol. 374, no. 9703, p. 1744.
[2] GAO, 'Factors Contributing to Low Vaccination Rates in Developing Countries - Report to Congressional Requesters', (Washington DC: United States General Accounting Office, 1999). P. 18

thesis is made by cooperation on HIV. It is precisely when the contagious threat of HIV declined that cooperation emerged. In the early days of HIV, the disease was not universally present, and there were no treatments (which would mitigate disease severity). In these early days, from the 1980s to the late 1990s, there was relatively little international cooperation on HIV. However, when the contagion index for the disease fell with the development of treatments, cooperation emerged. For HIV, with decreasing contagion, there was increasing international cooperation. For tobacco, rich states were able to both prevent and treat diseases within their borders through the regulation of tobacco sale and use, and treatments (albeit expensive ones) for the ailments caused by tobacco use. For rich states, there was an incentive to cooperate to prevent the illegal smuggling of tobacco, but beyond smuggling, there was relatively little international externality associated with tobacco. For all the cases examined in this chapter, the causal relationship between contagion and cooperation is tenuous, and needs to be probed and challenged.

Before examining the relative distribution of cooperation among diseases, it must be noted that during the period examined here, development assistance for health was rising steadily, and began to rise sharply around 1998 (Figure 6.1 and Appendix 6A). As seen in section 6.3, this sharp rise is due to the emergence of cooperation on HIV/AIDS treatment. Development assistance for health grew at an average of 5.59 per cent annually from 1976 to 1998, then at 10.9 per cent annually from 1998 to 2002 and 13.2 per cent annually from 2002 to 2006 (see Appendix 6A). Notably, development assistance for health continued to grow from 1992 to 2000, at a time when total Official Development Assistance (ODA) was falling.[3] An OECD report demonstrates that during this time period, health began to take a larger portion of development assistance, rising from 8% of total ODA in 1996-1998 to 13% in 2002-2004.[4] Overall, development assistance for health in 2006 was nearly 10 times development assistance for health in 1976 (in 2008 dollars, Appendix 6A).

[3] OECD, *Recent Trends in Official Development Assistance to Health* (2004 [cited 10 March 2010]); available from www.oecd.org/dataoecd/1/11/37461859.pdf.
[4] Ibid. Some countries give a much larger share of their ODA to health. These include Ireland (35%), Luxembourg (29%) and the United Kingdom (23%)

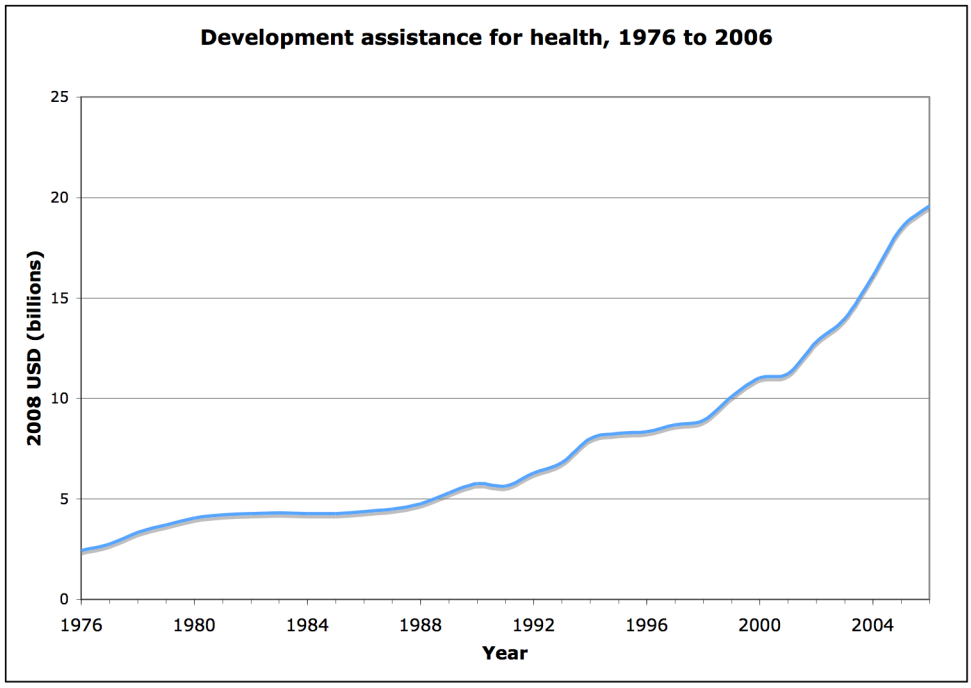


Figure 6.1 Development assistance for health, 1976 to 2006. See Appendix 6A for data and sources.

Despite the dramatic rise in international health financing, the Health Cooperation Index remains comparably composed of financing, regulation and research & surveillance throughout this period. In 1976, financing was responsible for an average of 37.8 percent of the Health Cooperation Index of each disease (Appendix 6B). In 2005, financing was responsible for an average of 40.2 per cent of the Health Cooperation Index. The remainder of the Health Cooperation Index is made up of scores from regulation and research or surveillance. Notably, the highest HCI in 1976 is 49.9 (diarrhoeal disease), while the highest HCI in 2005 is 87.89 (HIV) (Appendix 6B for details).

Major developments in international health institutions: New players and new priorities

The period from 1976 to 2006 saw the emergence of new institutions for international cooperation on health. In the late 1970s, WHO and the United States stated a vision for health based on basic health services for all. This focus led WHO to (temporarily) abandon disease-focused campaigns by the early 1980s. At the same time, the World Bank began disbursing

loans and grants for health, based on recognition of the importance of health for development. In 1976, the World Bank provided 19 million dollars to a nutrition program in Brazil. By 1981, the Bank disbursed 79 million dollars for health; this figure jumped to 400 million dollars by 1990.[5] Notably, in 1990, the World Bank committed 933 million dollars for health,[6] and by 2005, the World Bank disbursed 3.8 billion dollars for health annually.[7] The increase in World Bank funding for health was justified and guided by the 1993 World Development Report, which laid out the most cost-effective health priorities and estimated the burden of disease around the world.[8] The World Bank quickly became a dominant financier of international cooperation on health. In response to the global HIV/AIDS epidemic, two major institutions were launched: UNAIDS was launched in 1996 to coordinate the response of UN agencies to the epidemic and to reach beyond the health sector; and, the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) was created in 2002 to facilitate collective financing on the disease. In 2005, GFATM disbursed over a billion dollars in funding.[9] And by 2006, GFATM contributed 'two-thirds of all donor resources to fight tuberculosis, half for malaria, and one-quarter for HIV/AIDS.'[10] These new institutions changed the process of international cooperation on health.

In addition to new international institutions for cooperation on health, there were new institutional rules for selecting priority areas for cooperation. Three frameworks emerged that shaped the priorities for international cooperation on health. First, WHO adopted a goal of 'Health for All' based on a system of universal primary care in 1977. This was followed by the International Conference on Primary Health Care, in Alma Ata, Kazakhstan in 1978, where 134

[5] C. Michaud & C. J. Murray, 'External assistance to the health sector in developing countries: a detailed analysis, 1972-90', Bull World Health Organ, (1994) vol. 72, no. 4, pp. 639-51.
[6] Sridhar & Batniji, 'Misfinancing global health: a case for transparency in disbursements and decision making'.
[7] Michaud & Murray, 'External assistance to the health sector in developing countries: a detailed analysis, 1972-90'.
[8] World Bank, *World Development Report 1993: Investing in Health*.
[9] Sridhar & Batniji, 'Misfinancing global health: a case for transparency in disbursements and decision making'.
[10] S. Radelet & B. Siddiqi, 'Global Fund grant programmes: an analysis of evaluation scores', Lancet, (2007) vol. 369, no. 9575, May 26, pp. 1807-13. P. 1807

countries and numerous NGOs adopted primary health care as the framework for achieving this goal of health for all. The Health for All agenda framed health as a development issue and firmly placed responsibility for health with governments, and linked health to an agenda based on equity and universal access to care.[11] The focus of the Health for All framework put priority on primary healthcare, nutrition and sanitation, and this was reflected in international financing for health throughout the 1980s and 1990s.

The second framework shaping institutional priorities and rules for cooperation was based on the 'Global Burden of Disease.' This framework emerged from the World Bank in the late 1980s, partly in response to WHO's focus on universal primary health care. The Global Burden of Disease framework put priority on those diseases with the highest burdens and most cost-effective interventions, creating a vision for 'selective' (rather than universal) primary health care. The idea that the measurement of disease burden should guide the selection of institutional priorities was definitively stated by the World Bank in the 1993 World Development Report.[12] By 1998, upon the election of Gro Harlem Brundtland as Director-General of WHO, this framework was also adopted by WHO. Brundtland imported the people and the ideas that had created the Bank's health strategy into a new WHO department, seeking to embed priority-setting processes based disease burden into WHO. As a senior WHO staff member explained, 'Brundtland wanted to direct the budget, attention, and resources to the burden of disease.'[13] As her senior advisor commented, 'Brundtland was not politically naïve. She said priorities must follow the burden of disease to create a shift [in priorities].'[14] The creation of a policy within WHO of directing funding towards those issues which present the greatest burden led directly to cooperation on tobacco control.

[11] I. Kickbusch, 'The development of international health policies--accountability intact?' Soc Sci Med, (2000) vol. 51, no. 6, Sep, pp. 979-89.
[12] World Bank, *World Development Report 1993: Investing in Health*.
[13] Bettcher, Doug. Personal interview. 7 November 2007.
[14] Smith, Ian. Personal Interview. 8 November 2007

The third framework shaping institutional priorities and rules for cooperation was based on the Millennium Development Goals (MDGs). In 2000, 147 heads of state committed themselves to a series of development objectives, to be reached in the next 15 years. Known as the Millennium Development Goals since 2001, five out of eight of the MDGs and eight of the sixteen targets relate to health (Table 6.1).[15] The health MDGs seek to reduce child mortality, improve maternal health and combat HIV/AIDs, malaria and 'other major diseases.' The goals were formed initially from a review of OECD development policy and evolved based on agreements among donor countries.[16] These objectives, and their associated targets, were explicitly used by the World Bank, WHO and many bilateral agencies, to establish priorities for international cooperation on health.[17] Critically, donor agencies re-shaped their programming to focus on the MDGs. As one senior official the UK's Department for International Development said, 'the reason why non-communicable disease is not on our agenda is simple. It is not in the MDGs.'[18] The adoption of the MDGs as the basis for international cooperation on health, like the adoption of previous frameworks, may explain some of the variations in cooperation.

Nutrition (MDG 1): Reduce by half the proportion of people who suffer from hunger
Child Mortality (MDG 4): Reduce by two thirds the mortality rate among children under five
Maternal Health (MDG 5): Reduce by three quarters the maternal mortality ratio
HIV/AIDS, malaria and other diseases (MDG 6): Halt and begin to reverse the spread of HIV/AIDS and the incidence of malaria and other major diseases
Environment (MDG 7): Reduce by half the proportion of people without sustainable access to safe drinking water
Development (MDG 8): In cooperation with pharmaceutical companies, provide access to affordable essential drugs in developing countries

Table 6.1: Health-related MDGs[19] Source: http://www.who.int/mdg/goals/en/index.html and http://www.un.org/millenniumgoals/#

Major variations in cooperation, 1976-2006

The priorities for international cooperation on health shifted sharply from 1976, when the focus was on diarrhoeal disease, nutrition and population control, to 2005, when the focus was on

[15] 'The Millenium Development Goals and the United Nations Role' (2002). http://www.un.org/millenniumgoals/background.html.
[16] M. A. Clemens, C. J. Kenny & T. J. Moss, 'The Trouble with the MDGs: Confronting Expectations of Aid and Development Success', World Development, (2007) vol. 35, no. 5, pp. 735-51. P. 736
[17] B. Saraceno*, et al.*, 'Barriers to improvement of mental health services in low-income and middle-income countries', Lancet, (2007) vol. 370, no. 9593, pp. 1164-74.
[18] Borowitz, Michael. Personal interview. 30 January 2008
[19] http://www.who.int/mdg/goals/en/index.html and http://www.un.org/millenniumgoals/#

HIV/AIDS and malaria. As noted at the start of this chapter, from 1976 to the late 1990s, there was relatively little cooperation on infectious diseases. Excluding the infectious causes of diarrhoea (which are addressed with water and sanitation projects, rather than disease-specific interventions), 21.6 per cent of funding in 1976 was directed toward infectious disease (Appendix 6B).[20] In contrast, 80.3 per cent of funding in 2005 was directed toward infectious disease (Appendix 6B).[21] Figures 6.2 to 6.4 below show the varying levels of contagion and cooperation in 1976, 1990 and 2005.

This chapter examines and explains four of the unexpected points from the Figures 6.2 to 6.4 below. First, I explain the persistent cooperation on nutrition, beginning in 1976 and continuing through the 1990s (Figures 6.2 and 6.3). Second, I examine the failure to cooperate on HIV/AIDS despite the high level of contagion for the 1980s and most of the 1990s (Figure 6.3). Third, I explain why cooperation on HIV/AIDS goes well beyond that ever observed before in health (Figure 6.4). Finally, I explain the emergence of cooperation on tobacco control (Figure 6.4). The most dramatic outlier in these figures is HIV, which scores much higher on the Health Cooperation Index in 2005 than any other disease category.

[20] This figure excludes funding for water and sanitation entirely. Non-contagious diseases received the following funding: population control, 52.8 per cent; nutrition 25.3 per cent. See Appendix 6B.
[21] Non-contagious diseases received the following funding: maternal and perinatal conditions, 11.7 per cent; chronic NCDs, 7.5 per cent; nutrition ,2.3 per cent.

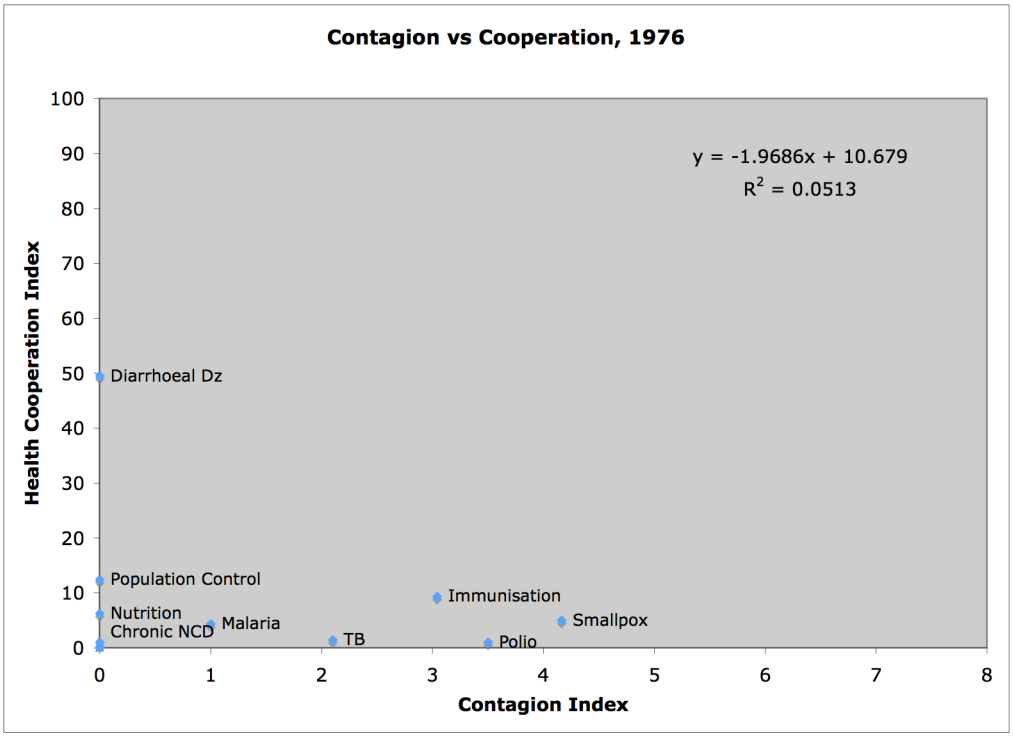


Figure 6.2 Contagion versus cooperation, 1976

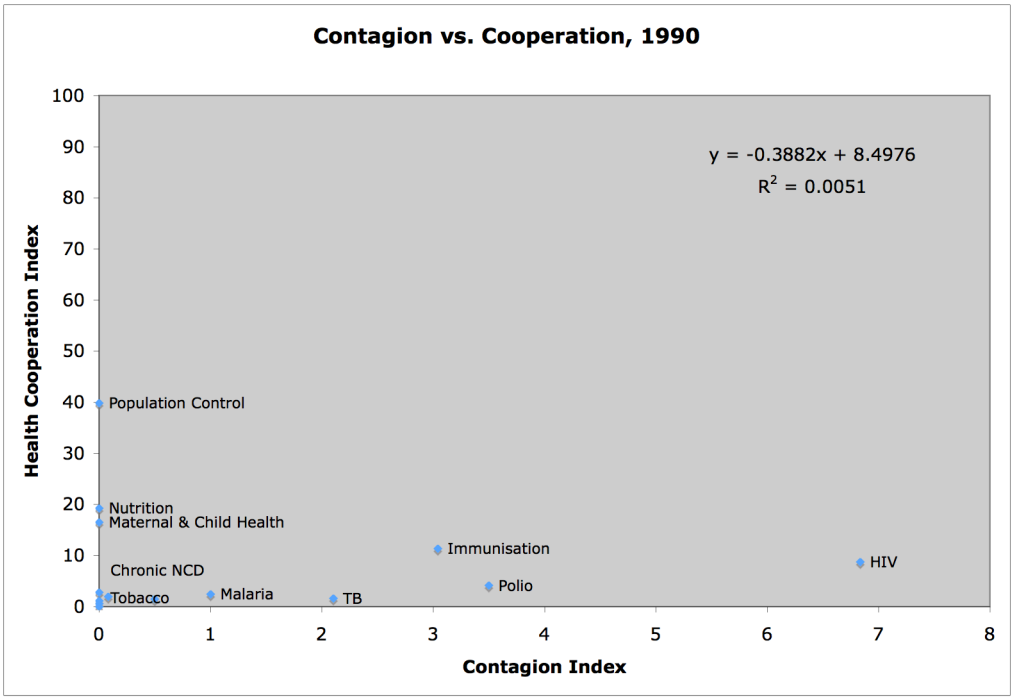


Figure 6.3 Contagion versus cooperation, 1990

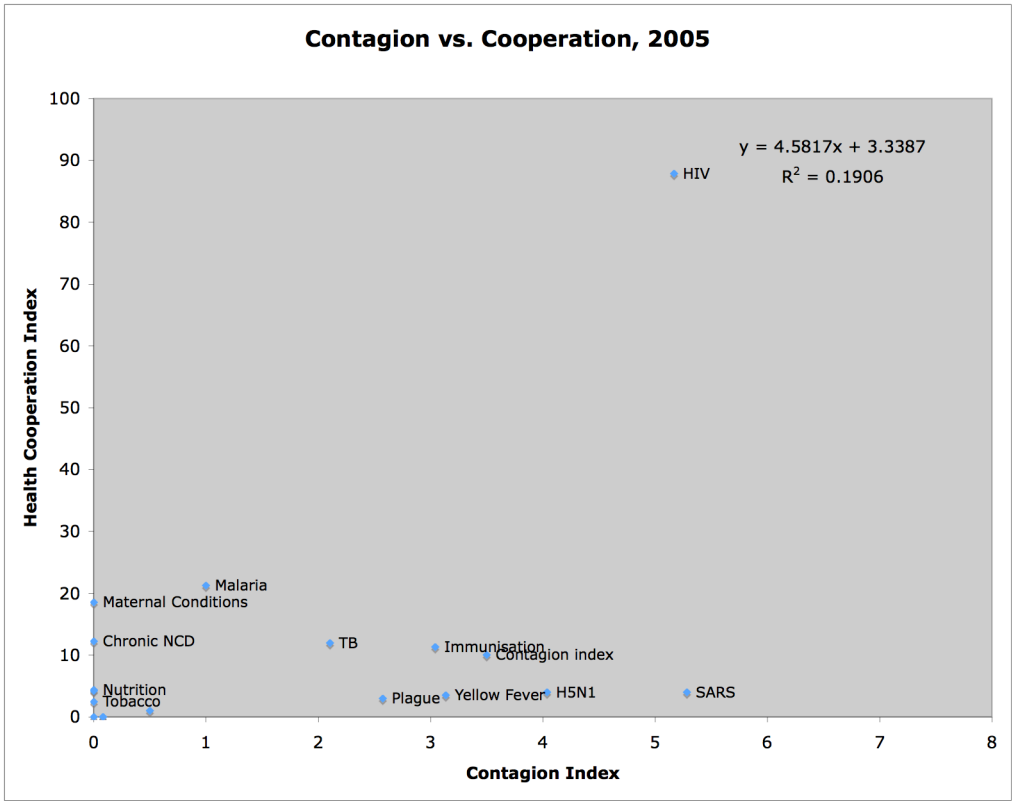


Figure 6.4 Contagion versus cooperation, 2005

The figures above, like those in previous chapters, do not include the financial incentives indicator (based on a measure of global disability burden). The addition of the financial incentives indicator raises the contagion index for non-contagious diseases, reflecting the international economic externalities posed by these diseases. In figures 6.5 below, I show the contagion+ versus cooperation graphs for 2005, which includes the financial incentives indicator in the contagion index. The most significant increases (increases shown in brackets) seen are in the index scores for chronic non-communicable disease (5.81), under-nutrition (2.8), mental health (2.18), pneumonia (1.06) and tobacco (0.65). The financial incentives indicator, introduced in Chapter 3, assumes that Disability-Adjusted Life Years can serve as a proxy for the economic impact of a disease, which is consistent with leading methods in estimating the costs posed by each disease in the field of public health.

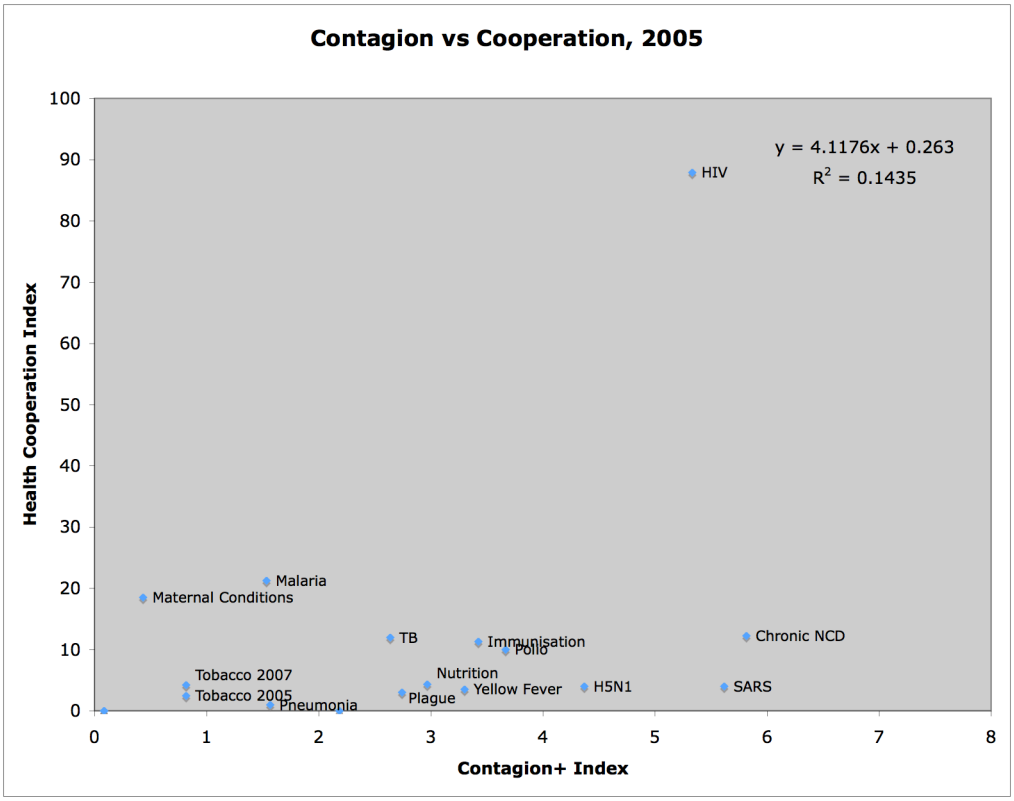


Figure 6.5 Contagion + index versus cooperation, 2005 (with financial incentives indicator)

6.1 COOPERATION ON NUTRITION

Unlike smallpox, hunger in India does not threaten to spread to the United States; nor will the elimination of hunger in India provide direct financial benefits to the United States. Yet, even in the final days of the international fight against smallpox, nutrition became a priority for international cooperation on health. This cooperation would take two major forms. First, international institutions began funding nutrition interventions. Second, and later, international regulations were created for breast milk substitutes (infant formula), which had been shown to increase malnutrition in poor countries. In this section, I analyse how leadership, international institutions and knowledge communities have driven cooperation on nutrition, determining that formal institutional rules and knowledge communities play critical explanatory roles.

International cooperation on nutrition most visibly emerged in 1976 when the World Bank gave 19 million dollars to a nutrition program in Brazil. This sum was nearly double the 10.4 million dollars that went to international smallpox control in 1976 from all sources, including WHO,

voluntary contributions and bilateral aid (see Appendix 5B). To put it in perspective, this sum was about one-fifth of the total amount the international community spent on smallpox control for the entire duration of the more than decade-long intensified smallpox campaign (Appendix 5B).

International financing for nutrition grew quickly. By 1990, international financing for nutrition reached 730 million 2008 USD annually (446 million in 1990 dollars, Appendix 6B). The World Bank became a major international financier of nutrition programs, contributing nearly three-fourths of the 1990 international nutrition financing. Other international institutions and bilateral donors also contributed to nutrition financing. UNICEF provided an annual average of 9 million dollars for nutrition in the 1970s, and was providing 29 million dollars by 1990.[22] In addition, nutrition became central to development policies in American, German and Canadian aid agencies, and nutrition policies became a component of the World Bank's structural adjustment programs. Berg notes that these policy effects cannot be directly quantified, but are reflected in the 'more than sevenfold increase' in Venezuala's spending on nutrition from 1989 to 1991 during a period of World Bank guided structural adjustment.[23] From 1976 to the early 1990s, there was a dramatic rise in international financing for nutrition, and international cooperation to promote policies favouring investment in nutrition. As Berg wrote in 1993, 'resources and attention for nutrition--even in an era of tight resources and compassion fatigue-are clearly on an upsurge. We in nutrition no longer are trying to walk up the down escalator.' [24]

In addition to financing, there was a regulatory effort that emerged in the 1970s to limit the international sale and marketing of breast-milk substitutes, which were shown to lead to under-nutrition, infection and deaths in babies. With beginnings as a trans-national grass roots advocacy effort, the movement to regulate the corporations producing breast-milk substitutes

[22] A Berg, 'Sliding toward nutrition malpractice: time to reconsider and redeploy', Annual review of nutrition, (1993) Jan 1.
[23] Ibid. p. 3
[24] Ibid. p. 4

was brought to international institutions.[25] In 1981, WHO and UNICEF approved an International Code of Marketing of Breast-milk Substitutes. As Sikkink details, the code restricted the marketing of breast-milk substitutes, though it did not limit the sale of these products.[26] By May 1984, Nestle (the largest producer of these substitutes) agreed to fully implement the Code. As Kelley Lee notes, the approval of the Code was the first time that members of a UN organization voted to regulate a transnational industry.[27]

Explaining international cooperation on nutrition

Contagion explains little of the international cooperation on nutrition

International financing for nutrition did not emerge to prevent malnutrition from spreading to rich countries. Nor was regulation on breast milk substitutes meant to limit the marketing and sale of breast milk substitutes in rich countries. Malnutrition posed no risk of international spread, and breast milk substitutes were safe to use in developed countries where water supplies were clean and the products were properly prepared. As described below, nutrition experts made the case that malnutrition hindered national development, that breast milk substitutes caused malnutrition, and that there was a crisis in nutrition. Ultimately, the realisation that improved nutrition in poor countries would lead to benefits in rich countries, served to drive cooperation.

---

[25] Kathryn Sikkink, 'Codes of Conduct for Transnational Corporations: The Case of the WHO/UNICEF Code ', International Organization, (1986) vol. 40, no. 4, Autumn, 1986, pp. 815-40. Sikkink's analysis highlights the novelty of NGOs impacting a transnational corporation.

[26] Ibid. Sikkink writes that the code, 'calls for a prohibition on the use of mothercraft nurses to promote formula, bans direct advertising of breast-milk substitutes, prohibits distribution of free samples to mothers, and requires product labels to acknowledge the superiority of breast feeding and warn about the dangers of improper preparation. The code forbids the use of health care facilities for the promotion of baby food and limits company donations and gifts to hospitals and health care personnel. In addition, it specifies that companies shall not pay employees any commissions or bonuses on sales of infant formula.' P. 822

[27] Lee, *The World Health Organization (WHO)*. P. 89

Leadership of the United States drives early cooperation on nutrition

The United States government's commitment to international cooperation on nutrition preceded, and facilitated, the World Bank's focus on the issue.[28] By the 1960s, the United States had been working to improve nutrition, especially in the Americas, operating 'food for freedom' and 'food for peace' campaigns.[29] USAID began nutrition work in the early 1970s, but these programs took on increasingly clear focus with President Jimmy Carter's commitment to the issue in 1977. Shortly after coming to office, the Carter administration had made nutrition a core component of the 'basic health' programs it sought to implement through USAID, in collaboration with other government agencies.[30] USAID's nutrition strategy was not based on achieving reductions in malnutrition in developing countries, but rather, based on, 'encouraging and assisting countries to incorporate nutrition goals into their planning and by helping them implement the policies and programs which emerge from such planning.'[31] In this respect, United State's sponsorship of efforts on nutrition differ sharply from the previous cooperation on malaria and smallpox, in which US funding sought to facilitate the implementation of programs, rather than policies.

The United States sponsorship of international cooperation on nutrition was most pronounced in the area of nutrition research. The United States sponsored 1.6 billion dollars of research on nutrition problems in developing countries from 1971 to 1991 (roughly 3.8 billion 2008 USD). This investment in nutrition research supported the development of nutrition experts and provided a basis for World Bank nutrition programs. In comparison, the United States provided a more modest contribution to international financing for nutrition. In 1990, the United States provided 56.5 million to international nutrition interventions, which was about 12.4 per cent of

[28] As discussed in the following section, Sridhar notes that USAID's support for nutrition encouraged the World Bank to take on the issue. See Devi Sridhar, *The Battle Against Hunger* (Oxford: Oxford University Press, 2008). P. 43

[29] USAID, 'Report on the health, population and nutrition activities of the Agency for International Development, 1967/1968', (Washington DC: USAID, U.S. Dept of Health and Human Services, 1969).

[30] James McIntyre & Peter Bourne, 'Memorandum to the President: Status Report - World Health Strategy', (Washington DC: 1978).

[31] USAID, 'Annual Budget Submission FY 1981, Development Support Bureau, Office of Nutrition', (Washington DC: USAID, 1979). P. 1. USAID committed 15.01 million 1980 USD to international nutrition in this budget

the total financing for nutrition.[32] The United States government was willing to bear the costs of nutrition research (though only a modest amount of the costs of interventions).

In regulating breast-milk substitutes, powerful actors, including the companies producing breast-milk substitutes, took a leading role in bringing the issue to international institutions. As Sikkink has detailed, the request for WHO to consider a code on breast milk substitutes emerged from a 1978 meeting between United States Senator Edward Kennedy and industry representatives.[33] However, the support for the Code from the United States and from industry diminished after the Reagan administration came to power in January 1981, and industry realised it could not control the WHO negotiations. As discussed in the section below, the institutionalisation of the issue within WHO allowed cooperation to persist after a reversal in the preferences of the powerful actors that had initiated cooperation.

International institutions facilitate cooperation beyond state interests

The World Bank's lending and grant-making to nutrition had their origins in the Bank's focus on international development, which had been cultivated by World Bank President Robert McNamara. In an analysis of the World Bank, Finnemore, citing no widespread political change that empowered poor countries, nor a change in the condition of the poor, argues that the institutionalization of poverty concerns within the World Bank, and the organizational structure of the Bank allowed poverty-alleviating projects to gain priority.[34] Finnemore notes that between 1968 and 1975, the goal of poverty alleviation became institutionalised in the international development effort. She writes,

> 'Concerns about poverty had been around for centuries and arguments that development activity should be attending to distributional issues had begun to appear in the new discipline of development economics for several years. However these views did not become globally influential until they found a powerful organizational home, as they

[32] McFarland, 'Review of child survival funding: 1980-1995.'
[33] Sikkink, 'Codes of Conduct for Transnational Corporations: The Case of the WHO/UNICEF Code '.
[34] M. Finnemore, 'Redefining development at the World Bank', in Fredrick Cooper & Randall Packard, eds., *International Development and the Social Sciences: essays on the history and politics of knowledge* (Berkeley: University of California Press, 1997). P. 203

> did when McNamara brought them to the Bank. Ideas needed to be institutionalized for maximum effect.'[35]

Finnermore's conclusion, like the evidence presented here, is concordant with the view that formal rules of institutions determine priorities, allowing them to diverge from contagion. It was from this institutional focus on poverty and development that nutrition efforts emerged from the World Bank.

The historical record supports Finnemore's conclusion that the World Bank's institutionalisation of poverty concerns, including nutrition, allowed these concerns and ideas to be translated into international cooperation. As Sridhar notes, the emergence of nutrition as an institutional priority at the World Bank was driven by McNamara's attendance at a 1971 conference on nutrition, and 'by the priority given to nutritional planning by USAID and the Rockefeller Foundation.'[36] The 1971 conference had been organised by Alan Berg, a prominent nutritionist whose 1967 article, and 1973 book on international nutrition made the compelling case that good nutrition was fundamental to national development (both of these are considered in the section on knowledge below).[37] McNamara asked Berg to write a policy brief on nutrition. Sridhar notes, 'this brief was crucial as it convinced the Bank's Board and several senior managers that the Bank should start lending for nutrition.'[38] By 1972, Berg joined the Bank as an advisor, and helped establish a nutrition unit within the World Bank. And, by 1976, the Bank made its first loan for nutrition. The 1980 World Development Report focused on social sector investments, advancing the view that improved nutrition would lead to economic growth. [39]

WHO's institutionalisation of regulatory efforts allowed cooperation to persist after the interests of powerful actors had changed. The idea of a code for breast-milk substitutes was brought to

---

[35] Ibid. P. 203
[36] Sridhar, *The Battle Against Hunger*. P. 43. Note that on p. 43-44, Sridhar gives a detailed account of the emergence of nutrition as an institutional priority at the World Bank.
[37] Berg, 'Malnutrition and National Development'. See also Alan Berg & Robert Muscat, *The nutrition factor: its role in national development* (Washington Dc: Brookings Institution, 1973).
[38] Sridhar, *The Battle Against Hunger*. P. 85
[39] Ibid. P. 43.

WHO by the Carter administration, sympathetic to concerns about the health effects of these products, and by a transnational industry seeking an escape from the negative press. Shortly after the inauguration of President Reagan, the President sent Elliot Abrams to meet with Director General Halfdan Mahler, indicating United States opposition to binding regulations. [40] Ultimately, the United States voted against even the non-binding 'Code' adopted by WHO in 1981. Similarly, industry reversed its initial support for the Code upon realising that with the formal WHO negotiating process, they could no longer control the code, which was becoming more constrictive than they had desired. Sikkink credits the speed of the negotiating process and the use of the international forum based on consensual knowledge for preventing the new United States administration from undermining the negotiations.[41] Formal institutional rules for negotiation allowed cooperation on the regulation of breast-milk substitutes to go beyond the interests of powerful actors.

Knowledge communities make the economic costs of under-nutrition clear

Scientists and public health experts working on nutrition communicated the externalities of under-nutrition in two distinct ways. First, beginning in 1965, a WHO Expert Committee on Nutrition and Infection sought to put together epidemiological, clinical and experimental evidence on whether 'malnutrition increases susceptibility to infectious diseases,' and whether 'infectious diseases have an adverse effect on nutritional state.'[42] In effect, scientists were establishing a bi-directional causal relationship between under-nutrition and contagion. In doing so, they associated under-nutrition with the risk of epidemics and the threat of lethal infection. Second, experts made a compelling case that it was in the financial self-interest of key actors to support cooperation on nutrition. As Alan Berg concluded in his seminal 1967 article, 'without improved nutrition in the less favoured two- thirds of the world, the development of human resources-and the development of the nations themselves is sure to be

[40] Sikkink, 'Codes of Conduct for Transnational Corporations: The Case of the WHO/UNICEF Code '.
[41] Ibid.
[42] N Scrimshaw, C Taylor & J Gordon, 'Interactions of nutrition and infection', in *World Health Organization Monograph Series* (Geneva: WHO, 1968). P. 9

retarded.'[43] Berg's article suggested that under-nutrition led to mental retardation and, in turn, diminished worker productivity, early death and medical costs. He cited estimates that under-nutrition costs India hundreds of millions of dollars each year. Berg communicated that under-nutrion effects most people in the world and has an enormous economic impact, creating a sense of crisis. Similarly, advocates and experts on breast-milk substitutes dramatised the finding that the improper use of these products was killing one to three million babies per year, creating a sense of crisis and urgency that resonated with the public.[44] Nutrition scientists in the 1960s associated under-nutrition with all core aspects of the contagion thesis, including epidemic potential, disease severity, financial burden. In doing so, nutrition scientists succeeded in communicating externalities for a non-contagious disease.

Knowledge communities in nutrition also succeeded in identifying policy alternatives and changing state interests. In his 1967 article, Berg posed questions about the potential impact of 10 million dollars in nutrition financing. By 1973, there were proposals to provide millions of dollars annually in nutrition financing.[45] By 1976, international financing for nutrition had taken off at the World Bank, based on the established importance of nutrition to national development. The path towards regulation of breast-milk substitutes was similarly quick, and based on scientist's success in identifying policy alternatives and changing state interests. A seminal article by Plank and Milanesi in 1973 found that there were 'three times as many deaths among babies given bottles before the age of 3 months as among those who were wholly breast-fed.'[46] Their study in Chile found that nearly half of children were bottle fed before the age of 3 months, and thus determined that bottle-feeding was a major contributor to infant mortality. Based on this finding, paediatric organisations and several experts forged a consensus that the marketing and sale of breast-milk substitutes should be limited. For both financing and

[43] Berg, 'Malnutrition and National Development'.
[44] Sikkink, 'Codes of Conduct for Transnational Corporations: The Case of the WHO/UNICEF Code '. p. 824
[45] Berg & Muscat, *The nutrition factor: its role in national development*.
[46] S J Plank & M L Milanesi, 'Infant feeding and infant mortality in rural Chile', Bull World Health Organ, (1973) vol. 48, no. 2, Jan 1, pp. 203-10. P. 203

regulation of nutrition, the total time from identifying the causal relationship, proposing the policy alternative, and implementing international cooperation was less than ten years.

Concluding thoughts on the emergence of cooperation on nutrition

International cooperation on nutrition emerged in the late 1970s, driven by a consensus among scientists that associated poor nutrition with slowed economic development, and the use of infant formula with poor nutrition and death. The institutionalisation of nutrition at the World Bank and WHO was a key driver of cooperation. Critically, powerful actors did not pose barriers to cooperation, and in doing so, facilitated the work of international institutions and the establishment of scientific consensus.

6.2 NON-COOPERATION ON HIV/AIDS PREVENTION

Today, HIV/AIDS has so visibly come to dominate international cooperation on health that analysts have been asking if the focus on HIV/AIDS might be displacing other health issues.[47] HIV/AIDS treatment has now become the most expensive cooperative effort in the history of international health (Figure 6.6). Looking back at the first years of the HIV/AIDS epidemic, from 1981 to 1998, a very different story is told. Then, HIV was demonstrated to be a highly contagious and lethal virus that was spreading around the world. While, early on, the virus affected mostly homosexual men and intravenous drug users in the United States and Europe, it was shown to be spreading among heterosexual populations in Africa and Haiti. The threat of contagion to the entire population was known. In defiance of the contagion thesis, cooperation on the early HIV/AIDS epidemic was muted. The United States did little to address the disease, failing to act in its own rational self-interest.[48] WHO, initially trying to promote cooperation on HIV, silenced the issue in the early 1990s. While a clear scientific consensus on the cause of the virus emerged by 1986, minor (and sometimes fringe) disagreements within the scientific

[47] Jeremy Shiffman, 'Has donor prioritization of HIV/AIDS displaced aid for other health issues?' Health Policy and Planning, (2008) vol. 23, no. 2, Feb 29, pp. 95-100.
[48] Greg Behrman, *The Invisible People* (New York: Simon & Schuster, 2004).

community were amplified into mainstream policy discussions. The failure to cooperate on HIV/AIDS is a challenge to interest-based explanations of international cooperation. Explaining this early cooperation failure is the subject of the analysis that follows.

Existing accounts of the early HIV/AIDS epidemic have been essential to the assessment here. Three books have been especially useful in shaping the analysis in this section. Greg Behrman provides an account of the failure of the United States to provide leadership in response to the early HIV/AIDS epidemic from the United States.[49] Jonathan Mann, who led WHO's early efforts on AIDS, offers a reflective account that focuses on the role of international institutions in responding to the early epidemic.[50] Steven Epstein has written an empirical study tracing the formation of consensus within the epistemic community, and this community's engagement with policy.[51]

An overview of the timeline of the early international response to HIV/AIDS helps to place the analysis in context. In 1981, gay men in Europe and North America began dying of an unexplained illness, with a range of infections suggesting that their immune systems had been compromised.[52] At the same time, Belgian doctors noticed a similar phenomenon among African patients seeking care in Brussels. By 1983, scientists suggested that a virus was the cause of the syndrome, and by 1984 scientists identified the virus, though some debate remained within the scientific community on its causal role. In 1983, prompted by a contamination of the blood supply with the suspected virus, WHO led the first international action on HIV/AIDS by calling a conference on blood safety. In 1986, WHO created the Special Program on AIDS, renamed the Global Program on AIDS in 1987. The WHO initiative sought to assist developing countries with national AIDS programs, to mobilise donors, and promote global action on AIDS

[49] Ibid.
[50] Jonathan Mann, D Tarantola & Thomas Netter, *AIDS in the world* (Oxford: Oxford University Press, 1992).
[51] Epstein, *Impure Science: AIDS, Activism, and the Politics of Knowledge*.
[52] Evidence now shows that the virus has existed in human populations since at least the mid 1970s, and likely earlier, though this was not known in 1981.

prevention.[53] In October 1987, the United Nations General Assembly passed a resolution on HIV, the first ever on a specific disease.[54] In January 1988, a Global Summit on AIDS, held in London, assembled more ministers of health than ever gathered before to discuss international cooperation on this disease. Yet, scientific progress and the initiatives of international institutions did not lead to cooperation. As late as 1995, only 2.8% of global expenditure for HIV/AIDS prevention went to sub-Saharan Africa, even though this region accounted for two-thirds of the world's HIV infections.[55] Despite the existence of a clear threat of contagion, there was very little cooperation on the prevention of HIV, and cooperative initiatives struggled to raise a fraction of their requested funding.

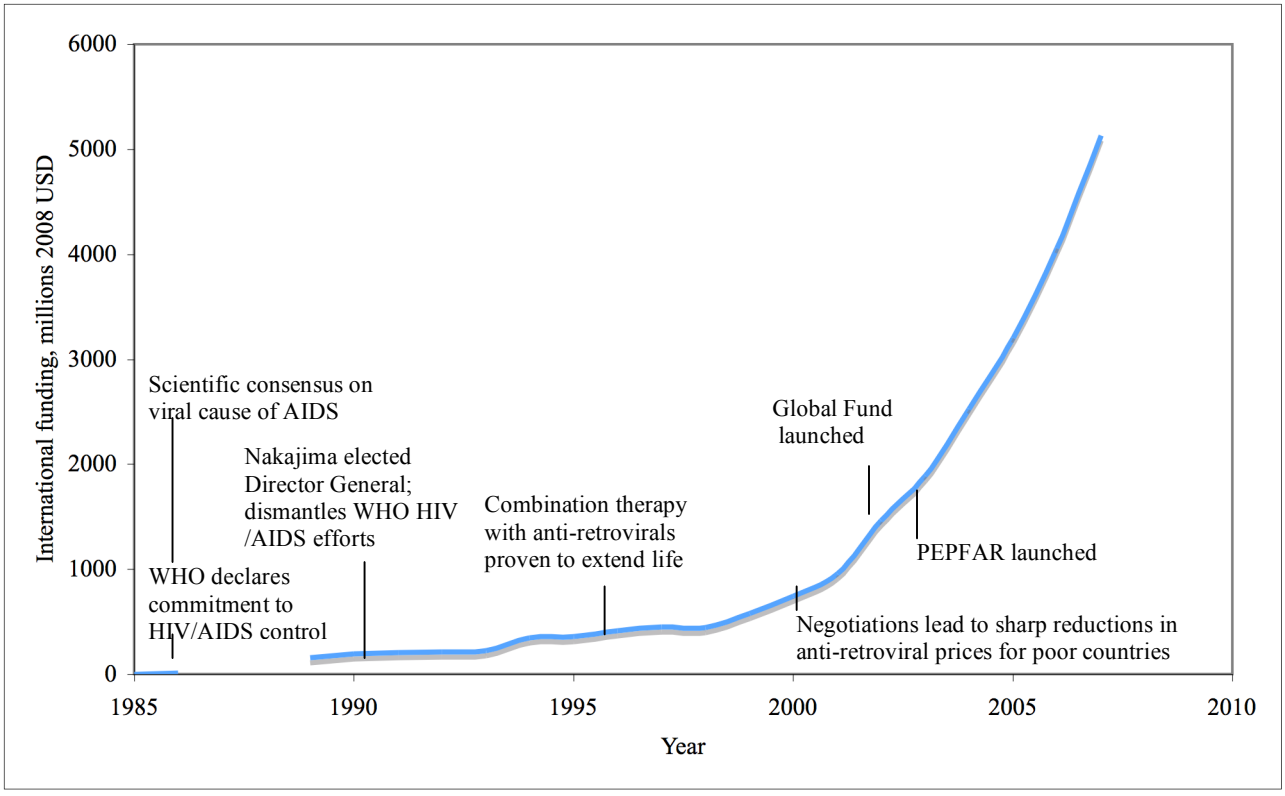


Figure 6.6 Timeline of cooperation on HIV/AIDS: key events and international funding by year. For detailed funding, see Appendix 6B.

Explaining the failure to cooperate on HIV/AIDS

[53] Mann, Tarantola & Netter, *AIDS in the world*.
[54] United Nations General Assembly, 'Prevention and control of acquired immunodeficiency syndrome (AIDS)', in *A/RES/42/8* (1987).
[55] P Lurie, P Hintzen & R Lowe, 'Socioeconomic obstacles to HIV prevention and treatment in developing countries: the roles of the International Monetary Fund and the World Bank', Aids, (1995) vol. 9, pp. 539-46.

Contagion fails to drive cooperation on HIV/AIDS prevention

By all measures, the early HIV/AIDS epidemic was associated with exceptionally high contagion. The disease was not universally present (and in particular, it had not penetrated heterosexual populations in some countries); it posed a viable threat of international spread; it could not be controlled with domestic efforts alone; and it appeared to kill everyone it infected. As Jonathan Mann, who led the WHO's HIV/AIDS efforts beginning in 1986, wrote, 'HIV demonstrates that a seemingly obscure health event in one place can become, within a short time, a health crisis at home.'[56] Here, I show that contagion failed to drive international cooperation because of a false belief that HIV would only spread to homosexuals, and because of concerns for the economic costs (primarily in reduced trade) of recognising HIV epidemics.

Policy-makers discarded some of the evidence on the contagious risks of HIV in favour of a misguided assessment that the epidemic was limited to homosexual populations. Early observations of the case fatality rate showed clearly that infection with HIV would kill more than 75 per cent of persons infected.[57] This figure made HIV more lethal than all infectious diseases except rabies.[58] The case-fatality rate should have created a strong incentive for cooperation. In addition, in the early epidemic, it was estimated that each infection created about 5 secondary infections, yet these secondary infections were overwhelmingly confined to homosexuals and IV-drug users (Appendix 3A). [59] These statistics had limited impact, as some decision makers were not convinced of the disease's ability to spread beyond homosexuals and intravenous drug users. If all new secondary infections could be limited to these marginalised communities, policy-makers needed to focus, in the words of the American Secretary of Health and Human Services, on stopping the virus 'before it spreads to the heterosexual community.'[60] It was perceived that international cooperation was not needed to stop the international spread

[56] Mann, Tarantola & Netter, *AIDS in the world*. P.227
[57] Rutherford, Lifson & Hessol, 'Course of HIV-1 infection in a cohort of homosexual and bisexual men: an 11-year follow up study'.
[58] D P Francis, 'Toward a comprehensive HIV prevention program for the CDC and the nation', Jama, (1992) vol. 268, no. 11, Sep 15, pp. 1444-7.
[59] May & Anderson, 'Transmission dynamics of HIV infection'.
[60] Margaret Heckler, United States Secretary of Health and Human Services, as quoted in Epstein, *Impure Science: AIDS, Activism, and the Politics of Knowledge*. P. 73

of the virus, but rather domestic efforts were needed to stop the spread of the virus from marginalised communities to the rest of the population.

In addition to measures of epidemic potential and disease severity, measures of the financial incentives for cooperation, based on economic modelling by WHO, failed to spur action. A 1993 WHO report estimated that a program of condom promotion, treatment of sexually transmitted infections, needle exchange for drug users, and screening of the blood supply, would cost 2.5 billion dollars annually, but save 90 billion dollars (in direct and indirect costs) from 1993 to 2000. However, the economic case for cooperation was disrupted by the fear that HIV would slow trade and investment. As Behrman notes, 'many leaders didn't want to acknowledge the disease for fear that it may divert foreign investment, or cripple the local tourism industry. If their militaries were infected, they didn't want their adversaries to know about it.'[61] Since the negative economic consequences of recognising the epidemic were greater to individual states than the perceived economic benefits of cooperation (which would be more diffuse), financial incentives failed to spur early cooperation.

Leadership fails to arise, obstructed by domestic politics

While the United States invested in the international control of many emerging infectious diseases, there was trace support for international cooperation on HIV/AIDS during the early epidemic. This inconsistency is pointed out by Donald Francis of the United States who asks, 'Given the extreme virulence of HIV, has our national response been in keeping with our previous responses to importations of other serious infectious agents?'[62] He answers his own question:

> 'In the past, a single importation of smallpox or an importation of Lassa virus or an epidemic of Ebola virus has motivated CDC to mobilize enormous resources to prevent further spread. The public health community has learned that these infectious agents can cause great harm to our society if left unchecked. Have we given HIV its due respect?[63]'

[61] Behrman, *The Invisible People*. P. 45
[62] Francis, 'Toward a comprehensive HIV prevention program for the CDC and the nation'. P. 1444
[63] Ibid. p. 1444

Francis concludes that Reagan administration officials disregarded the potential dangers of HIV, which had been recognized as early as 1983 by the CDC. Similarly, in his damning account of the early US response to HIV, Behrman offers this statement of the U.S.'s failure to act in its own self-interest:

> 'Throughout the pandemic's twenty-year flight, the United States has shrunk from its strategic imperative and its moral obligation, failing at almost every turn to lead a comprehensive global response to the pandemic.[64]'

The scientific institutions of the United States had been clear about the potential threats of the HIV epidemic, yet the government stalled almost all international action on the disease.

United States government health and intelligence agencies had suggested that the benefits from cooperation on HIV/AIDS prevention would be much greater than the costs. But, these rational calculations were barred from decision-making. Early disease estimates from the Centers for Disease Control (CDC) suggested that HIV would infect 1 million Americans by 2010, and lead to 750,000 deaths.[65] As one CDC official pointed out in 1992, this sum would 'exceed the cumulative American war deaths from all conflicts since and including the Civil War.'[66] HIV was expected to take a heavy toll on the American healthcare system and the American economy. These findings were given even greater prominence with a 1991 CIA Interagency memo, titled 'The Global AIDS Disaster,' which predicted 45 million infections globally by the year 2000 and called for the United States to provide 3 billion dollars annually for international HIV prevention, or risk much greater economic losses.[67] Despite these projected costs and the incentives, the United States rejected plans for international cooperation that could have slowed an American epidemic.

---

[64] Behrman, *The Invisible People*. P. xiv

[65] The early estimates on the numbers infected would prove to be impressively accurate. In 2008, CDC reported that 1.1 million Americans were infected with HIV (See CDC, 'HIV Prevalence Estimates - United States, 2006', MMWR, (2008) vol. 57, no. 39, 3 October.) However, the number killed is far lower due to anti-retroviral drugs which greatly extend the life-expectancy of persons infected with HIV.

[66] Francis, 'Toward a comprehensive HIV prevention program for the CDC and the nation'.

[67] Gellman, 'The Belated Global Response to AIDS in Africa'.

Two reasons, both grounded in the domestic politics of the United States, may explain the inaction of the United States on international HIV/AIDS prevention. First, attitudes towards homosexuality in the Reagan administration prevented American science from informing American interests and policies. As described earlier, the priority of the Secretary of Health and Human Services was to prevent HIV/AIDS from becoming a heterosexual communities epidemic. Before the virus was identified, U.S. officials had linked the emerging American epidemic to the 'gay lifestyle.[68]' Yet, as early as 1983, scientists had described an epidemic in Zaire affecting heterosexuals and homosexuals equally, with symptoms identical to those seen in gay men in the United States.[69] Reagan-appointees rejected the scientist's explanation of sexual transmission in heterosexuals, and insisted on a mosquito-vector for the disease.[70] Behrman has carefully chronicled the numerous similar instances in which beliefs about homosexuality that were entrenched in the top levels of a conservative American government allowed leaders to disregard science, and in turn, the national interest.

A second explanation for the failure of American leadership on global HIV/AIDS is that no domestic institution was prepared to deal with the international epidemic. Scientists based at the CDC had been the chief American advocates for international action on HIV, yet neither the CDC, nor the Department of Health and Human Services, had an international mandate. Of the possible domestic institutions, only USAID had a mandate that could accommodate international cooperation on HIV. USAID had a small health office, with funds mostly earmarked for child-related programs. Behrman chronicles the meeting of head of USAID health office with young physician, who was told 'we want you to coordinate our AIDS program one day a week. It's twenty percent time and we think after six months it will go away … trust me.'[71] USAID's efforts received virtually no funding until 1986 when Congress

[68] According to these (incorrect) explanations, immunusupression was linked to recurrent viral infections associated with gay bathhouses, drug use, or an immune response to sperm. See Epstein, *Impure Science: AIDS, Activism, and the Politics of Knowledge*.
[69] P Piot*, et al.*, 'Acquired immunodeficiency syndrome in a heterosexual population in Zaire', Lancet, (1984) no. 8394, Jul 14, pp. 65-9.
[70] Behrman, *The Invisible People*. P. 11-12
[71] Ibid. p. 24

allocated 2 million dollars for global HIV. Unable to absorb even this modest funding, and uninterested in leading an international effort against the disease, USAID passed almost all of the funding to WHO's efforts on HIV. As Behrman notes, USAID 'felt that what was needed was an international coordinating capacity, and with little to offer, and little enthusiasm about engineering an effort, they passed the funds to the fledgling WHO effort.'[72] By the end of the decade, United States NGOs began asking Congress for the money allocated for HIV, and the US became less supportive of WHO efforts.[73] The only domestic institution with the mandate to deal with international cooperation on HIV/AIDS was distracted, unable to adjust priorities quickly, and unprepared to bear the costs and burdens of international cooperation.

While there was almost a complete disregard for international cooperation and domestic action to prevent HIV, the United States government invested much more substantially in research on HIV/AIDS during the 1980s. Almost all of the 85.5 million dollars of US funding for HIV/AIDS in 1986 went to research, and in particular, to vaccine development (about 4 million dollars went to domestic prevention efforts).[74] With research funds, CDC was able to launch surveillance efforts in several countries. These international research programs were supported, according to a former head of CDC's global HIV/AIDS effort, because 'there were lessons to be learned from the international setting that could be used for domestic populations.'[75] Thus, self-interest and rational cost-benefit calculation facilitated support for the study of early HIV, though neither its domestic nor international prevention.

Institutions drive early cooperation, but bureaucratic interests become a barrier to cooperation

For a brief period, from 1986 to 1990, WHO was a clear focal institution for cooperation on HIV. During this time, the institution allowed cooperation to diverge from the interests of the most powerful actors and allowed the concerns of some weaker members to guide cooperation.

---

[72] Ibid. p. 34. Notably, with this donation, the USA became the largest donor to WHO's Special Program on Aids, contributing 40% of the 1986 fund-raising total.
[73] Ibid.
[74] R. Shilts, *And the band played on: People, politics and the AIDS crisis* (London: Penguin, 1987).
[75] Helene Gayle as quoted in Behrman, *The Invisible People*. P. 19

While WHO was initially able to lead cooperation on HIV/AIDS, bureaucratic self-interests soon obstructed cooperation. Here, I explore the drivers that allowed cooperation on HIV/AIDS to emerge within WHO, then consider the barriers to international cooperation created by WHO in the 1990s.

WHO's leadership was initially resistant to cooperation on HIV. An internal 1983 WHO memo explained that AIDS 'is being well taken care of by some of the richest countries in the world where there is the manpower and the know-how and where most of the patients are to be found.'[76] The most significant instance of cooperation early in the epidemic was a 1983 international conference on blood safety, which had been prompted by contamination of blood supply, resulting in infections after blood transfusions. In 1985, when WHO first decided to address HIV, it had one staff member, Jonathan Mann, who arrived to lead the newly created Special Program on AIDS (renamed the Global Programme on AIDS in 1987). Mann was given no budget. At the time, the disease was considered a threat to the promiscuous few, and not to the global population. All funding was extra-budgetary, meaning it needed to be raised from donors. Thus, WHO's formal capacity for financing cooperative efforts through assessed contributions (based on a country's wealth) was not utilized. Initially, the Special Program on AIDS was a marginal program within WHO, unable to utilize the institution's capacity to reduce the costs of cooperation.

WHO's commitment to cooperation on HIV/AIDS began prominently in 1986. At a press conference at the United Nations in November of 1986, WHO's Director General signalled a new commitment to HIV.

> 'We stand nakedly in front of a pandemic as mortal as any pandemic there has ever been. In the same spirit that WHO addressed smallpox eradication, WHO will dedicate its energy, commitment, and creativity to the even more urgent, difficult and complex task of global AIDS prevention and control.'[77]

[76] As quoted in Ibid. p14
[77] World Health Organization, 'Special Programme on AIDS: Progress Report Number 1', (Geneva: World Health Organization, 1987). P. 21

Mahler continued to explain that 'WHO is ideally suited to provide an effective international platform for coordinating and directing the overall efforts for AIDS in such fields as prevention, control, research and policy making.' [78] He called on national governments to make a commitment to HIV prevention. WHO's commitment would lead to the mobilization of donors, the first ever UN General Assembly resolution on a disease – calling for strong and coordinated international action,[79] and the creation of a global strategy for disease control that began to be 'implemented as a common strategy for community, national and international action.'[80] These efforts had quick success. 100 countries adopted WHO-coordinated National AIDS Prevention Strategies within one and a half years. While in 1986, there were fewer than 5 staff working on HIV, there were more than 400 staff by 1989. Mann's Special Programme on AIDS had quickly become the largest unit at WHO; roughly equal to the staff working on malaria in the 1950s. The budget for global AIDS at WHO jumped too, from 5 million in 1986 to over 90 million in 1989.

WHO's broad membership and organizational structure made it susceptible to influence from developing countries and from its own staff scientists. In his analysis, Behrman concludes that WHO Director General Mahler's move to allow WHO to become the focal point for international cooperation on HIV/AIDS was driven by two factors. First, there was pressure from the Ugandan government. This pressure originated in the 1986 decision of Fidel Castro to return Ugandan soldiers from Cuba, where they had been going for training, citing the occurrence of a debilitating infectious disease in some soldiers. President Museveni, who had recently come to power and was dependent on the strength of his military, launched an aggressive response to the disease, and quickly put pressure on WHO (and the Director General personally) to take action. Second, Jonathan Mann's persistent lobbying convinced the Director General of the likely increasing burden of the disease, and the need for international cooperation to stop the epidemic. Mann's efforts were based primarily on the rising number of

[78] Ibid. P. 21
[79] United Nations General Assembly, 'Prevention and control of acquired immunodeficiency syndrome (AIDS)'.
[80] Mann, Tarantola & Netter, *AIDS in the world*. P. 228

cases of HIV/AIDS reported to WHO, and the rising number of countries reporting on the disease (Figure 6.6). Both the pressure from the Ugandan government and Jonathan Mann's lobbying originate in concern over HIV's contagion. However, without an institution that could serve as the focal point for cooperation, international efforts would have been even more slow and costly. In 1986, WHO's broad membership and scope allowed it to diverge from the priorities of powerful member states in favour of cooperation on HIV.

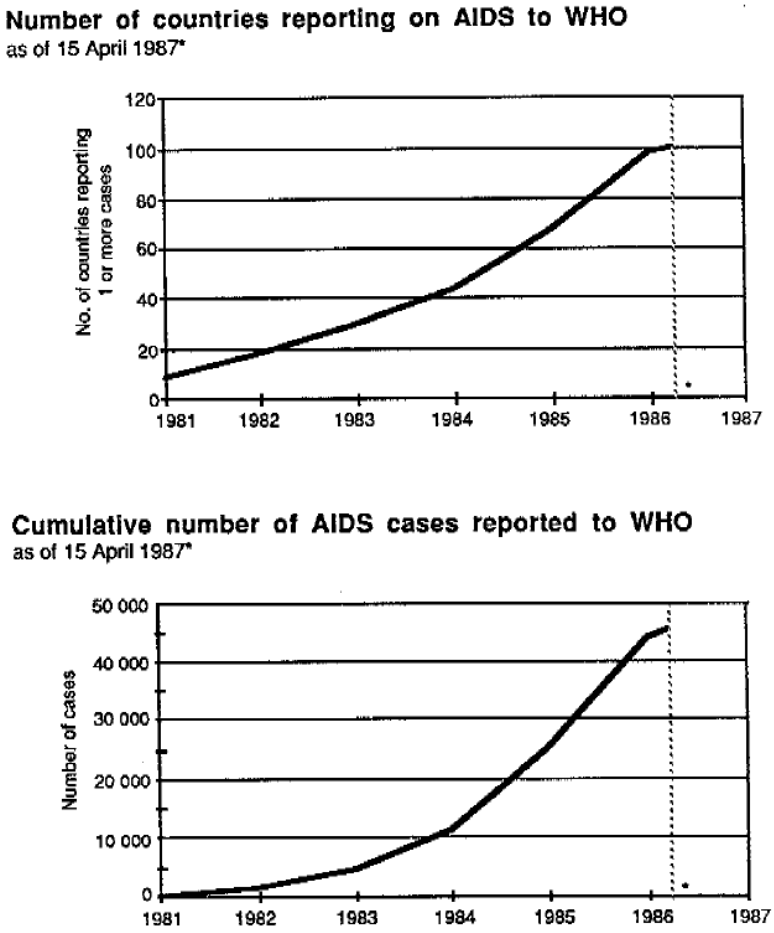


Figure 6. 7 AIDS reporting to WHO: countries and cases Source: World Health Organization, 'Special Programme on AIDS: Progress Report Number 1', (Geneva: World Health Organization, 1987). P. 33

WHO's commitment to international cooperation on HIV/AIDS prevention was obstructed by bureaucratic interests when Nakajima replaced Mahler as Director General in 1988. The new Director General sought to minimize attention and resources given to the disease, in order to maximise his central authority in WHO. WHO's governance structure, in which priorities were nominally set by the World Health Assembly, but the budget allocations set by the secretariat, allowed the Director General to have great influence. Nakajima's most successful tactic was to

employ WHO's bureaucratic rules against Jonathan Mann's global AIDS efforts. While Mann had been able to operate the Global Programme on AIDS with independence, Nakajima soon began to restrict his ability to use WHO as an institutional platform. Nakajima demanded that Mann's travel be authorized by the Director General, his public statements go through the WHO's media director, and his budget and staff be curtailed by shifting WHO's HIV/AIDS efforts to the African regional office. Mann left WHO in 1990, and a smaller global AIDS effort remained at WHO.

Director-General Nakajima made use of WHO's ability to link issues, and its institutional rules to obstruct, rather than drive, cooperation on HIV/AIDS prevention. The negative use of issue-linkage is powerfully demonstrated by Behrman's account of the deal Nakajima struck on the eve of his election: trading his efforts to assure a rejection of the Palestinian Liberation Organization's membership bid for the authority to manage – and minimise – WHO's global AIDS efforts. Behrman notes,

> 'Nakajima went to work as a 'floor manager,' brokering alliances to ensure that the WHA would deny the PLO membership. In return, Nakajima demanded free reign from leading donors to manage WHO's global AIDS effort, which by then had begun to shadow much of the rest of the agency.'[81]

Nakajima soon began dismantling the Global Programme on AIDS, at a time when the incidence of AIDS around the world was climbing (Figure 6.7). In addition, Nakajima dismantled the links between related infectious diseases. Rather than link the common dual infection with HIV and malaria, Nakajima famously said, 'Don't talk to me about AIDS; I have malaria, which is a much bigger killer of people on my hands.'[82] The Director General was able to use the weight of WHO's bureaucracy, the secretariat's authority over the budget, and the institution's capacity for issue-interlinkage to obstruct cooperation on HIV/AIDS beginning in 1988. Several competing international initiatives arose to fill the void in WHO leadership, including a new United Nations agency, UNAIDS. These institutions played an important explanatory role in later cooperation on HIV, as discussed in the following section (6.3).

---

[81] Behrman, *The Invisible People*. P. 54.
[82] As quoted in Lee, *The World Health Organization (WHO)*. P. 59 and Gellman, 'The Belated Global Response to AIDS in Africa'. P. A01

Gaps in knowledge and scientific consensus amplified, obstructing international cooperation

Knowledge communities played an essential role in shaping the perception of contagion for HIV/AIDS. If the disease was caused by a 'gay lifestyle,' or transmitted by mosquitoes, as some policy makers had argued, then the international externalities were limited to gay communities and those at risk of mosquito-borne illness. If however, the disease was caused by a virus that could spread to all heterosexual communities, the international externalities were much greater. Thus, debates on causation sought to answer the fundamental questions of 'who is affected?' and 'how can we prevent it?' This gave knowledge communities an essential role in establishing contagion. Here, I consider how the development of scientific consensus on the cause of the AIDS epidemic changed the cost-benefit calculations of international cooperation.

Unlike the debates on the causes of disease in the 19th century, which were carried out at international meetings of scientists, the debates on the causes of HIV were open to a wide public. Debates took place in academic journals, the mainstream press, on picket signs, and among policy-makers.[83] Epstein has argued that this wide public participation changed the dynamics of 'fact-making,' and widened inclusion in the epistemic community.[84] However, this broadening of the knowledge community to include non-scientists would allow gaps in consensus to emerge and become amplified. Epstein writes, 'if, as some have argued, the purity of science is guaranteed by its insulation from external pressures, then AIDS research is a clear-cut case of impure science.'[85] While scientific publications demonstrate the development of a consensus on a viral cause of the disease by 1986, the public debate raged on, stalling international cooperation.

Debates on who is (or could be) affected by AIDS were contentious, even within the scientific community, until at least1986. The finding in 1983 that heterosexual men and women were

[83] Cooper, 'International Cooperation in Public Health as a Prologue to Macroeconomic Cooperation'.
[84] Epstein, *Impure Science: AIDS, Activism, and the Politics of Knowledge.*
[85] Ibid. p.8

dying of the same disease that was killing gay men was rejected by the Reagan administration.[86] Some scientists published theories about 'immune overload,' linking the disease to the lifestyles of gay men, while others argued that the hallmark immunusupression of the disease was related to an immune response to sperm.[87] Most famously, after the identification of a virus that could be detected in the blood of persons with AIDS in 1984, Peter Duesberg, a highly respected scientist, argued that HIV causes mononucleosis syndrome (a flu-like illness), but that antibodies to HIV were protective from this flu-like illness, and had no role in explaining AIDS. Duesberg increasingly took his argument, challenging HIV's role in causing AIDS, to the mainstream media, where it was better received than in the academic press, which had formed a consensus around the viral cause of AIDS.[88] However, arguments like Duesberg's were not fully laid to rest until 1993, with the discovery of the HIV virus in the critical immune cells that are destroyed by the virus (T cells), and by a study disproving the hypothesis that a gay lifestyle caused AIDS. [89]

While there was early scientific debate, consensus within the scientific community on the viral cause of AIDS developed by 1986. This is empirically demonstrated by the trend towards making unqualified claims about the viral aetiology of AIDS (Table 6.2). In 1984, 3 per cent of academic papers made such unqualified claims, while by 1986, 62 per cent made these claims. As Table 6.2 shows, the percentage of papers concerned with explaining the aetiology of AIDS dropped, while the percentage of papers about the virus, and the percentage making unqualified claims about viral aetiology jumped. At the same time, news articles (previously more sceptical than academic articles) transitioned to unqualified claims about a viral origin of the disease. In 1986, 65% of news articles made unqualified claims about the viral aetiology of AIDS.[90]

---

[86] Piot*, et al.*, 'Acquired immunodeficiency syndrome in a heterosexual population in Zaire'.
[87] Epstein, *Impure Science: AIDS, Activism, and the Politics of Knowledge*. P. 60
[88] Ibid. p. 116
[89] M T Schechter*, et al.*, 'HIV-1 and the aetiology of AIDS', Lancet, (1993) vol. 341, no. 8846, pp. 658-9. This study compared groups of gay men infected with HIV and those not infected, finding that all who developed an AIDS-related illness were infected with the virus.
[90] Epstein, *Impure Science: AIDS, Activism, and the Politics of Knowledge*. P. 93

Year	Aetiology	Virus	Unqualified claims about viral aetiology
1983	25%	2%	NR
1984	NR	5%	3%
1985	10%	20%	25%
1986	5%	37%	62%

Table 6.2. Development of scientific consensus on the cause of HIV, measured by unqualified claims of viral aetiology in scientific articles. NR = Not reported. The category aetiology here refers to studies on the cause of the disease, which decrease over time, while the category of virus refers to studies of the virus thought to cause the disease, which increase over time. Source: Epstein, Steven, *Impure Science: AIDS, Activism, and the Politics of Knowledge*, Berkeley, California: University of California Press, 1996. P. 80-82

Alongside the scientific consensus a policy consensus developed in the epistemic community. Indeed, by 1983, scientists had determined routes of transmission and formulated prevention recommendations 'even before the etiologic agent, HIV, was identified.'[91] Lieberman documents the development of consensus in the mid 1980s on medical and policy strategies to guide global action on HIV/AIDS.[92] He terms this the 'Geneva Consensus.'[93] In general terms, the Geneva Consensus called for an aggressive response involving bureaucratic development, prevention and a rights-based orientation (later, treatment would be added to this consensus). The central actor in the Geneva Consensus would be national governments, whose AIDS policies were written almost entirely by experts based at WHO and informed by the international epistemic community. Lieberman notes that 'given that only a handful of states in the developing world had confirmed significant numbers of HIV-infected individuals at the time, a great many of these states were responding to global government pressure to act.'[94]

Scientists established that HIV/AIDS was indeed a contagious threat that could effect all people on earth, changing cost-benefit calculations to favour cooperation. Despite the controversy on the aetiology of AIDS, the epistemic community worked quickly to identify the causative agent, test treatments, and formulate a global policy response. On all three tasks, quick consensus with

[91] Mann, Tarantola & Netter, *AIDS in the world*. P.228
[92] Lieberman, *Boundaries of Contagion: How Ethnic Politics Have Shaped Government Responses to AIDS*.
[93] Ibid. P73
[94] Ibid. P. 89

little dissent was achieved within the mainstream scientific community.[95] Activists played a critical role in increasing support for research, and transforming consensus into global policy responses.

Concluding thoughts on the failure to cooperate on HIV/AIDS prevention

Delays in the development of consensus on the cause of AIDS – especially outside of the scientific community, domestic politics in powerful states, and bureaucratic interests within international institutions slowed the emergence of cooperation on HIV/AIDS until the late 1990s. During this time period, contagion failed to drive cooperation because of disagreement on who would be affected by the disease. Early in the epidemic, the United States government disregarded the cost-benefit calculations made by its health and intelligence agencies, which had favoured cooperation, because of domestic political concerns. International institutions, which had initially succeeded in driving cooperation that diverged from the agendas of the most powerful states, succumbed to bureaucratic self-interest that obstructed cooperation. While scientists succeeded in establishing the contagious threat of AIDS, and in identifying the viral cause of the disease, the popular press and political leaders amplified debates (even those that had expired), obstructing international cooperation. By the late 1990s, these barriers to cooperation would reverse, and cooperation on HIV/AIDS would finally emerge.

6.3 COOPERATION ON HIV/AIDS TREATMENT

In 1996, the treatment of HIV-infection with anti-retroviral medications became possible in rich countries. Overnight, AIDS mortality in rich countries stalled. Treatment transformed a once universally lethal infection into a chronic condition. Soon after, international financing for HIV/AIDS soared. From 1998 to 2006, HIV/AIDS treatment quickly became the largest financial investment ever made in international cooperation on health, with campaigns

[95] This lack of dissent within the scientific community was highlighted by HIV-sceptics to suggest a conspiracy among scientists.

sponsored by the United States, development banks, and a new financing institution, the Global Fund to Fight AIDS, Tuberculosis and Malaria.

The scale of international financing for HIV/AIDS is unprecedented in international cooperation on health. International financing for HIV/AIDS treatment began in 1998, but took off beginning in 2001. In April 2001, Kofi Annan made a call for 7 to 10 billion dollars in annual international financing for HIV.[96] In August of that year, The United Nations General Assembly Special Session on HIV/AIDS made a declaration of commitment to financing HIV/AIDS that was adopted by all member states.[97] In 2002, the Global Fund to Fight AIDS, Tuberculosis and Malaria was launched as a mechanism for financing for international efforts against these three diseases. And, in January 2003, President Bush made a 5-year 15 billion dollar commitment to international HIV/AIDS efforts. By 2005, international financing for HIV/AIDS had exceeded 4 billion USD annually, and by 2007 it reached 4.9 billion USD annually.[98] For 2005, annual funding for HIV/AIDS was about 100 times the annual funding for smallpox during the intensified eradication campaign. International financing comprises more than half of HIV/AIDS spending in developing countries.[99] For comparison, during the intensified smallpox eradication campaign, international financing made up about one-third of total smallpox spending. And, for the malaria eradication campaign of the 1950s, international financing made up just over half of total malaria spending (Figure 5.1).

Explaining international cooperation on HIV/AIDS treatment

Contagion does not explain cooperation on HIV/AIDS treatment

---

[96] BBC, *Annan declares war on AIDS* (2001 [cited 23 March 2010]); available from http://news.bbc.co.uk/1/hi/world/africa/1297474.stm. See also Peter Piot, Sarah Russell & Heidi Larson, 'Good politics, bad politics: the experience of AIDS', Am J Public Health, (2007) vol. 97, no. 11, Nov 1, pp. 1934-6.

[97] United Nations General Assembly, 'Declaration of commitment on HIV/AIDS', in *Resolution A/RES/S-26/2* (2001).

[98] Ravishankar*, et al.*, 'Financing of global health: tracking development assistance for health from 1990 to 2007'. And Department of Error, 'Department of Error'.

[99] Levine & Blumer, 'Following the Money: Toward Better Tracking of Global Health Resources'. And Shiffman, 'Has donor prioritization of HIV/AIDS displaced aid for other health issues?'

The scale of HIV/AIDS funding looks like a confirmation of the contagion thesis. In fact, financing for HIV/AIDS has popularised the view that contagion drives international cooperation on health. However, when the timing and purpose of HIV/AIDS financing are dissected, it appears that contagion was not the key driver for cooperation. In this section, I seek to explain the emergence of cooperation, at precisely the point where contagion-related drivers became weaker.

The timing of cooperation on HIV/AIDS suggests that contagion may not have been a key driver for cooperation. As shown in the previous section, there was relatively little cooperation on HIV/AIDS before the development of anti-retroviral therapy. According to the contagion thesis, the availability of treatment for a disease in rich countries should decrease the threat of disease severity. This is reflected in the reduction in the contagion index that accompanies the development of treatment (Figure 6.4 and Appendix 6B). At the same time, by the late 1990s, HIV/AIDS had become universally present, and the disease was much more likely to spread domestically than internationally. It is precisely at the time when the threat of contagion was falling that cooperation on HIV/AIDS treatment emerged.

The purpose of cooperation on HIV/AIDS also suggests that contagion may not have been a key driver for cooperation. While the contagion thesis would expect that disease prevention would be the focus of international cooperation, about 70 per cent of international financing for HIV/AIDS was directed to treatment.[100] There is now a consensus that HIV/AIDS treatment is an important component of prevention efforts because access to treatment creates incentives for individuals to seek testing (a central component of prevention). Furthermore, decreasing the viral lode in an individual through treatment reduces the likelihood of HIV transmission. Yet, at the time that the decision to make treatment a priority for international cooperation, there was little evidence that treatment would facilitate prevention. Some scientists had pointed to

[100] Sridhar & Batniji, 'Misfinancing global health: a case for transparency in disbursements and decision making'.

evidence that treatment access had been associated with more risky sexual behaviours in rich countries. And, in 2001, most experts thought that prevention should be the main focus of international cooperation, as discussed in the section on knowledge communities below. Per dollar invested in international cooperation, prevention efforts were likely to reduce the externalities of HIV/AIDS more than treatment. The decision to focus cooperation on treatment suggests that the control of international externalities was not the sole driver for cooperation.

In addition to the direct threat of disease spread, HIV/AIDS was associated with economic and security externalities. Economic externalities play a minor role in explaining cooperation on HIV/AIDS treatment. As one newspaper put the cost-benefit calculations crudely, 'a country that spends 1000 dollars a year to save the life of someone earning 500 dollars a year would suffer a net economic loss.'[101] Estimates of the economic benefits of HIV/AIDS treatment created a preference for prevention, and no convincing case was made for the international economic benefits of treating HIV/AIDS in poor countries. [102] HIV/AIDS was associated with security externalities, but these do not entirely explain cooperation on the disease. Many scholars have suggested that the securitization of HIV/AIDS has increased the resources directed to the disease and changed the nature of international cooperative efforts.[103] This scholarship highlights the use of the language of security, and in particular, the discussions surrounding United Nations Security Council Resolution 1308 in 2000 that brought a health issue to the Security Council for the first time.[104] Security concerns have facilitated some cooperation on HIV/AIDS. As discussed previously, HIV/AIDS first came to grab the attention of WHO when it interrupted the training of Ugandan soldiers in Cuba in the 1980s.

---

[101] Washington Post (2000) 27 December, p 27 as quoted in N Poku, 'The Global AIDS Fund: context and opportunity', Third World Quarterly, (2002) Dec 31. P. 296

[102] David Canning, 'The economics of HIV/AIDS in low-income countries: the case for prevention', J Econ Perspect, (2006) vol. 20, no. 3, Dec 21, pp. 121-42.

[103] See, for example, S Elbe, 'AIDS, security, biopolitics', International Relations, (2005) Jan 1.; Garrett, *HIV and National Security: Where are the Links?*; G. Prins, 'AIDS and global security', International Affairs, (2004) vol. 80, no. 5, pp. 931-52.

[104] UN Security Council, 'Security Council Resolution 1308: on the responsibility of the Security Council in the maintenance of international peace and security: HIV/AIDS and international peacekeeping operations', in *S/RES/1308 (2000)* (2001).

The causal relationship between securitization and cooperation is empirically tenuous. The UN Security Council resolution on HIV/AIDS focused on the spread of the disease in (and through) military personnel, not the general population. Advocates and scholars seeking to link HIV/AIDS to security often overlook the fact that this resolution only called for treatment in peacekeeping forces.[105] A more convincing case against the argument that security concerns drove cooperation on HIV/AIDS can be made by looking at the geographic focus, and the methods, of cooperation. If security were driving cooperation, then it would be expected that international efforts on HIV/AIDS would be focused on those countries that the HIV/AIDS epidemic puts at risk of state failure. Instead the United States Government (PEPFAR) selected the 16 countries it would work with based partly on good governance.[106] Countries with democratic governments and transparent institutions seem, intuitively, to not be those countries at the highest risk for state failure from a pandemic. In parallel, the Global Fund has taken a 'hands-off' approach, leaving decision-making for programs to a representative body called the Country Coordinating Mechanism.[107] [108] This hands-off approach would not be the mode of cooperation preferred if attempting to avoid state failure were the driving purpose. The security implications of HIV/AIDS are important, but they do not go far in explaining the emergence and nature of international cooperation.

Leadership of the United States is a critical driver for cooperation on HIV/AIDS treatment

Despite the uncertain cost-benefit calculations, the United States, and to a lesser degree, France, Canada and other rich countries made cooperation on the treatment of HIV/AIDS a priority between 1997 and 2003, with commitments extending to the present. In 1997, just one year after effective treatment for HIV/AIDS was available in rich countries, French President Chirac

[105] Ibid.
[106] Institute of Medicine, *PEPFAR implementation : progress and promise* (Washington, DC: National Academies Press, 2007).See also PEPFAR, 'Emergency Plan for AIDS Relief, Fiscal Year 2005 Operational Plan', (Washington D.C.: 2005).
[107] R. G. Feachem & O. J. Sabot, 'An examination of the Global Fund at 5 years', Lancet, (2006) vol. 368, no. 9534, pp. 537-40.
[108] The Country Coordinating Mechanism is, 'a national body that aims to bring together interested parties from all sectors, be responsible for the design and oversight of programmes, thereby ensuring that those programmes are comprehensive and broadly representative.'

proposed an 'International Therapeutic Solidarity Fund.' He declared, 'We have no right to accept that there should now be two ways of fighting AIDS: treating sufferers in the developed countries, and simply preventing infection in the South [...].'[109] At the time, there was little support for the idea of international treatment, and Chirac's call was ridiculed in many circles.[110] When WHO adopted the goal of placing 3 million people in poor countries on anti-retroviral treatment by 2005, the Canadian government provided the critical financial support. Most importantly, the United States announced in January 2003 a commitment to give 15 billion dollars for HIV/AIDS efforts in poor countries.[111] These observations appear to challenge theories of international cooperation which hold that when the benefits of cooperation are greater than the costs for a powerful actor, or a group of powerful actors, these actors will bear the costs of cooperation.[112] On HIV/AIDS treatment, powerful actors were willing to bear the costs and burdens of cooperation, even without an expected net financial benefit.

Powerful actors made cooperation decisions on HIV/AIDS based on moral, rather than economic rationale. This is not to suggest that these cooperation decisions were not guided, to some extent, by self-interest. The good will and moral legitimacy attained from sponsoring international cooperation on HIV/AIDS had the potential to compensate for other policies that were draining international good will. President Bush made this moral connection between the wars in Iraq and Afghanistan and cooperation on HIV/AIDS treatment directly in announcing the President's Emergency Plan for AIDS Relief (PEPFAR) in his January 2003 State of the Union Address. President Bush stated,

> 'As our nation moves troops and builds alliances to make our world safer, we must also remember our calling, as a blessed country, is to make the world better. Today, on the continent of Africa, nearly 30 million people have the AIDS virus, including 3 million children under the age of 15. There are whole countries in Africa where more than one-third of the adult population carries the infection. More than 4 million require immediate drug treatment. Yet across that continent, only 50,000 AIDS victims--only 50,000--are receiving the medicine they need. Because the AIDS diagnosis is

[109] As quoted in Schwartländer, Grubb & Perriëns, 'The 10-year struggle to provide antiretroviral treatment to people with HIV in the developing world'. P. 541
[110] Feachem, Richard. Personal interview. 9 September 2008
[111] George W Bush, *State of the Union Address, 28 January* (2003 [cited 23 March 2010]); available from http://www.washingtonpost.com/wp-srv/onpolitics/transcripts/bushtext_012803.html.
[112] Snidal, 'The limits of hegemonic stability theory'.

> considered a death sentence, many do not seek treatment. Almost all who do are turned away.[113]'

The President continued to outline the rationale for his plan, suggesting that anti-retroviral drugs could now extend life for 300 dollars a year, placing a tremendous opportunity within reach. He called, his plan for AIDS relief 'a work of mercy beyond all current international efforts to help the people of Africa.'[114] Indeed, his pledge led to the largest international effort against HIV, and can be credited with a 10.5 per cent reduction in HIV-related deaths in recipient countries.[115] PEPFAR presented a sharp increase in United States support for HIV/AIDS treatment. Before the announcement, the United States had committed about 300 million dollars to international HIV/AIDS.[116] The United States was soon assuming 45.4 percent of the total international funding for HIV/AIDS (in 2007).[117] As Mark Dybul, head of PEPFAR stated, 'The US should not be giving more than the rest of the world combined.'[118]

Pharmaceutical companies, who had opposed efforts to reduce prices for their anti-retroviral medication, may have been among the chief beneficiaries of the massive commitment to finance the treatment of HIV/AIDS. The health cooperation thesis suggests that powerful private actors, seeking financial benefit, may influence other actors to bear the costs of cooperation (Table 2.4, driver 5). To what extent did pharmaceutical companies capture the process of cooperation? Since 1998, there was broad and sustained demand, especially among non-governmental organizations for cooperation on HIV/AIDS treatment. However, the process of cooperation depended to a large extent on a pharmaceutical sector that had secured intellectual property protection, making the institutional supply of cooperation more limited. In their analysis of regulatory capture, Mattli and Woods suggest that in settings where the demand for regulation is

---

[113] Bush, *State of the Union Address, 28 January* ([cited).
[114] Ibid.([cited).
[115] E Bendavid & J Bhattacharya, 'The President's Emergency Plan for AIDS Relief in Africa: evaluation of outcomes', Ann Intern Med, (2009) vol. 150, no. 10, pp. 688-95.
[116] R. Parker, 'The Global HIV/AIDS Pandemic, Structural Inequalities, and the Politics of International Health', (Am Public Health Assoc, 2002).
[117] J Kates, J Izazola & E Lief, 'Financing the response to AIDS in low- and middle- income countries: International assistance from the G8, European Commission and other donor Governments, 2007', (Menlo Park, CA: Kaiser Family Foundation, 2008).
[118] B Roehr, 'Report argues US should not pay more than rest of world to fight HIV/AIDS', BMJ: British Medical Journal, (2005) vol. 331, no. 7511, 30 July.

broad and sustained, while the supply for regulation is limited (occurring in closed and exclusive forums, or with asymmetries in information and resources), regulatory capture with concessions and compromises is the most likely outcome.[119] Pharmaceutical companies, seeking protected markets in rich countries and expanded markets for their products in poor countries, agreed to international agreements that both protected and expanded their markets. However, as expected by the model on regulatory outcomes, they also made concessions: dropping the price of medications sharply for poor countries.

In the United States, the role of the pharmaceutical industry in capturing the process of cooperation can be clearly seen. PEPFAR initially provided only FDA approved drugs, effectively excluding generic medications. And, the first leader of the U.S. initiative was a former chief executive of a major pharmaceutical company.[120] As discussed in the section on institutions, below, the United States had initially proposed a Trust Fund for HIV/AIDS with a significant role for the pharmaceutical industry, yet the formalisation of this process within an international institution ultimately gave the industry a more limited role.

Institutions facilitate divergence from contagion and interests of powerful actors

The key consideration in assessing the role of international institutions in explaining cooperation, as outlined in Chapter 2, is their role in explaining the divergence from contagion and from the interests of powerful actors. The international institutions for cooperation on HIV/AIDS have facilitated a divergence from rationalist expectations based on externality and cost-benefit calculations of the powerful. Many institutions have been involved in cooperation on HIV/AIDS, including UNAIDS, WHO, the Global Fund, World Bank, and virtually every

[119] See. Mattli & Woods, 'In Whose Benefit? Explaining regulatory change in global politics '. P. 16. In this model, when demand is narrow, pure capture regulation is expected, and when demand is broad and supply is extensive and open, common interest regulation is expected.

[120] Randall Tobias, who served as the United States Global AIDS Coordinator (head of PEPFAR) from 2003 to 2007 had previously been the chief executive officer of Eli Lilly and Company, from 1993 to 1999

organisation within the United Nations system.[121] These institutions collectively seek to serve three essential functions. International institutions for HIV/AIDS facilitate collective financing, price-negotiations for pharmaceuticals, and the creation of treatment standards. In commentary on the international response to HIV/AIDS, much attention has been given to distinguishing among the roles of these institutions. Here, I am concerned not with this descriptive analysis of HIV/AIDS governance, but rather, with explaining what role international institutions play in explaining cooperation on the treatment of HIV/AIDS.

The earliest collective financing agreements for HIV/AIDS emerged in April 2000 when the United States Congress established an AIDS Trust Fund at the World Bank.[122] The original proposal calls for a fund controlled by donors and pharmaceutical companies. While this fund effectively remains the fiduciary body for the Global Fund today, the governance of the Global Fund has diverged from what the Treasury Department had proposed. As Poku writes, 'The Treasury Department's proposal envisages a governing board made up of donors, with some participation by recipient countries.' [123] The Trust Fund was proposed by the Chairman of the United States House Banking and Financial Services Committee in January 2000, and quickly approved in the 'Global AIDS and Tuberculosis Relief Act of 2000' (H.R. 3519).[124] The proposal called for a billion-dollar fund, in which the United States would contribute 10 per cent (this figure is about a third of the percentage in assessed contributions to WHO). Notably, among the activities supported by the bill, 5 were related to prevention, one related to care for orphans, and only one related to 'incentives to promote affordable access to treatments against AIDS and related infections.'[125] The private sector was intended to have a major role in the governance of fund. As stated in a press release, 'for the first time in the context of an

[121] UNAIDS seeks to bring together UNHCR (United Nations High Commision for Refugees), UNICEF (United Nations Children's Fund), WFP (World Food Programme), UNDP (United Nations Development Programme), UNFPA (United Nations Family Planning Agency), ILO (International Labour Organization), UNESCO (United Nations Environmental Social and Cultural Organization), WHO and the World Bank.
[122] Poku, 'The Global AIDS Fund: context and opportunity'. P. 296
[123] Ibid. p. 296
[124] One-hundred sixth congress of the United States of America, 'Global AIDS and Tuberculosis Relief Act of 2000', in *H.R. 3519* (United States: 2000).
[125] Ibid. p.8

international institution initiative, an integral part would be played by the private sector.'[126] With this proposal, pharmaceutical companies and other private firms could buy themselves seats on the Trust Fund's governing board for a 5 million dollar contribution.[127] President Bush committed 200 million dollars to the trust fund in May 2001.[128]

As the proposed Fund moved outside of US control and into international institutions, the structure and purpose of the Fund began to diverge from US interests. International institutions have facilitated a broadening of cooperation on HIV/AIDS to include tuberculosis and malaria, greater recipient country control of collective financing efforts, and a limiting the role of pharmaceutical companies, all counter to the preferences of the United States. The institutionalisation of financing for collective action began with the January 2000 United States proposal to house an AIDS Trust Fund in the World Bank. In July 2000, at the G8 Summit in Okinawa, Japan, the United States and United Kingdom wanted the G8 to make a statement about HIV. The Japanese suggested that HIV was about sex and drugs, which were topics their leadership preferred to avoid.[129] The Japanese insisted on including tuberculosis (their contribution to TB research was tremendous), and malaria (which they had eradicated from Japan) alongside any mention of HIV.[130] While Canadian and UK leaders readily supported the Japanese proposal, the United States preferred to focus only on HIV. In April 2001, Kofi Annan made a call for a 'war chest' to fight HIV, without referencing the United States effort for a World Bank trust fund. And in June 2001, Annan recommended a 'Global Fund' for HIV/AIDS and other infectious diseases. Allowing concerns of weaker members to influence policies was a key goal. Annan stated, 'this Fund must be structured in such a way as to ensure

---

[126] Log Cabin Republicans, *Congressman Leach (R-IA) Proposes World Bank AIDS Trust Fund: To Fund Crucial Infrastructure-Building Efforts in Education, Prevention and Treatment* (2000 [cited 23 March 2010]); available from http://www.lcrga.com/news/World-Bank-AIDS-Trust-Fund-James-Leach/200001241454.shtml.
[127] Poku, 'The Global AIDS Fund: context and opportunity'.
[128] 'Opening Statement: Congressman Doug Bereuter', in *Subcommittee on International Monetary Policy and Trade: FY2002 Authorization Requests and the activities of the African Development Bank, the International Monetary Fund and the World Bank in Africa*, United States House of Representatives (Washington DC: 2001).
[129] Feachem, Richard. Personal interview. 9 September 2008
[130] Ibid.

that it responds to the needs of the affected countries and people.'[131] The Global Fund to Fight AIDS, Tuberculosis and Malaria was created in 2002, with a board that includes representatives of donor and recipient governments, NGOs, private companies and foundations, and affected communities. By embedding the collective financing mechanism within an international institution, the concerns of weaker states were given greater representation, while the United States and pharmaceutical companies, had less influence than under the original US Treasury proposals for collective financing.

International institutions also facilitated a divergence from the interests of powerful actors in successfully negotiating the prices of anti-retroviral medications. Individual governments, most visibly in Brazil and South Africa, had threatened to violate intellectual property protection in order to make HIV/AIDS treatment available to their populations. Pharmaceutical companies, supported by governments, balked at these efforts. However, by coordinating advocates and leveraging the legitimacy and independence of an international institution, UNAIDS led negotiations with pharmaceutical companies, through the Accelerating Access Initiative, announcing a major success in 2000 when five companies agreed to dramatically cut the prices for their anti-retroviral medications to be sold in poor countries. WHO joined these negotiations, and with UNAIDS, 'partly pressured, partly enticed' pharmaceutical companies into more use of differential pricing.[132] Institutions were able to reduce transaction costs and link issues, simultaneously arranging for developing countries to pay a fraction of the price of those in rich countries, while guaranteeing that there would be no 'reverse importation' of cheap drugs from poor to rich countries. These efforts succeeded in bringing the annual price of anti-retroviral medications down from about 20,000 dollars, to 1200 dollars in 2000, then to as little as 300 dollars by 2005.

International institutions created treatment standards that legitimized generic medications,

[131] Kofi Annan, as quoted in Schwartländer, Grubb & Perriëns, 'The 10-year struggle to provide antiretroviral treatment to people with HIV in the developing world'. P. 543
[132] Ibid. p. 542

diverging from the interests and policies of powerful actors. WHO, acting autonomously from its largest donors, created a scheme to pre-qualify generic anti-retroviral medications. WHO's approval process, granting legitimacy to these generic medicines, greatly facilitated the use of these medicines in developing countries. The divergence from the interests of powerful actors is most visible by considering the gap between PEPFAR and WHO anti-retroviral drug policies. Initially, PEPFAR funded HIV/AIDS treatment programs were only permitted to use medicines approved by the United States Food and Drug Administration (FDA). Since the FDA approval process was lengthy and expensive, this restriction acted as a de facto ban on the use of generic anti-retroviral medications. The first US Global AIDS Coordinator (a former pharmaceutical industry CEO) had fostered a distrust of generics, commenting, 'Maybe these drugs are safe and effective. Maybe these drugs are, in fact, exact duplicates of research-based drugs. Maybe they aren't. Nobody really knows.'[133] In contrast, WHO had a formal scheme for approving generic medications, and the institution's perceived autonomy and independence facilitated its authority in certifying drugs. Pressure mounted from advocacy groups for PEPFAR to use generics, and the FDA created an expedited review of generic anti-retroviral medications, approving the first in January 2005. While, only 27 per cent of PEPFAR drug purchases in 2006 were generics, the United States had begun to adopt the policies put in place by an international institution.[134] As Dietrich wrote, 'the generic drug issue is one of the few examples of a U.S. administration partly reversing policy in a way that put humanitarian objectives above U.S economic gains.'[135] Without WHO's legitimacy in certifying generic drugs, the United States could not have adopted its approval process to more closely reflect the approval process of an international institution.

Most fundamentally, international institutions facilitated cooperation on HIV/AIDS treatment even when that approach diverged from contagion and knowledge. In his analysis on global AIDS policy, Lieberman provides an explanation for the diffusion of AIDS treatment policies.

[133] Randall Tobias, as quoted in John W. Dietrich, 'The Politics of PEPFAR: The President's Emergency Plan for AIDS Relief', Ethics & International Affairs, (2007) vol. 21, no. 3, pp. 277-92. P. 285
[134] Ibid.
[135] Ibid. p. 286

He argues that this diffusion into target countries is related to political coercion by powerful states and international organizations, not learning.[136] Yet, as outlined earlier, cooperation driven only by contagion would favor prevention. And, as discussed below, there was debate among scientists about whether international cooperation should focus on treatment or prevention. Nonetheless, a consensus among international institutions favored HIV/AIDS treatment programs.[137] WHO had stated a commitment to put 3 million people on anti-retroviral treatment by 2005. UNAIDS had a similar goal to put 9.8 million people on treatment by 2010. PEPFAR was distributing more than 70 per cent of its funds to treatment and care for persons with HIV.[138] An exception to this trend is the World Bank. Of World Bank funding for HIV/AIDS in 2005, 61.3 per cent of dollars were for prevention, 36.1 per cent of dollars were for combined prevention and treatment programs, and 2.6 per cent were for treatment.[139] It is surprising that the World Bank is alone among financiers in favoring prevention to treatment. While states might finance international prevention of HIV/AIDS out of self-interest, treatment is a development concern. Institutions have diverged cooperation on HIV/AIDS from both self-interest (or contagion), and knowledge.

Knowledge communities communicate an HIV/AIDS crisis

The development of combined anti-retroviral treatment for HIV/AIDS in 1996 fundamentally altered the lethality of the virus. As early as 1985, scientists had found that an existing drug (HPA-23) was effective at reducing the replication of the HIV virus.[140] And, in 1986 a study showed that a cancer drug called AZT greatly reduced the deaths caused by AIDS and the

---

[136] Lieberman, *Boundaries of Contagion: How Ethnic Politics Have Shaped Government Responses to AIDS*. P.63

[137] Canning, 'The economics of HIV/AIDS in low-income countries: the case for prevention'. P. 136

[138] Ibid.

[139] These calculations have been made from the dataset used for the analysis in Sridhar & Batniji, 'Misfinancing global health: a case for transparency in disbursements and decision making'. Data are available from the authors upon request. Notably, these findings seem to contradict Canning's assertion that 'World Bank encourages the use of its loans and grants for treatment of HIV/AIDS.' See Canning, 'The economics of HIV/AIDS in low-income countries: the case for prevention'. P.122

[140] W Rozenbaum*, et al.*, 'Antimoniotungstate (HPA 23) treatment of three patients with AIDS and one with prodrome', Lancet, (1985) vol. 1, no. 8426, Feb 23, pp. 450-1.

number of AIDS-related infections that developed.[141] However, clinical outcomes did not improve substantially until 1996. In 1996, it was found that treatment with a 'cocktail' of anti-retroviral medications could protect the immune system. Persons on treatment could expect a life expectancy near the average for the population. While resistance often developed when using one drug, with combined therapy, resistance to the drugs seldom developed, and life could be extended much longer. There was little dispute to the benefits of combined therapy, and even though it cost 20,000 dollars per year in 1996, there were immediate calls to make the treatment available to poor countries.[142]

A major debate occurred within HIV/AIDS knowledge communities about whether treatment or prevention of HIV/AIDS should be the goal of cooperation on HIV/AIDS. Scientists basing decisions on cost-benefit analysis argued that prevention efforts would provide greater total health gains than treatment efforts.[143] These advocates for cooperation on prevention pointed to econometric analysis and epidemiologic findings. As Canning wrote, 'The case for prevention is based, to a large extent, on the externality that each infection leads to added transmission to others so that the public benefits of prevention efforts outweigh the private benefits.'[144] Prevention efforts focused on changing sexual behaviour, promoting condom use, treating other sexual infections (which increase the transmission of HIV), and circumcision. Economists argued that given limited resources, prevention should be take priority over treatment in international cooperation.

Other experts, especially those who took views based in human rights, advocated for expanding access to HIV/AIDS treatment. For many of these experts, a 'turning point' was a major July 2000 International AIDS Conference in Durban, where treatment access goals were solidified

---

[141] R Yarchoan*, et al.*, 'Administration of 3'-azido-3'-deoxythymidine, an inhibitor of HTLV-III/LAV replication, to patients with AIDS or AIDS-related complex', Lancet, (1986) vol. 1, no. 8481, Mar 15, pp. 575-80.
[142] Schwartländer, Grubb & Perriëns, 'The 10-year struggle to provide antiretroviral treatment to people with HIV in the developing world'.
[143] Canning, 'The economics of HIV/AIDS in low-income countries: the case for prevention'.
[144] Ibid. P. 136

within the knowledge community.[145] As the founding director of the Global Fund explained, 'At Durban, technical opinion [on treatment] swung to 'we can and we should.''[146] This was followed by an influential consensus statement from Harvard faculty in March 2001, which argued that the high cost of drugs and poor infrastructure in developing countries (chief obstacles to treatment), could be 'overcome through well-designed and well-financed international efforts.'[147] While there is now a consensus that prevention and treatment efforts are complementary and reinforcing, early on, some saw treatment and prevention were perceived to be in conflict. Seeking to set this debate aside in 2004, the heads of the UNAIDS, the Global Fund, WHO and World Bank wrote,

> 'We can now leave simplistic discussions of prevention versus treatment behind. Growing scientific evidence supports common sense in arguing that new HIV infections will only be substantially reduced when broad access to treatment is combined with strengthened prevention efforts.'[148]

Cooperation moved forward not because consensus existed among scientists, but because commitment existed among advocates and institutions.

Despite the disagreement within the knowledge communities, international cooperation on treatment was largely undeterred. Discussing Director General Lee's commitment to put 3 million persons in developing countries on treatment by 2005, one senior WHO official, 'Lee had HIV treatment – not prevention – as the number one priority, without evidence.'[149] This had angered many staff members at WHO. The deviation from evidence was acknowledged by a senior advisor to the Director General who explained, 'there was little evidence that providing treatment [for HIV] decreases infections at the time. What drove the campaign was the moral imperative around inequity and opportunity.'[150] WHO was able to deviate from a knowledge-based policy process on HIV/AIDS.

---

[145] Michael H Merson, 'The HIV-AIDS pandemic at 25--the global response', N Engl J Med, (2006) vol. 354, no. 23, Jun 7, pp. 2414-7.
[146] Feachem, Richard. Personal interview. 9 September 2008
[147] Individual members of the Faculty of Harvard University, 'Consensus statement on antiretroviral treatment for AIDS in poor countries', Topics in HIV Medicine, (2001) vol. 9, pp. 14-26.
[148] Peter Piot*, et al.*, 'Public health. A global response to AIDS: lessons learned, next steps', Science, (2004) vol. 304, no. 5679, Jun 24, pp. 1909-10. P. 1910
[149] Mathers, Colin. Personal interview. 3 December 2007
[150] Smith, Ian. Personal interview. 8 November 2007

The moral crisis surrounding HIV/AIDS treatment was clear. In rich countries, AIDS became a chronic condition. In poor countries, AIDS remained a death sentence. This striking disparity, and the ease with which it could be addressed with medicine, created a sense of moral crisis that reached political leaders. In calling for treatment access in 1998, President Chirac derided the 'two ways of fighting AIDS' in rich and poor countries. In announcing PEPFAR in 2003, George Bush described hospitals telling patients, 'You've got AIDS. We can't help you. Go home and die.'[151] President Bush continued, 'In an age of miraculous medicines, no person should have to hear those words.' While scientists struggled to reach a consensus on debates about treatment and prevention, the broader knowledge community succeeded in communicating a moral crisis and bypassing debates among scientists about treatment and prevention approaches. Activists and political leaders, not just scientists, communicated this moral crisis. While an expanded knowledge community - that included advocates, persons living with HIV, countless organizations and scientists - made the development of consensus on the cause of disease more challenging, this expansive scope made it easier to communicate the crisis caused by HIV/AIDS, and the need for international cooperation to address the crisis.[152]

Concluding thoughts on the emergence of cooperation on HIV/AIDS treatment

Cooperation on HIV/AIDS began to expand in the late 1990s. Yet this cooperation diverged from contagion and the interests of powerful actors: efforts focused on treatment, rather than prevention; efforts did not target those states most at risk of state failure from HIV/AIDS, instead preferring those states with good governance. International institutions play a critical role in explaining the divergence from interests. Institutions, acting with autonomy and independence, succeeded in reducing the cost of pharmaceuticals, legitimising the use of generic pharmaceuticals, and limiting the role of pharmaceutical companies in the collective financing arrangements for cooperation on HIV/AIDS. Institutions were also able to challenge the interests of powerful states, and lead cooperation to diverge from their proposals. This is

[151] Bush, *State of the Union Address, 28 January* ([cited).
[152] S Friedman & S Mottiar, 'A rewarding engagement? The treatment action campaign and the politics of HIV/AIDS', Politics & Society, (2005) Dec 31.p. 513

most clearly demonstrated by contrasting the original United States Treasury and Congressional proposals for a collective financing arrangement for HIV/AIDS with the Global Fund to Fight AIDS, Tuberculosis and Malaria. The latter included much more space for recipient countries to have a role in decision making, and less space for private actors. Finally, knowledge communities, which expanded well beyond scientists, succeeded in communicating a moral crisis that demanded treatment for persons with HIV/AIDS. This message was incorporated into cooperative efforts, that were willing to go beyond cost-benefit calculations in justifying their expansion. These drivers of cooperation transformed a cooperation failure from 1981 to 1997 into the largest international cooperative effort on health from 1998 to 2006.

6.4 COOPERATION ON TOBACCO CONTROL

Tobacco kills one-third to one-half of its users, making it more lethal than most infectious diseases (Appendix 6B). And, like some infectious diseases, tobacco use is spread through international trade. If tobacco were an infection, the contagion thesis would expect international cooperation on tobacco control. Yet, the international externalities associated with tobacco, which are not immediately obvious, did not lead to cooperation.

Global tobacco control sought to bring international policies in line with the tobacco control policies of many rich nations. These countries had already taken steps to limit the advertising and sale of tobacco. Further, the international control of tobacco was expected to bring financial benefits to most rich states. Yet, key powerful actors did not seek to promote their own domestic policies on the international stage.

Since the 1950s, it was known that smoking tobacco causes lung cancer.[153] Over the years tobacco was established as a common risk factor for many diseases, including cardiovascular

[153] R. Doll & A. B. HILL, 'Smoking and carcinoma of the lung; preliminary report', British Medical Journal, (1950) vol. 2, no. 4682, Sep 30, pp. 739-48.

disease.[154] By the 1990s, epidemiologists showed that tobacco kills more people, and leads to more disability, than any single infectious disease.[155] Yet, knowledge about the dangers of tobacco did not lead to cooperation.

As I show here, international cooperation on tobacco control was driven decisively by WHO. The institution's autonomy, broad membership, and formal rules allowed WHO to lead the process of negotiating an international treaty on tobacco control. Cooperation on tobacco control began, quietly, in 1995, when WHO's World Health Assembly requested an inquiry into the feasibility of developing an international instrument on tobacco control (WHA 48.11). [156] At the next meeting of the WHA, the assembly agreed to a 'Framework Convention on Tobacco Control' (FCTC). And, in 1998, the recently elected WHO Director General Gro Harlem Brundtland made tobacco control one of her two core priorities (the other being malaria). She invested heavily in mobilising support for the effort. The FCTC was negotiated from 1999 to May 2003, and came into effect in 2005.[157] The treaty placed bans on tobacco advertising and promotion, mandated warnings on packaging, and prohibited misleading labelling of cigarettes or their promotion to children. In addition, the treaty addressed the illegal smuggling of tobacco products and promoted policies of taxing tobacco.[158]

Explaining international cooperation on tobacco control

Externalities fail to drive cooperation on tobacco control

The tobacco epidemic, though not infectious, appears to have high levels of international externality that can be addressed through international cooperation. The contagion index

---

[154] Ibid; M. Ezzati*, et al.*, 'Selected major risk factors and global and regional burden of disease', Lancet, (2002) vol. 360, no. 9343, Nov 2, pp. 1347-60.
[155] Lopez*, et al.*, eds., *Global burden of disease and risk factors*.
[156] WHO, 'WHO Framework Convention on Tobacco Control', (Geneva: WHO, 2003). See Annex 2, 'History of the WHO FCTC process' p. 33
[157] Cooperation on tobacco control may be more expansive than the Health Cooperation Index suggests (Figure 6.4, 6.6; Appendix 6B). As discussed in Chapter 3, this is because financing has a wider range on the index.
[158] WHO, 'WHO Framework Convention on Tobacco Control'. See Annex 2, 'History of the WHO FCTC process' p. 33

measures externality by considering the case fatality, basic reproductive number associated and disease burden, weighing these considerations against the availability of prevention and treatment strategies. While it is not possible to calculate a basic reproductive number for tobacco, it can be observed that the tobacco epidemic in developing countries is spreading faster than the epidemic of HIV/AIDS.[159] While rates of smoking in rich countries have been falling by 2 per cent per year, rates of smoking in poor countries have been increasing by 2 per cent per year.[160] An epidemic of tobacco use is responsible for 3.9 per cent of global disability, more than any single infectious disease (Appendix 6B). About 25 per cent of the world's population currently uses tobacco. A goal of reducing this figure to 20 per cent by 2020 promises to save 100 million lives.[161] In addition to these externalities, the illicit trade and smuggling of tobacco has been linked to criminal networks, and posed a threat to the financial interests and security of many states.[162]

Yet, these externalities did not lead to cooperation on tobacco before WHO made cooperation a priority. One reason may be that some rich and emerging economies were able to reduce tobacco use through domestic regulation, reducing the demand for international cooperation. Australia, Canada, South Africa and Sweden all reduced their smoking rates to less than 20 percent with national policies.[163] However, poorer states with limited regulatory capacity were unable to control the activities of multinational tobacco companies, leaving them vulnerable. Unlike infectious disease covered in this thesis, which typically threaten to spread from poor countries to rich countries, tobacco use threatens to spread from rich countries to poor and middle-income countries. Partly as a result of American and European success in passing anti-smoking laws, taxing tobacco, and sponsoring programs to help people quit smoking, tobacco

[159] J. Mackay & M. P. Eriksen, *The Tobacco Atlas* (Geneva: WHO, 2002).
[160] M. Ezzati*, et al.*, 'Role of smoking in global and regional cardiovascular mortality', Circulation, (2005) vol. 112, no. 4, Jul 26, pp. 489-97.
[161] T. R. Frieden & M. R. Bloomberg, 'How to prevent 100 million deaths from tobacco', Lancet, (2007) vol. 369, no. 9574, May 19, pp. 1758-61.
[162] J. Collin, K. Lee & K. Bissel, 'The framework convention on tobacco control: the politics of global health governance', Third World Quarterly, (2002) vol. 23, no. 2, pp. 265-82.
[163] Frieden & Bloomberg, 'How to prevent 100 million deaths from tobacco'.

companies began directing aggressive campaigns to expand their markets in developing countries.[164]

Powerful actors oppose cooperation on tobacco control

Opposition to tobacco control came predominantly from two sources: rich countries opposing international regulation of tobacco based on their financial interests or ideological positions, and a multinational tobacco industry attempting to capture the international regulatory process. In addition, there was a third – though short-lived – resistance from poor countries (mostly in sub-Saharan Africa) that depended heavily on growing and exporting tobacco. Analysis from the World Bank showed that reductions in global demand for tobacco would result in job losses in these small tobacco exporting economies, but that these losses would occur slowly (over a generation or more).[165] Below, I focus the analysis on the role of powerful actors, including rich states and the tobacco industry, in international cooperation on tobacco control.

While most countries forged a relatively easy consensus on tobacco control, two powerful countries threatened to disrupt WHO's efforts on the tobacco treaty: the United States and Japan.[166] The United States had been initially supportive of efforts to reduce global tobacco use at the meetings in 1999 and 2000. However, with the election of the Bush administration, the US delegates reversed positions. In 2001, the U.S. negotiators accepted 10 of 11 deletions to the treaty proposed by Philip Morris, the largest U.S. tobacco company.[167] These deletions included a provision that 'warning labels on cigarette packages be printed in the main language or languages of the country of sale.'[168] In addition, a leaked memo from the US embassy in Riyadh showed that the US was asking allies for help in disrupting the debate on the links

[164] The Economist, 'Snuffed out', *The Economist*, 5 July 2007.
[165] P. Jha & F. J. Chaloupka, *Curbing the Epidemic: governments and the economics of tobacco control* (Washington DC: World Bank, 1999).
[166] Notably, Germany too was opposed to the tobacco negotiations, though this opposition appears to be based on then German Chancelor Schroeder's ideological opposition to regulation. Yach, Derek, personal interview. 23 September 2007
[167] US Representative Waxman details has detailed the change in US positions. See H. A. Waxman, 'The Future of the Global Tobacco Treaty Negotiations', (2002).
[168] Ibid.

between trade and health, including tobacco control.[169] The US government had some success with this strategy; it was noted that Pakistan 'often did the work of the US Government in the negotiating process.'[170] The concern for tobacco export revenues led the United States, under the Bush administration, to initially calculate that the costs of cooperation exceeded the benefits. However, by the end of the negotiating process, the US conceded on almost all major points.[171] Furthermore, the United States provided critical leadership on negotiations to reduce the smuggling of tobacco. As a WHO staff member commented, 'We would have been hard-pressed to complete article 15 [which deals with smuggling and illicit trade] of the treaty if the US Treasury Department didn't fund the 3-4 million dollars needed to discuss anti-fraud, and anti-illicit trade measures.'[172]

The short-lived American rejection of international tobacco control policies, and the US export of cigarettes conflicted with American leadership on domestic tobacco control. As former US Surgeon General Koop commented,

> 'The inconsistency between U.S. tobacco trade policy and U.S. health policy increasingly is obvious and denounced in the international health community.... At a time when we are pleading with foreign governments to stop the export of cocaine, it is the height of hypocrisy for the U.S. to export tobacco.'[173]

Henry Waxman, an influential member of the US House of Representatives also observed this inconsistency, commenting,

> 'Some of the most compelling evidence of the effectiveness of anti-tobacco policies comes from state programs in the United States. Yet the United States also exports more cigarettes than any other nation in the world — more than one of every five traded, representing billions of dollars in revenue for U.S. tobacco companies.' [174]

Indeed, the international regulation of tobacco was modelled, in part, on the success in legislating tobacco control in the United States, which immediately preceded the negotiations.

---

[169] J. Collin, 'Tobacco Politics', Development, (2004) vol. 47, no. 2, pp. 91-96.
[170] Yach, Derek. Personal interview. 23 September 2007
Notably, Pakistan was also the only poor country opposed to the intensified smallpox campaign at WHO in 1966 (Chapter 5).
[171] Ibid.
[172] Bettcher, Doug. Personal interview. 7 November 2007
[173] D. Yach & D. Bettcher, 'The globalization of public health, II: The convergence of self-interest and altruism', American Journal of Public Health, (1998) vol. 88, no. 5, eng, pp. 738-41.
[174] Waxman, 'The Future of the Global Tobacco Treaty Negotiations'.

While in the US, the tobacco industry had close ties to government through lobbying, in Japan, the links between tobacco and the government were much closer. The Japanese Ministry of Finance owned two-thirds of the shares in Japan Tobacco. Like the US, Japan worked to extend its reach by influencing other countries. Japan Tobacco made the case against the FCTC in Russia, Romania and Turkey.[175] However, the East Asian financial crises changed Japan's position. As Yach explained,

> 'In the final negotiating round, the Japanese changed the negotiating team. Instead of having people who were really obstructionist, they sent one of their senior weapons negotiators, who told us (and I was in the meeting with Brundtland) that they had come to show good faith and turn out a treaty that they could implement. Part of the reason was that the power of the finance ministry had diminished relative to health and labour. There was a financial crisis in the country, and owning a large part of a company that wasn't particularly profitable wasn't seen as good and they wanted to reduce their dependency at a financial level.'

While the Japanese cost-benefit calculations had initially opposed cooperation on tobacco control, these calculations shifted in favour of cooperation during the course of the negotiations.

The most pervasive opposition to international cooperation on tobacco control came from the tobacco industry. The health cooperation thesis posits that powerful private actors might obstruct cooperation for private benefit (Table 2.6, 15). The tobacco industry attempted to capture the international regulatory process. The industry had some early success in shaping standards on cigarette production at the International Standards Organisation (ISO). Scholars have noted that the chair of the ISO committee 'is both a former employee of Imperial Tobacco and a consultant to the Tobacco Manufacturers Association,' while the committee's work relied on an industry-run research group.[176] When WHO began negotiations on tobacco control, industry infiltrated NGO-delegations, and the delegations of member-states, and attempted to discredit the work of WHO. As discussed below, WHO managed to protect its autonomy by limiting industry's access to multilateral discussions and by publicly exposing industry tactics.

An autonomous WHO drives cooperation on tobacco

[175] Collin, Lee & Bissel, 'The framework convention on tobacco control: the politics of global health governance'.
[176] Ibid. p. 272

If the explanatory role of international institutions is assessed by their ability to divert cooperation from contagion and the interests of powerful actors, few cases provide as powerful a demonstration as tobacco control. International tobacco control efforts were driven by an organization that fought to maintain its autonomy and independence from the tobacco industry, and from donor governments opposed to international regulation. Tobacco control was selected and implemented as a priority based on formal rules within WHO, acting independently of its most powerful members.

The formal rules at WHO, and the authority of the Director General, allowed tobacco control to emerge as a clear priority for cooperation on health. Upon taking office as Director General, Gro Harlem Brundtland announced her commitment to setting priorities based on the burden of disease (as discussed at the beginning of this Chapter). As a direct result of this commitment to directing the resources of WHO to disease burden, Brundtland created a Department of Non-Communicable disease, and launched the 'Tobacco Free Initiative.'[177] The tobacco control efforts sought to utilise, for the first time, WHO's treaty-making powers. As the first director of the tobacco efforts recalled,

> 'Just before Brundtland took office she called me in and said she was going to have two pathfinder projects. One on malaria, one on tobacco and she asked me to head the tobacco one. She made clear that the objective was not only to focus on tobacco control, but also to do work very differently within the UN, addressing different approaches to interventions – for tobacco, a regulatory approach.'[178]

WHO's formal rules for decision-making made tobacco control a priority, and rules in the conduct of the negotiations allowed for a divergence from the interests of the powerful. For example, despite American insistence on a reservation clause (permitting deletions upon adoption), the WHO rules made this non-negotiable.[179]

WHO's autonomy and independence allowed cooperation to diverge from contagion and the interests of powerful actors. Early on, tobacco control appealed to no powerful member states

[177] Bettcher, Doug. Personal interview. 7 November 2007
[178] Yach, Derek. Personal interview. 23 September 2007
[179] Yach, Derek. Personal interview. 23 September 2007

(only Canada was willing to support the efforts financially), and control efforts met fierce opposition from the tobacco industry. This made the preservation of institutional independence especially important and difficult because there was a vocal opposition to cooperation from industry. In contrast, viruses and bacteria do not employ lobbyists to undermine regulative efforts on infectious disease. WHO maintained independence by implementing a 'firewall' to keep out industry influence seeking to capture the regulatory process. The tobacco industry attempted to send its representatives on the delegations of NGOs and developing countries. Turkey's delegation to WHO included the deputy director of the state's tobacco monopoly, while the delegations of poor countries were often influenced by funding from tobacco companies.[180] A July 2000 Report of the Committee of Experts on Tobacco Industry Documents concluded that 'tobacco companies instigated global strategies to discredit and impede WHO's ability to carry out its mission.' The Expert Committee reported that

> 'The tobacco companies' campaign against WHO was rarely directed at the merits of the public health issues raised by tobacco use. Instead, the documents show that tobacco companies sought to divert attention from the public health issues, to reduce budgets for the scientific and policy activities carried out by WHO, to pit other UN agencies against WHO, to convince developing countries that WHO's tobacco control program was a "First World" agenda carried out at the expense of the developing world, to distort the results of important scientific studies on tobacco, and to discredit WHO as an institution.'[181]

In response, WHO publicized the industry efforts to thwart international negotiations, and limited their access to negotiations. The preservation of institutional autonomy allowed WHO to pursue tobacco control efforts without succumbing to pressure from industry.

The permanence of institutional rules, including the FCTC, has led cooperation on tobacco to persist. Since the treaty was approved under Brundtand, every subsequent Director-General has supported and expanded tobacco control efforts. Lee was dedicated to increasing implementation of the treaty, and making it 'come alive at country level.' And Chan, who had

---

[180] Collin, Lee & Bissel, 'The framework convention on tobacco control: the politics of global health governance'.

[181] T. Zeltner, *et al.*, 'Tobacco Company Strategies to Undermine Tobacco Control Activities at the World Health Organization', (Geneva: WHO, 2000).

served as a Chinese delegate to the FCTC, has made tobacco efforts a central focus – and a source of confidence – for work on non-communicable diseases.[182]

Long-standing scientific consensus does not drive cooperation on tobacco

It is remarkable that no new scientific consensus, nor any new technology, was driving cooperation on tobacco control. As mentioned, evidence linking tobacco use to cancer had existed since the 1950s, and continued to be strengthened. New knowledge could not explain WHO's new-found commitment to tobacco control. As a leader of tobacco control efforts explained, 'the same data that existed before Brundtland came in existed after Brundtland came in.'[183] Knowledge on global tobacco use and regulation was essential when the regulatory process was launched, but it does not appear to have driven any rapid changes.[184]

Once the tobacco negotiations were launched, knowledge communities played a role in implementing tobacco policies. The negotiations themselves served as a 'university of tobacco control,' creating a global epistemic community on tobacco policy that led to the implementation of many policies in countries even before the negotiations were complete.[185] By convening experts from all countries to discuss international tobacco control, the treaty negotiations created a sense that tobacco was an emergency public health issue.[186]

Concluding thoughts on tobacco control

Tobacco control had been a purely domestic matter until WHO sought to pursue the Framework Convention on Tobacco Control. While rich states could regulate tobacco domestically, they sought to benefit from international cooperation to prevent the smuggling of tobacco. Meanwhile, many poor and middle-income countries had been unable to overcome the forceful opposition from the tobacco industry to domestic regulation. These countries stood to benefit

[182] Yach, Derek. Personal interview. 23 September 2007
[183] Ibid.
[184] Mackay & Eriksen, *The Tobacco Atlas*.
[185] Yach, Derek. Personal interview. 23 September 2007
[186] Collin, Lee & Bissel, 'The framework convention on tobacco control: the politics of global health governance'.

most from a global response to tobacco. International tobacco control was resisted by the United States and Japan, concerned about the costs to their industries with regulation. However, the autonomy, independence and formal rules of WHO served to place tobacco on the international agenda, even when no powerful states were supporting cooperation, and to prohibit the tobacco industry from capturing the regulatory process.

CONCLUSIONS

International efforts to reduce under-nutrition, treat HIV/AIDS and regulate the sale and marketing of tobacco products demonstrate the limited role of contagion in explaining cooperation, the increasing importance of international institutions in driving international cooperation, and the changing role of the international scientific community in international cooperation on health.

Each case study in this chapter challenges the contagion thesis. The most robust cooperation on health observed from 1976 to 2006 cannot be explained by the threatened spread of disease. Until the 1990s, less than a quarter of development assistance for health was directed to infectious disease. Cooperation on under-nutrition was a centrepiece of international health efforts throughout the late 1970s and the 1980s. And, the most expansive international cooperation on health focused on the treatment of HIV/AIDS, rather than its prevention, countering the predictions of the contagion thesis. In addition, the first international health treaty was developed to address tobacco use, a key risk factor for many non-contagious diseases.

During the period examined in this Chapter, international institutions have taken on an especially important role in driving international cooperation. Institutional autonomy and independence, and the use of formal rules for priority-setting have allowed cooperation to diverge from contagion and the interests of the most powerful actors. These diversions from

contagion and the interests of the powerful play an essential role in explaining the cooperation on nutrition, HIV/AIDS treatment and tobacco control. International institutions made international nutrition a financing priority by incorporating it into World Bank strategies for international development. Meanwhile, by institutionalising the negotiations on tobacco control, and a code on breast-milk substitutes at WHO, progress in negotiations persisted, even after newly elected Presidents in the United opposed both of these regulatory efforts that had been supported by their predecessors. In addition, the autonomy and independence of international institutions limited the role played by the pharmaceutical industry in collective financing for HIV/AIDS (in comparison to the larger role in the initial US proposals), and prevented the tobacco industry from subverting negotiations on a tobacco control treaty. Institutions used formal rules and agreements to allow weaker members to shape cooperation on HIV/AIDS treatment, and to direct resources to tobacco control, despite the lack of support from powerful member states.

Finally, knowledge communities for health expanded beyond a narrow group of scientific experts to include economists, activists, and, in the case of HIV/AIDS, people who developed expertise by living with disease. In the earliest international cooperation on health, the epistemic community consisted of an international group of scientists meeting to discuss the aetiology of infectious disease. In the period covered in this Chapter, the epistemic community debated in medical journals and the popular media, and reached consensus through scientific debate and advocacy. Sometimes, this wider knowledge community slowed cooperation, as it did early in the HIV/AIDS epidemic. However, the broadening of this epistemic community for health can be credited with the linking of under-nutrition to national development, and promoting HIV/AIDS treatment, despite the ongoing debate among scientists and technocrats. Informing the cost-benefit calculations of states, and generating a perception of crisis is no longer under the limited purview of scientists; a much wider knowledge community has communicated the externalities of disease and promoted international cooperation.

As shown in this chapter, contagion does not appear to explain variations in international cooperation from 1976 to 2006. Further, the interests of powerful actors do not seem to explain the emergence of cooperation on nutrition on tobacco. This analysis has highlighted the critical, and increasingly important, role of international institutions in explaining variations in cooperation on health.

Chapter 7: Conclusions – Going Beyond Contagion in Explaining Cooperation on Health

The preceding chapters have laid out the theory and history of international cooperation on health. Chapter 2 outlined the contagion thesis, an explanation of international cooperation on health based on international externalities. Chapter 2 also outlined an alternative health cooperation thesis, an explanation for international cooperation based on the ability of powerful actors, international institutions, and knowledge communities to drive cooperation beyond contagion. Chapter 3 provided measures for contagion and international cooperation on health, which were used to select case studies and assess trends in international cooperation. Chapters 4 to 6 demonstrated the explanatory power of the contagion thesis and the broader health cooperation thesis in a series of case studies covering the period 1918 to 2006.

Three critical tasks remain for this concluding chapter. First, this chapter will provide a summary assessment of the contagion thesis, drawing lessons from the case studies in historical chapters and the 85 quantitative assessments of contagion and cooperation made from 1918 to 2006. Using the indices presented in Chapter 3, I demonstrate that contagion is neither necessary nor sufficient for cooperation. Second, this chapter will provide an empirical summary assessment of the health cooperation thesis, drawing lessons from the case studies and the quantitative measures compiled from the cooperation indices to demonstrate the relative explanatory power of leadership, institutions and knowledge in understanding international cooperation on health. This assessment points to the central role of international institutions in explaining cooperation on health. Finally, this chapter considers the implications of these findings for global health policy.

7.1 EVALUATING THE CONTAGION THESIS

As detailed in Chapters 1 and 2, the idea that contagion drives international cooperation has shaped leading explanations of international cooperation on health. These explanations are supported by rationalist theories of international cooperation. Recent phenomena, especially the rise of cooperation on HIV/AIDS, have reinforced the conclusion that contagion drives international cooperation. However, these theories are incomplete, as demonstrated below.

Case studies show that contagion does not explain cooperation

As I have shown in the last three chapters, contagion appears to provide an incomplete, and sometimes inaccurate, explanation of international cooperation. Even cooperation on contagious diseases may not be driven by contagion. This cooperation has sometimes arisen after the threat of contagion has subsided, or it has sought to reduce the suffering caused by the disease, not its spread (Chapter 6). Differing levels of contagion among infectious diseases – like malaria and smallpox – do not appear to explain the differing levels of cooperation observed, suggesting that factors beyond contagion may play an essential explanatory role (Chapter 5).

Historically, there has been an absence of cooperation on some of the most dire contagious threats, and cooperation on non-contagious diseases. There was an absence of cooperation on smallpox for over 30 years from the eradication of the disease from Europe – a time in which the benefits of cooperation would have been great. Similarly, states failed to cooperate on pandemic influenza after the 1918 pandemic, despite the obvious contagious threats. After the Second World War, forceful cooperation emerged on malaria, while cooperation on smallpox was delayed until 1967, even though smallpox posed a greater contagious threat than malaria. Some of the most robust financial and regulatory cooperation emerged on non-contagious disease threats. Cooperation on non-contagious disease included standards-setting for biological

products in the interwar period, international cooperation on nutrition in the 1970s and 1980s, and international cooperation on tobacco control in the 1990s. In addition, cooperation on contagious disease has sometimes not addressed the disease's contagion or spread. For example, cooperation on HIV/AIDS emerged after the disease had spread widely, and focused primarily on treatment of the disease, rather than its prevention.

Regression finds no relationship between contagion and international financing, but contagion explains some regulation and research

To assess trends in international cooperation, I conducted regression analyses using the 85 calculations of the contagion and cooperation indices from 1918 to 2006 (Figure 7.1, Table 7.1 - 7.2).[1] The contagion index is not significantly correlated with the health cooperation index. Breaking the cooperation index down into its three components, it appears that contagion is not significantly correlated with international financing, though the contagion index (without financial incentives indicator) predicts international regulation and international research and surveillance with statistical significance. The regression reveals that approximately 11 per cent (22 per cent since 1948) of the variance in the international regulation indicator and 9 per cent (32 per cent since 1948) of the variance in the international research and surveillance indicator can be explained by the contagion index (Table 7.1, 7.2). Table 7.3 and Figure 7.2 below show the relationship between contagion and cooperation for each time period considered in this thesis.

[1] It should be noted that these quantitative assessments do not include the financial incentives indicator, which is available only for 1990 and 2005.

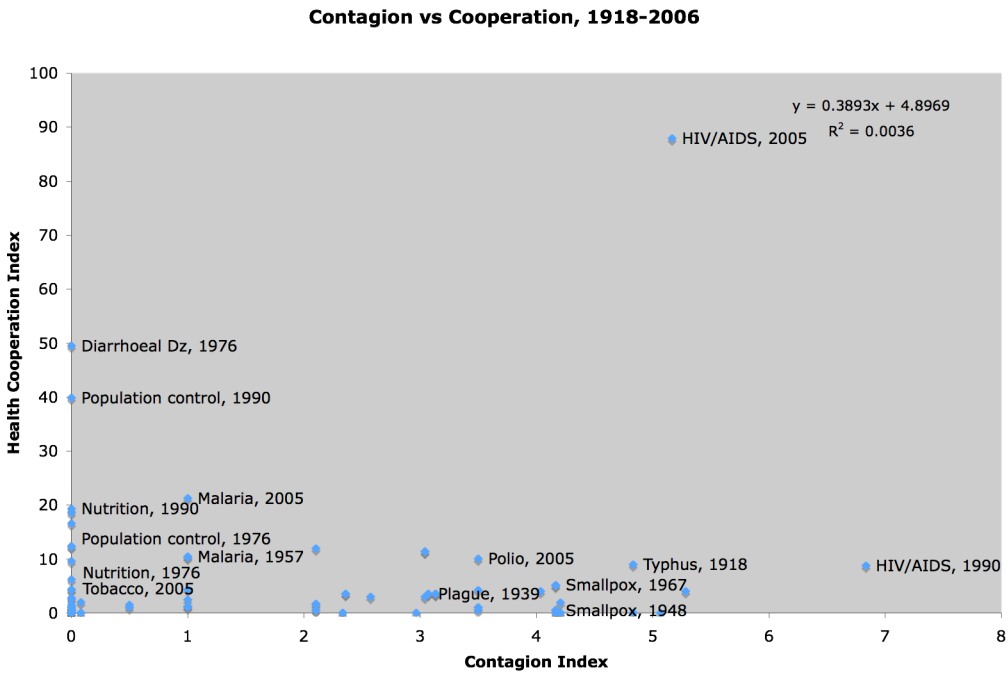


Figure 7.1. Contagion vs Cooperation, 1918 to 2006. Case-studies are labelled here.

Measure	Coefficient	R-squared	p-value
Health Cooperation Index	0.389	0.0036	.58
International Financing Indicator (C_F)	0.13	0.0004	.84
*International Regulation Indicator (C_R)	0.14	0.11	0.002
*International Research and Surveillance Indicator (C_S)	0.30	0.09	0.005

Table 7.1 1918-2006: Regression of Contagion Index (without financial incentives indicator) against Health Cooperation Index and health cooperation indicators.

Measure	Coefficient	R-squared	p-value
Health Cooperation Index	0.90	0.01	0.36
International Financing Indicator (C_F)	0.56	0.005	.56902
*International Regulation Indicator (C_R)	0.20	0.22	.00012
*International Research and Surveillance Indicator (C_S)	0.17	0.32	.000001

Table 7.2 1948-2006: Regression of Contagion Index (without financial incentives indicator) against Health Cooperation Index and health cooperation indicators.

Time period	Coefficient	R-squared	p-value
1918 – 1947 (Chapter 4)	0.31	0.062	0.24
1948 – 1976 (Chapter 5)	– 0.25	0.014	0.63
1977 – 2006 (Chapter 6)	1.51	0.031	0.26

Table 7.3 Regression of Contagion Index (without financial incentives indicator) against Health Cooperation Index, 1918-2006, by time period.

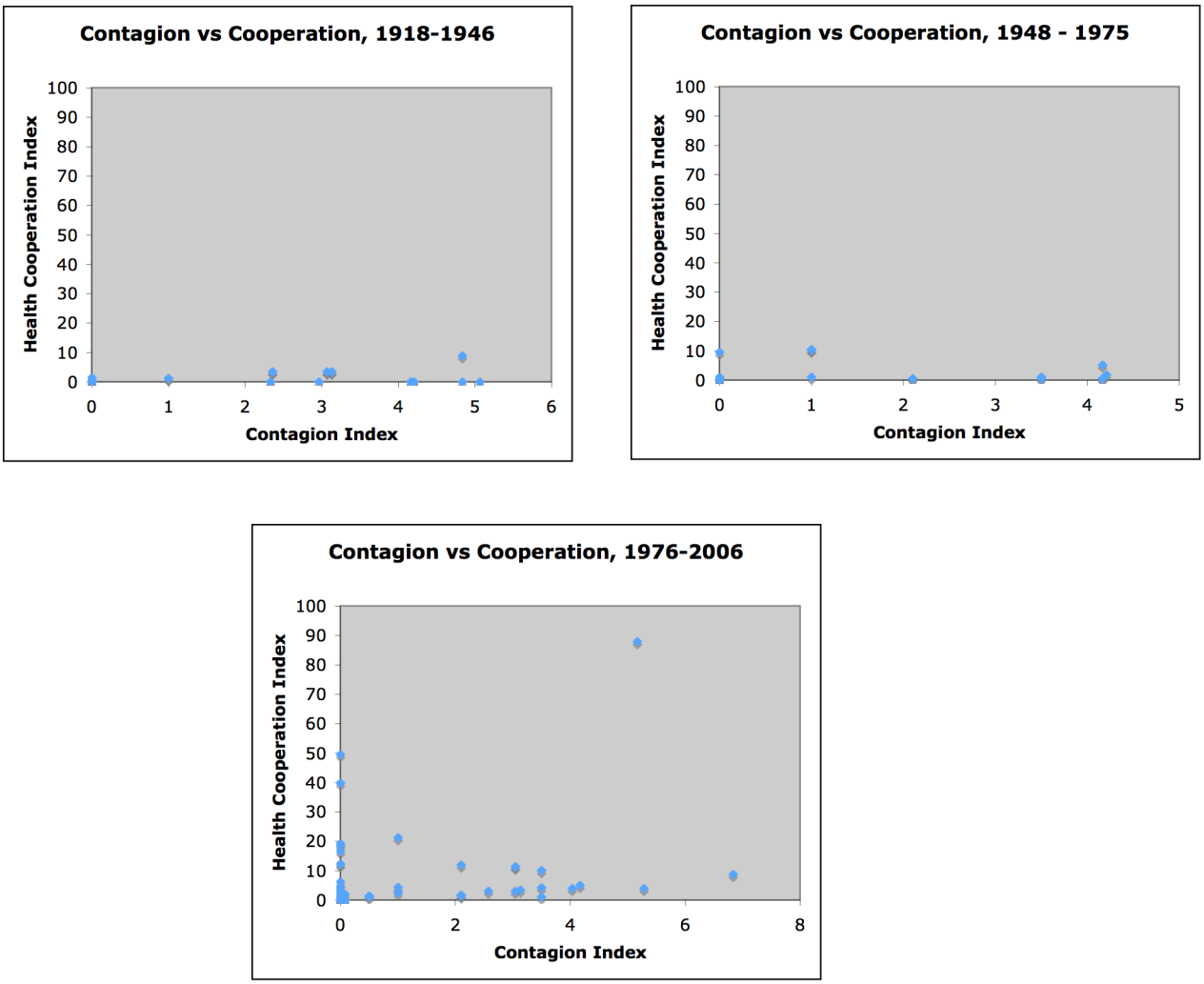


Figure 7.2 Contagion vs Cooperation by time period, 1918 – 2006.

Measure	Coefficient	R-squared	p-value
Contagion index	0.389	0.0035	0.58
*International Epidemic Potential Indicator (I_E)	0.57	0.092	0.046
*Disease Severity Indicator (I_S)	0.15	0.062	0.022
Financial Incentives Indicator (I_F) (2005 only)	– 0.22	0.0097	0.698

Table 7.3 Regression of Contagion Index (without financial incentives indicator) and contagion indicators against Health Cooperation Index, 1918-2006. See Table 3.4 for composition of indicators.

These findings from the regression analysis affirm the case-studies' conclusions about the limited role played by contagion in explaining cooperation. The quantitative analysis includes a broader range of diseases than the case studies, as this analysis has sought to include all disease categories for which data is available. If generalized, the finding that contagion does not predict international financing with any significance, while explaining some variation in regulation and research, poses a challenge to dominant explanations of international cooperation on health. Health analysts have attributed the flow of financial resources to infectious diseases to concerns about contagion and health security.[2] The acceptance of the contagion thesis has been based mostly on observations of international financing for health. This is precisely the form of cooperation that contagion is worst at explaining.

Contagion Index is an imperfect measure of externality

The explanatory power of regressions based on the contagion and health cooperation indices is limited by selection bias. In each of the years considered in the indices, only those diseases for which data on cooperation is available were included. This has created a selection bias that favours those diseases for which cooperation has emerged. For example, due to a lack of data, polio is not included in 1948, though it is included in each subsequent year. There are two reasons for the presence of this bias. The first reason for the selection bias is empirical: it is easier to find data on those diseases where cooperation has occurred, and more difficult to find confirmatory data that cooperation has been absent. The second reason for the selection bias is

[2] Robert Beaglehole & Ruth Bonita, 'Global public health: a scorecard', Lancet, (2008) vol. 372, no. 9654, Dec 6, pp. 1988-96. See also

analytical: disease categories are more narrowly defined for diseases on which cooperation does occur. For example, onchoceriasis, malaria, smallpox and tuberculosis are each considered separately, while diabetes, cardiovascular disease and chronic respiratory conditions are considered under the category of chronic non-communicable disease. The reason for these groupings is that these conditions cannot possibly be addressed through programs focused on a single disease, but must be addressed by programs targeting their shared risk factors. Thus, any cooperative initiative, almost inevitably, addresses these health issues collectively. It is not clear whether this selection bias leads the analysis to unfairly favour the contagion thesis by excluding those highly contagious diseases for which cooperation did not emerge, or to unfairly oppose the contagion thesis by excluding those non-contagious diseases for which cooperation did not emerge. In either case, this is an imperfection of this study and the findings should be interpreted in light of this bias.

The contagion index provides an incomplete assessment of the externalities associated with disease. The case studies capture more externalities by considering qualitative and quantitative assessments of the threat of various diseases, beyond epidemic potential, disease severity or economic incentives. Contagion, and the perception of externalities, is often based on uncertainty. This uncertainty is not captured by the contagion index. For example, though treatment for malaria with quinine was known and available after the Second World War, the Japanese control over the Dutch Indies meant that American access to the principal source of quinine was threatened. The contagion index does not capture this threatened loss of access to treatment. In addition, cooperation on pandemic influenza, HIV/AIDS and other disease, has been justified by the potential to cause a large economic burden, rather than the actual burden already created. These qualitative concerns and uncertainties are not captured by the contagion index.

Cooperation index is an imperfect measure of cooperation

As discussed in Chapter 3, the Health Cooperation Index improves upon existing measures of cooperation on health by including the three major forms of cooperation: financing, regulation and research and surveillance. While overall, these make up a nearly equally ratio of the index for each individual disease (Appendix 4A, 5A, 6B), the index preferences international financing. A possible solution to this is to place financing on a scale to limit the maximum values, or to increase the weight given to regulation and research.

7.2 EXPLAINING COOPERATION BEYOND CONTAGION

As an alternative to the contagion thesis, Chapter 2 presented a health cooperation thesis, in which the leadership of powerful actors, international institutions, and knowledge communities are given a role in explaining international cooperation on health. Here, I assess the relative importance of each of these categories in explaining international cooperation on health, drawing from the case studies and regression analysis based on the indices.

Powerful actors may be sufficient for driving cooperation on health

The framework presented in Chapter 2 points to three drivers for cooperation under the explanatory category of leadership. The first two drivers suggest that cooperation will emerge when the benefits of cooperation exceed the costs for a powerful actor, or a group of powerful actors. The third driver suggests that a powerful actor, which stands to benefit from cooperation, is able to influence other actors to bear the costs of cooperation (thus divorcing costs and benefits). This last driver relates to the role of the private sector in driving cooperation.

Throughout the case studies in the preceding three chapters, the cost-benefit calculations of powerful actors have been illustrated. Consistently, these cost-benefit calculations have not been made on purely economic grounds, but rather, they have incorporated strategic concerns that defy quantification. While the cost-benefit calculations favouring smallpox eradication had

been in place (and were largely unchanged) for over 30 years, it was, in part, a desire for international good will that led the United States to sponsor cooperation. For malaria, strategic concerns about access to quinine were likely more important as an acute driver of cooperation to eradicate the disease, than were the cost-benefit calculations favourable to cooperation. The United States' decision to sponsor HIV/AIDS treatment was guided partly by moral concerns and a desire to project a positive image abroad, as demonstrated in Chapter 6. While leadership from powerful actors is important, the drivers for this leadership extend well beyond economic cost-benefit calculations.

American Presidential leadership has driven cooperation on four of the five cases examined since 1948. In 1958, President Dwight D. Eisenhower announced his support for malaria eradication at the State of the Union address. This commitment spurred, and largely financed, WHO's Malaria Eradication Programme (Chapter 5). In 1964, President Lyndon Johnson declared support for the eradication of smallpox from Central and Western Africa to highlight his commitment to 'International Cooperation Year.' As described in Chapter 5, this commitment made the WHO's Intensified Smallpox Eradication campaign possible in 1967. In 1977, President Jimmy Carter, through his Presidential Committee on World Hunger, catalyzed cooperation on under-nutrition, and financed much of the research on nutrition in developing countries (Chapter 6). Finally, after the relative neglect of the global HIV/AIDS pandemic since the 1980s, President George W. Bush announced the President's Emergency Plan for AIDS Relief in his 2003 State of the Union Address, making the United States, by far, the largest contributor to the global efforts against HIV/AIDS. Among the case studies examined since 1948, only international cooperation on tobacco control lacked direct initiative from the President of the United States.

The leadership of the United States has initiated, expanded and restrained international cooperation on health (Figure 7.2). In some instances, American leadership has driven cooperation that would not have occurred, as was the case with malaria. In other instances, it

has expanded or catalyzed cooperation that was already underway, as was the case with smallpox and HIV/AIDS since 2003, and – to a lesser extent – with nutrition. Finally, in some instances, American leadership acted as a restraining force, as was the case with the early HIV/AIDS epidemic, and with tobacco control.

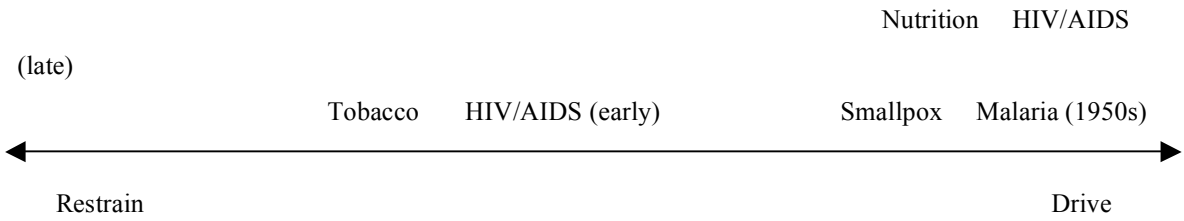


Figure 7.2 Spectrum of leadership's role in explaining international cooperation

It may be that the private financial benefits, like those associated with the sale of anti-retroviral treatments for HIV/AIDS, DDT for malaria, and vaccines for smallpox and other illnesses, have driven cooperation. Industry, standing to benefit from concentrated benefits, may be able to capture the priority-setting process and influence powerful actors to bear the costs of cooperation. The preceding chapters have provided preliminary assessments of the role of these private financial benefits, giving mixed results. It has been demonstrated that there was no private benefit associated with smallpox eradication (the sharp short term increase in sales of vaccine would be offset by the long-term fall with success of eradication).[3] However, for malaria eradication, and HIV/AIDS treatment, the story is much less clear, and limited evidence suggests that private industry may have driven increases in international cooperation. For HIV/AIDS cooperation, private pharmaceutical companies, seeking protected markets in rich countries and expanded (though discounted) markets for their products in poor countries, agreed to international agreements that both protected and expanded their markets. While industry was initially vocal in opposition to arrangements to sharply reduce the costs of treatment, industry faired well in partnerships to provide anti-retroviral medications. In the United States, PEPFAR initially provided only FDA approved drugs, effectively excluding generic medications. At the Global Fund, pharmaceutical companies were given a voice in the governance of the

[3] Varun Gauri & Peyvan Khaleghian, 'Immunization in Developing Countries: Its Political and Organizational Determinants', World Development, (2002) vol. 30, no. 12, pp. 2109-32.

organization, with seats on the board. In contrast, with tobacco control, private industry in rich countries vocally opposed and attempted to obstruct international cooperation. The role of private benefits in explaining the emergence of international cooperation must be studied further as this thesis has not been able to draw firm conclusions regarding the nature and scale of their influence.

Institutions cause cooperation to diverge from contagion and interests of the powerful

The health cooperation thesis posits that institutions can lead cooperation to diverge from contagion and the interests of powerful actors through their autonomy, broad membership, formal rules and permanence. The case studies in the previous chapters, and analysis of quantitative data reveals that international institutions play an essential role in explaining cooperation beyond contagion.

International institutions explain many of the deviations from contagion examined in this thesis, including cooperation on non-contagious disease, and variations in cooperation among infectious diseases. As discussed in the previous section, cooperation has not been correlated with contagion. Cooperation in the interwar period extended to include standards-setting on biological products, such as insulin, not related to contagious disease. Later, international institutions facilitated cooperation on nutrition, HIV/AIDS treatment, and tobacco control. Even among infectious diseases with high levels of contagion, like smallpox, the case studies show that cooperation may not have been possible without international institutions.

International institutions have evolved and multiplied to expand cooperation beyond contagion and the interests of powerful actors. Historically, it appears that new institutions did not arise to fill a functional gap, but rather, to establish a new set of priorities: whether for typhus control (League of Nations), or collective financing for HIV/AIDS (Global Fund). As suggested by institutionalist scholars, international institutions can diverge from the purposes for which they

were created.[4] Cooperation on nutrition took hold first at the World Bank, an institution created to deal with reconstruction after the Second World War. The Bank made nutrition a core component of international development strategies, embedding nutrition lending and policy into its formal rules. While, as discussed in Chapter 5, WHO had won the support of the United States by demonstrating its relevance on infectious disease, the institution expanded cooperation to include the regulation of breast-milk substitutes in the late 1970s, and tobacco control in the late 1990s.

Just as international institutions have driven cooperation when contagion is low, international institutions have driven cooperation when the source of contagion (or international externality) is shifting or diffuse, as is the case with most health issues. In her study of financial regulation, Beth Simons concludes that when the source of externality is distinct, the United States will prefer unilateral action. While, when the source of externality is diffuse or shifting, the United States will support a multilateral institution.[5] In some cases, where externalities associated with contagion were distinct, the United States acted unilaterally. One example of this is the eradication of yellow fever from the Panama Canal Zone in 1914 (discussed in Chapter 4), where externality was presented through delays and costs added to shipping through the Panama Canal. However, in most cases, the threat posed by disease could not be clearly localized or contained, leading the United States to favour working through international institutions. With smallpox eradication, the potential sources for introducing the diseases were so wide that the United States did not seek to act unilaterally, despite the overwhelmingly favourable cost-benefit ratio. Similarly, with the threat of emerging infectious diseases, including pandemic influenza – where the threat is especially diffuse, the United States has worked through the World Health Organization.

---

[4] Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy*.
[5] B Simmons, 'The international politics of harmonization: the case of capital market regulation', International Organization, (2001) vol. 55, no. 3, pp. 589-620. See also the discussion in Mattli & Woods, 'In Whose Benefit? Explaining regulatory change in global politics '. P. 6

Institutions also have the ability to obstruct international cooperation, even when cooperation is in the interests of states acting on their own rational self-interests. In the 1950s, WHO was so consumed with malaria eradication that proposals to eradicate smallpox strayed from the zone of acceptable actions, demonstrating 'bounded rationality,' as discussed in Chapter 5. Later, at the height of the smallpox campaign, bureaucratic self-interests led WHO staff to release smallpox funding to meet other general health needs. Perhaps the most visible demonstration of bureaucratic self-interests are those that slowed WHO's work on HIV/AIDS from 1988 to 1996. As discussed in Chapter 6, Director General Nakajima made use of WHO's institutional rules and ability to link issues to obstruct cooperation. Consistent with theories of institutional choice, this led actors to seek and create other institutions for cooperation on HIV/AIDS, including UNAIDS for coordinating actors and policies, and the Global Fund to Fight AIDS, Tuberculosis and Malaria for collective financing.[6]

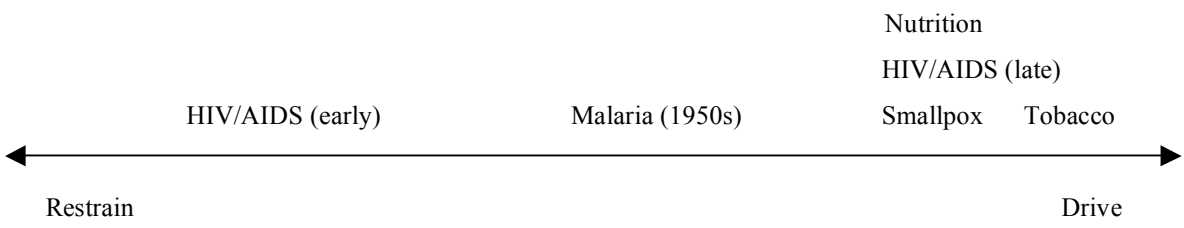


Figure 7.3 Spectrum of international institution's role in explaining international cooperation

A rudimentary quantitative assessment of the effect of international institutions can be made by comparing how international health financing from international institutions and bilateral donors correlate to contagion. It would be expected from the case studies that international institutions would lead to a divergence from contagion. In addition, if institutions lead to a divergence from contagion, than WHO's regular budget funds (whose allocations are decided by the World Health Assembly and Secretariat) should be more poorly correlated with contagion than WHO's extra-budgetary funds (whose allocations are decided by government donors and foundations).[7] To assess the role of international institutions in explaining variations in cooperation, I conducted regressions using existing data on the disbursements of the World Bank, WHO's regular budget, WHO's extra-budgetary funds, the United States

[6] Jupille & Snidal, 'The Choice of International Institutions: Cooperation, Alternatives and Strategies'.
[7] Note that these extra-budgetary funds make up about 75 per cent of WHO's budget.

Government and the Gates Foundation to disease areas.[8] The figures used reflect a one-year period for each institution: 2006-2007 for WHO, and 2005 for the World Bank, United States Government and Gates Foundation. Only disbursements made to a specific disease area included in the contagion index were incorporated in the regression. The per cent of total international health funding included from each institution is listed in Table 7.5.

The results of the quantitative assessment support the findings in the case studies that international institutions can explain some of the divergence from contagion (Table 7.5, Figure 7.4). While funding from the World Bank and WHO's regular budget are not correlated with contagion, funding from the United States Government and WHO's extra-budgetary funds do correlate with contagion. 58 per cent of the variation in funding from the United States government can be explained variations in contagion, and 33 per cent of variation in extra-budgetary funds to WHO can be explained by variations in contagion. Notably, funding from the Gates Foundation, a private donor, did not correlate to contagion.

Financing institution	Coefficient	R-squared	p-value	% funding included
World Health Organization, regular budget funds	– 0.16	0.0001	0.97	23.7
World Health Organization, extra-budgetary funds	37.70	0.332	0.06	52.1
World Bank	5.06	0.015	0.79	16.4
United States Government	238.74	0.585	0.04	73.4
Gates Foundation	21.48	0.201	0.31	77.1

Table 7.5 Regression of Contagion index (without financial incentives indicator) vs international financing in 2005, by institution. Note that if HIV/AIDS funding is excluded, there is no longer a significant relationship between contagion and financing by the United States government (R-squared 0.012, p value 0.83).

Data sources: For WHO budgets (2006): Stuckler, D., L. King, H. Robinson & M. McKee, 'WHO's budgetary allocations and burden of disease: a comparative analysis', *Lancet*, (2008); For others (2005): Sridhar, D. & R. Batniji, 'Misfinancing global health: a case for transparency in disbursements and decision making', *Lancet*, (2008)

[8] WHO data obtained from: Stuckler*, et al.*, 'WHO's budgetary allocations and burden of disease: a comparative analysis'.; World Bank, United States Government, and Gates Foundation data obtained from: Sridhar & Batniji, 'Misfinancing global health: a case for transparency in disbursements and decision making'.

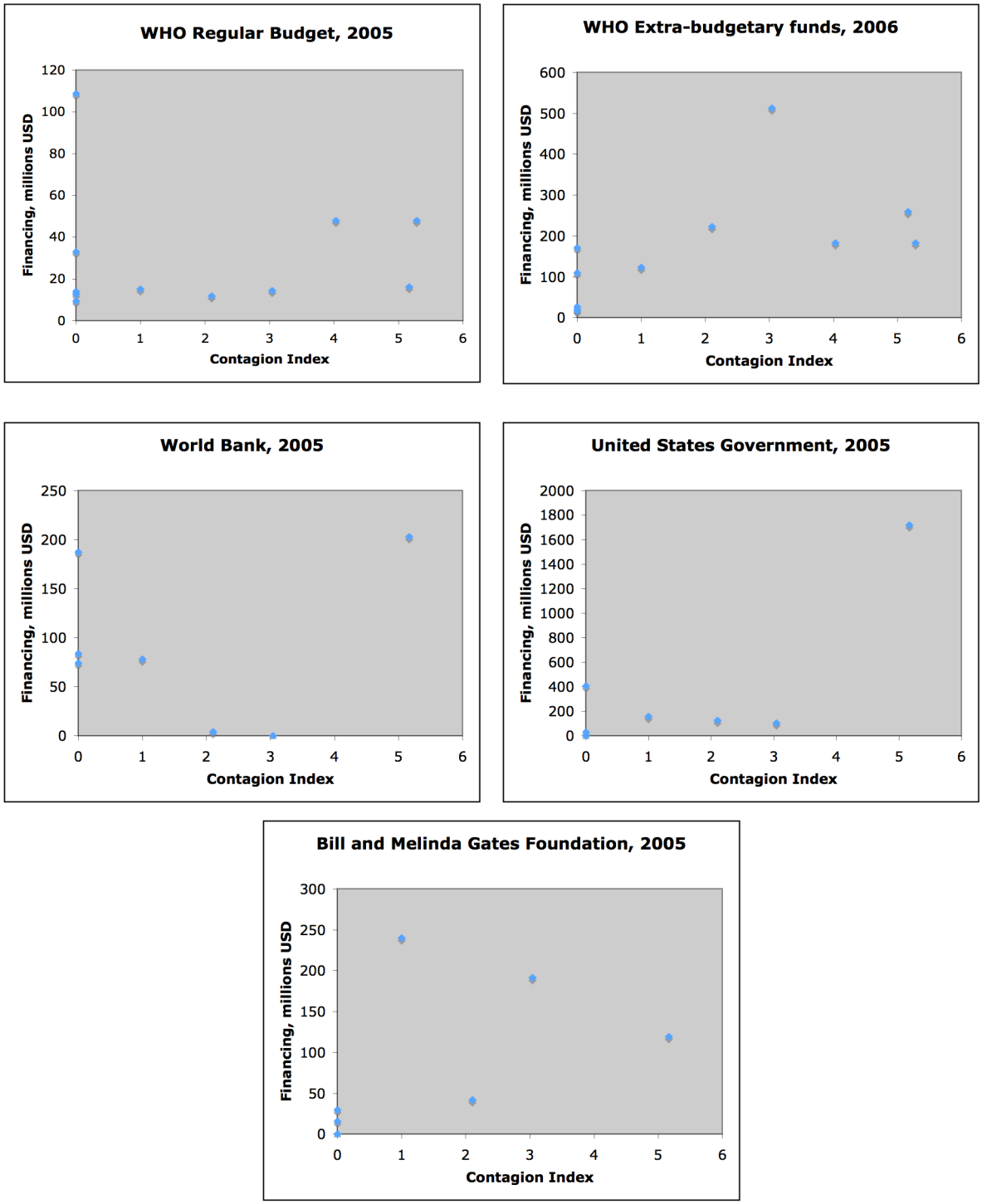


Figure 7.4 Contagion index vs financing by institution. See Table 7.5 for sources.

The most obvious limitation to this quantitative analysis is that for WHO's regular budget and the World Bank, a minority of funding was included in the regressions (Table 7.5). This is due to the exclusion of non-disease specific financing from this analysis. The World Bank gives the majority of its financing to health systems development, with major allocations to the

construction of water and sanitation infrastructure and roads seeking to reduce injury mortality.[9] Notably, if these funds were included, they would steer conclusions about the World Bank's funding even more decisively away from contagion. Similarly, the majority (60.1 per cent) of WHO regular budget funds are not disease-specific, as they are directed to areas like policy-making, human resources for health, and knowledge management. Even those that can be allocated to infectious disease cannot be appropriately labelled to one specific disease (e.g. 'communicable disease prevention and control,' or 'epidemic alert and response'). Like funding for the Bank, the inclusion of non-disease specific funding would steer conclusions about WHO's regular budget funding more decisively away from contagion.

Knowledge or new technologies change cost-benefit calculations

The health cooperation thesis suggests that knowledge communities will drive cooperation by changing cost-benefit calculations, redefining state interests and creating a perception of crisis. The case studies reveal that knowledge communities have played a decisive role in driving cooperation on smallpox, nutrition, HIV/AIDS (late in the epidemic) and tobacco.

The cases examined in this thesis suggest that scientific consensus does not always lead to cooperation, or may lead to cooperation many years later. At the International Sanitary Conferences, there was very little delay between agreement on the modes of transmission of cholera, plague and yellow fever and agreements to control their spread. In contrast, there was a 30 year delay between the consensus that eradication of smallpox was possible through vaccination, and a nearly 50 year delay from the observation that tobacco causes cancer to an international agreement to limit the promotion and sale of tobacco products. On the other hand, when the decision was made to pursue HIV/AIDS treatment, there was not yet a scientific consensus that treating the disease with anti-retrovirals was a good strategy for fighting the global pandemic. Instead, the knowledge community forged a broader consensus among

[9] Sridhar & Batniji, 'Misfinancing global health: a case for transparency in disbursements and decision making'.

advocates, people with HIV/AIDS and other parties to create a perception of crisis and make a case for treatment. The case studies suggest that scientific consensus may, in some cases, be a pre-condition for cooperation, but consensus has neither been necessary nor sufficient for international cooperation to occur.

While there was often a long lag between consensus and international cooperation, the development of new technologies has quickly led to international cooperation. While cooperation lagged scientific consensus by decades, cooperation followed the development of new technologies within a few years (Table 7.6). In the inter-war period, agreements on standards for biological products emerged within as little as a year from the development of these products, sometimes before they ever went into production. With DDT for malaria, new technologies appeared to sharply alter cost-benefit calculations of states. Cooperation on malaria emerged about 7 years after proving the efficacy of DDT in preventing transmission of malaria, creating a sharp shift in the cost-benefit calculations for cooperation on malaria. With new vaccination technologies for smallpox, and anti-retroviral treatment for HIV/AIDS, cooperation followed technological development despite the absence of a sharp shift in cost-benefit calculations. Cooperation on smallpox, which had existed at a low level, increased dramatically after the development of the jet injector and bifurcated needle. Even though these products meant that each vaccination required one-fourth as much vaccine as previously, their impact on the overall cost-benefit calculation is questionable, as the cost-benefit ratio had already dramatically favoured cooperation. And, while the development of anti-retroviral treatment did not lead to a shift in cost-benefit calculations regarding the control of HIV/AIDS, the disparity in access to these new medicines created a moral crisis that expedited international cooperation on HIV/AIDS treatment.

Disease or health issue	Years from consensus to cooperation	Years from new technology to cooperation
Cholera, plague, yellow fever	~10-30 (consensus evolves over meetings in late 19th century; 1892, international sanitary regulations in effect)	NA
Biological products (interwar)	NA	4 years (insulin, therapeutic use identified in 1921, standards in 1925) to 25 years (diphtheria antitoxin: developed in dried form in1896, standards in 1921)
Smallpox	~30 from consensus on vaccination for eradication (1936) to intensified smallpox eradication campaign (1967)	~1 year from development of bifurcated needle to intensified smallpox eradication campaign (1967)
Malaria	~60 years from consensus on interrupting mosquito transmission for prevention (1890s) ≥300 years from consensus on treatment with quinine	7 years from evaluation of efficacy of DDT (1948) to Malaria Eradication Programme (1955)
Nutrition	13 years from arguments linking nutrition to national development to World Bank funding	NA
HIV/AIDS	Early consensus on disease prevention (1986) did not lead to cooperation	5 years from development of combined anti-retroviral treatment (1996) to major collective financing efforts for HIV/AIDS treatment (2001)
Tobacco	~50 years from evidence (1950) and consensus (1952) that smoking causes cancer to FCTC (negotiations began 1999; adopted 2003)	NA

Table 7.6 Years from consensus to cooperation, and from new technology to cooperation

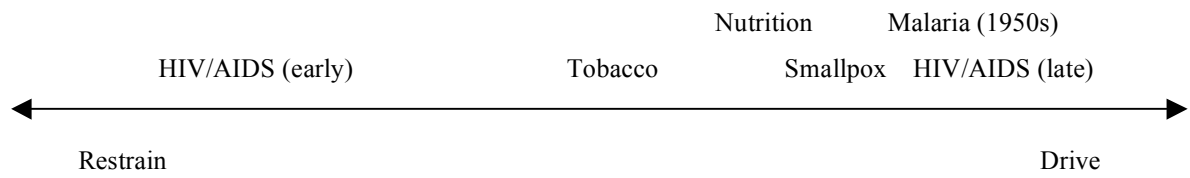


Figure 7.5 Spectrum of knowledge's role in explaining international cooperation. Knowledge here includes the work of knowledge communities in creating consensus, technological development, and creating the perception of crisis.

Knowledge communities have also driven cooperation by generating the perception of a crisis. The case studies allow us to contrast three different crises communicated by knowledge communities. First, in 1956, malaria experts gathered in Athens to discuss the use of DDT in combating malaria. The scientists agreed that DDT could lead to the eradication of malaria, but they also warned that within 10 years, there would be widespread resistance to the insecticide, rendering the new tool ineffective. Knowledge communities successfully wedded crisis and opportunity, facilitating international cooperation on malaria. Similarly, from the late 1960s, nutrition experts made the case that under-nutrition was holding back national economic development around the world, and creating a crisis of slowed economic growth and mental retardation that had repercussions for all. The language of this crisis resonated with development experts, who incorporated nutrition policies into their programming. Third, the expanded knowledge community for HIV/AIDS, which included activists and persons with AIDS, communicated a moral crisis, beginning in 1998, where AIDS had become a treatable disease in rich countries and a death sentence in poor countries. This stark inequality, and statistics on the spread of HIV/AIDS in Africa generated the momentum for international cooperation on the treatment of HIV/AIDS.

Knowledge communities have sometimes restrained cooperation. While genuine scientific debate on the cause of immunocompromise associated with AIDS existed until 1986, views that sought to link the epidemic to a 'gay lifestyle' and that questioned the viral cause of the disease persisted until 1996 in some circles. This debate, which took place in the mainstream media

(and outside of scientific journals, which had reached a consensus based on the evidence), slowed cooperation on HIV/AIDS, as explained in Chapter 6.

Interactions between explanatory categories demonstrate central role of institutions

The distinctions between the explanatory categories of leadership, institutions and knowledge, have balanced two analytic needs of this thesis: first, to more precisely identify the drivers of cooperation using sharper analytic divisions than those offered by regime theory; and, second, to identify the interactions among explanatory categories, seeking to highlight how the leadership of powerful actors, institutions, and knowledge communities interact. While the explanatory categories are distinct, the interactions among them may provide the most explanatory leverage.

The interests of powerful actors, technological advances and the consensus of knowledge communities interact through international institutions. The case studies show how powerful states use institutions to pursue their own interests, as the United States did by embedding malaria eradication campaign within WHO in the 1950s. However, institutions provide a check on these interests, as their formal rules and broad membership lead cooperation to diverge from these interests by broadening the geographical reach of cooperation, or its conduct, as they did for smallpox eradication and cooperation on nutrition and HIV/AIDS treatment. Further, international institutions provide a forum for knowledge communities to build consensus, to formulate policy options, and, sometimes, to integrate these views into the conduct of institutionalised international cooperation.

For both powerful actors and knowledge communities, the interaction with international institutions is bidirectional: they both influence and are influenced by institutions. Powerful states can come to learn about their own self-interests through interactions with international institutions, just as they exert their influence on them through funding priorities, and restrictions on their actions. In the smallpox eradication effort, the United States initially opposed, then

tried to limit funding, for eradication initiatives. It was only late in the campaign that the United States, influenced by WHO, acted on its own self-interests in supporting eradication of the disease. Similarly, states have realised their own self-interests related to under-nutrition and tobacco control through their interaction with international institutions.

In international cooperation on health, the interaction between institutions and knowledge has been vital to cooperation. While functions like collective financing could take place with ad hoc institutions, the long-standing benefit of international institutions in health has been based on their ability to provide and arbitrate information. The earliest institutions on health served as forums for sharing evidence on disease transmission, then in the interwar era, they served to collect information from around the world on epidemics. As they expanded, institutions broadened to include knowledge generation by sponsoring research and providing technical expertise to states as requested. The role of institutions in synthesizing and transmitting knowledge is based on the realisation that like power, knowledge is a systemic variable in international relations. As Keohane writes,

> 'International systems containing institutions that generate a great deal of high-quality information and make it available on a reasonably even basis too the major actors are likely to experience more cooperation than systems that do not contain such institutions […].'[10]

International systems that have information-rich institutions are more disposed to cooperation when there is a new problem (e.g. HIV/AIDS, or emerging infectious diseases), and when there is uncertainty associated with disease threats (e.g. pandemic influenza). Knowledge existing in national institutions, or within the diffuse international epistemic community do not favour cooperation to the extent as the same knowledge within an international institution.

[10] Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy*. P. 245

	Evidence		
Drivers of international cooperation	**Case-studies**	**Quant**	**Notes**
Contagion			
1. Sensitivity and vulnerability to disease threat, as shaped by epidemic potential and lethality of disease.	–	–	
2. International economic burden created by disease and the financial benefits of cooperation	+/–	NA	
Leadership			Presence of leadership explains cooperation, but there are many cases of non-cooperation where benefits > costs for powerful actors
3. Benefits of cooperation greater than costs for a hegemonic actor (k=1)	+/–	NA	
4. Benefits of cooperation greater than costs for a minimal number of actors (k>1)	+/–	NA	
International Institutions			Especially effective at promoting cooperation where contagion is low, and where threat is uncertain or diffuse. Institutions also provide a critical forum for the interaction of powerful actors and knowledge communities.
5. Autonomous and independent institutions determine priorities, diverging from the influence or interests of powerful actors	+	+	
6. Broad membership and scope of institutions allows concerns of weaker members to shape cooperation	+	NA	
7. Formal rules of institutions determine priorities, diverging from contagion (negative international externalities)	+	+	
8. Permanence of institutions allows rules and priorities to persist after a shift in contagion or a change in the interests of powerful actors.	+	NA	
Knowledge			New technologies or a consensus that communicates previously unrealised externalities drive cooperation most. New technologies do not need to shift cost-benefit calculations to promote cooperation.
9. Scientific developments change cost-benefit calculations, and in turn, lead rational self-interests to support cooperation	+	+[11]	
10. Scientific consensus redefines state interests	+/–	–[12]	
11. Knowledge communities direct attention toward, or create perception of, contagion or crisis (real or manufactured).	+	NA	

Table 7.7. Assessing the health cooperation thesis through case studies and quantitative analysis.
+ indicates 'supported'; – indicates 'not supported'; NA indicates 'not assessed'

Explanatory factors not included in cooperation thesis: Domestic agencies and morality

The analysis in the case studies suggests that leadership of powerful actors, international institutions, and knowledge communities explain much of the variation in international cooperation on health, while contagion explains little of the observed cooperation. However, the case studies also suggest two explanatory factors that have not been included in the

[11] Quantitative measure is the number of years from new technologies to cooperation
[12] Quantitative measure is the number of years from consensus to cooperation

framework. These relate to the roles of domestic agencies and morality in explaining international cooperation on health. In the preceding analysis, both of these factors had been subsumed – imperfectly – under the category of leadership. However, the role of domestic agencies and morality may be considered distinctly from leadership, as their influence is not related to cost-benefit calculations.

Domestic agencies

International cooperation appears to have been shaped by the domestic actors that pushed it on to the global agenda. In the United States, smallpox control was decentralized, malaria was coordinated by the military, and there was no domestic focal institution for HIV/AIDS. In each case, the domestic actors shaped the international response. For example, with cooperation on smallpox, Soviet enthusiasm and American reluctance to support global efforts stem, in part, from the varying domestic approaches to smallpox control. In the Soviet Union, smallpox was eradicated through a strategy of compulsory vaccination coordinated by the central government, which by 1936 had eliminated the disease from the vast territories. The Soviet Union's health ministry, eager to expand the strategy of compulsory vaccination to prevent the importation of disease from the Central Asian Republics in the 1950s, was the most persistent advocate for global eradication based on compulsory vaccination. In contrast, in the United States, vaccination policies were made on a state-by-state basis. As detailed in Chapter 4, in the 1920s, 4 states made compulsory vaccination illegal, and in 1928, only 10 states required smallpox vaccination. States did not demand mandatory reporting of smallpox cases until 1944. The United States, which hardly had coordinated a national campaign against the disease, was reluctant to support an international effort that demanded more authority than it had used in its national control efforts.

The domestic arrangements for the control of malaria and HIV/AIDS also shaped international responses. In contrast to the decentralized American approach to smallpox, the United States military was the clear authority on international malaria control. The United States had

encountered malaria primarily through its military, and the military was the leading agency for malaria research and control from the 1950s. The military leadership of malaria meant that the approach was centralized, authoritative and centrally controlled. In Chapter 5, it was demonstrated that this central control of decision-making on malaria might have contributed to the Malaria Eradication Programme's failure. Finally, with the HIV/AIDS epidemic emerging in the 1980s, there was no domestic agency that had international control of the disease within its mandate. While the CDC oversaw domestic HIV/AIDS efforts, the agency lacked an international mandate. Ultimately, responsibility was given to USAID, and as detailed in Chapter 6, the agency was unprepared to give more than minimal attention to the diseases as it lacked staff and strategy to address it.

Morality

Morality is an under-recognised influence on international cooperation on health. Rationalist theories of international relations discount the value of moral claims, suggesting that 'cynically self-interested statesmen should sound as moralistic as truly moralistic statesmen in environments that reward such talk.'[13] These rationalist assessments posit that since the behaviour of actors influenced by moral claims may be identical to the behaviour of self-interested actors, it is impossible to determine whether morality plays an important explanatory role.

Scholars have sought to challenge these rationalist explanations by demonstrating the role of morality in development policy. Lumsdaine has provided empirical support for the position that morality determines foreign aid priorities through his assessment of USAID budgets.[14] Lumsdaine concludes that 'economic foreign aid cannot be explained on the basis of donor states' political and economic interests, and that humanitarian concern in the donor countries

[13] R Keohane, 'Rational Choice Theory and International Law: Insights and Limitations', The Journal of Legal Studies, (2002) vol. XXXI, pp. S307-S19.
[14] David Lumsdaine, *Moral vision in international politics: the foreign aid regime, 1949-1989* (Princeton: Princeton University Press, 1993).

formed the main basis of support for aid.'[15] In Lumsdaine's analysis, morality enters foreign policy precisely because of domestic influences.[16] Busby has also addressed the potential explanatory role of morality, using process-tracing to identify the role of morality in HIV/AIDS policy.[17] He determined that a combination of material incentives and a moral and religious frame of advocacy that matched President Bush's are among the factors that led the United States to support global HIV/AIDS treatment. While Busby's assessment adds credence to the claim that morality may be an explanatory force, he determines that a confluence of moral claims and self-interest explain the emergence of United States' support for HIV/AIDS treatment. Notably, both Busby and Lumsdaine implicitly support Beitz's theory that moral responsibilities spring from interdependence.[18] Interdependence is central to Lumsdaine's analysis as the domestic interests that allow morality to play a role depend on interactions with foreign persons and states. While in Busby's analysis, interdependence is more likely to lead to the confluence of self-interests and morality. If there is a higher degree of interdependence on contagious diseases, will morally driven cooperation favour those diseases?

As I have shown in Chapter 6, United States support for cooperation on HIV/AIDS treatment diverged from what a rational self-interested actor should desire, suggesting that moral claims may play an explanatory role. United States self-interest with HIV/AIDS was based on the potential impact of the epidemic to destabilise governments and disable militaries in sub-Saharan Africa. These concerns were communicated by the CIA and affirmed in studies by the Pentagon. If these concerns, based on the self-interest of the United States were to shape cooperation, it would be expected that those states at highest risk of failure would be targeted by interventions to prevent the spread of HIV/AIDS (and possibly provide treatment). Instead, President Bush's initiative targeted 15 countries, using 'good governance' as a key selection

[15] Ibid. 1
[16] Ibid. See also D Lumsdaine, 'The intertwining of international and domestic politics', Polity, (1996) vol. 29, no. 2, pp. 299-306.
[17] Joshua W. Busby, 'From Benign Neglect to Moral Awakening: Donor Responses to HIV/AIDS', in *The Policy and Politics of HIV/AIDS* (Princeton University: 2006).
[18] Charles Beitz, *Political Theory and International Relations* (Princeton: Princeton University Press, 1979). Beitz appealed to economic interdependence to challenge Rawl's view that moral theory was restricted to domestic politics.

criterion, and invested most funds into disease treatment.[19] Further, the American programs dedicated one-third of prevention funds to abstinence-only programming, which had been proven to be ineffective, and in some cases, counter-productive. While a case for cooperation could be made based on self-interests, the focus and nature of the United States' efforts on global HIV/AIDS appear to defy these interests, suggesting that the moralistic claims surrounding the initiatives may actually play an explanatory role.

Morality has also been embedded in international institutions, perhaps contributing to the ability of institutions to lead cooperation on health to diverge from state-interests. Keohane has pointed to the ability of institutional rules to reduce inequality, writing, 'most international regimes seem to be less constraining of the autonomy of weak states than politically feasible alternatives, which would presumably involve bilateral bargaining on the basis of power rather than of general rules.'[20] The case-studies in this thesis have demonstrated that international institutions allow weaker states to have a greater role in shaping international cooperation. This increased autonomy for poor states is demonstrated by the vote to expand cooperation on smallpox in 1966, despite the opposition of the most powerful members of WHO. And, it is demonstrated again when the Ugandan President raise concerns about HIV/AIDS through WHO, early in the epidemic; and later in the institutions for collective financing for HIV/AIDS, which gave greater control to poor countries than initially proposed by the United States. Part of the reason that institutions have led cooperation to diverge from contagion and self-interest is that these international institutions incorporate egalitarian principles absent from unmediated inter-state cooperation.

The case for morality as an explanatory factor should not be overstated. By any test of morality, including a rights-based tests or an egalitarian utilitarian test, international cooperation on health, would fail. For a rights-based assessment, the key test is not a violation of any

[19] The 15 PEPFAR 'focus countries' were: Botswana, Cote d'Ivoire, Ethiopia, Guyana, Haiti, Kenya, Mozambique, Namibia, Nigeria, Rwanda, South Africa, Tanzania, Uganda, Vietnam, Zambia.
[20] Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy*. P. 249

agreement, but simply asking how features of society would be evaluated 'behind the veil of ignorance,' that is, without knowing our place in society, and how the features of it would affect us.[21] It is obvious that gross inequalities remain in access to the tools for preventing and treating disease. Similarly, an egalitarian utilitarian test would ask how the benefits, in terms of human welfare, of redistributing resources to poor countries would compare to the costs of doing so.[22] With the exception of smallpox, for every disease area considered in the case studies, the benefits of redistributing resources to poor countries would far outweigh the costs. As highlighted in Chapter 3, even in cases where cooperation is said to be high (like on HIV/AIDS treatment), it remains far from sufficient to meet the needs of people in poor countries. Even when there are high levels of cooperation, a case can easily be made that the net benefits of redistributing even greater resources is well below the costs of doing so. While morality may be a contributing explanatory factor, the observed cooperation on health falls far from needs determined by morality.

7.3 IMPLICATIONS FOR GLOBAL HEALTH POLICY AND FUTURE RESEARCH

Policy-makers and advocates have been seeking to increase international cooperation on health. The evidence presented in this thesis offers an informed assessment of which of the drivers for increasing cooperation can best explain the observed cooperation. In addition, the case studies offer some guidance on the conditions under which certain drivers are likely to have the most impact. This evidence is summarised in Table 7.7. While the purpose of this thesis has been to offer explanations of cooperation, these lessons have relevance to the strategies used by policy-makers and global health advocates. Based on the assessments of the drivers of international cooperation, I group the corresponding strategies for increasing international cooperation into three tiers in the discussion that follows: convincing, possible, and unlikely.

---

[21] John Rawls, *A theory of justice*, Original edn. (Cambridge, Mass.: Belknap Press, 2005).
[22] Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy*. P. 255. Citing Bruce Russett, 'The marginal utility of income transfers to the Third World', International Organization, (1978) vol. 32, pp. 913-28.

Contagion is based largely on fixed properties of the disease or the epidemic. Disease advocates cannot try to increase contagion. However, the other drivers of cooperation can, to varying degrees, be targeted by advocates seeking to increase international cooperation. For example, disease advocates and experts can seek to change or use the rules of international institutions; or, they can demonstrate previously unrealised international externalities and create new technologies and scientific consensus. Below, I consider some implications of the findings of the drivers of international cooperation for future international cooperation on health.

Convincing: technologies and international institutions

The most convincing strategies for increasing international cooperation, strongly supported by the findings here, are those that involve the creation of new technologies, and the creation or use of the formal rules of international institutions.

The creation of new technologies has led to increased cooperation quickly: from within 1 to 7 years in the case studies (Table 7.6). The creation of new technologies has driven cooperation on standards-setting for biological products, and driven international efforts targeting smallpox, malaria and HIV/AIDS. These technologies may have succeeded in changing the cost-benefit calculations of powerful actors, but more commonly, they created a sense of urgency for international cooperation. If successful, efforts to develop new technologies, like those in which the Gates Foundation is investing heavily, are very likely to spur cooperation. However, this finding must be accompanied by a major caveat. The analysis in this thesis has taken cooperation, not improvements in population health as its end point for measurement. The historical analysis in this thesis has demonstrated that new technologies are likely to lead to cooperation that promotes use of the technology. The use of technology does not necessarily correspond to an improvement (much less, the most efficient improvement) in population health. As critics of the Gates Foundation's focus on technology have suggested, the most

promising health interventions may require no new technology at all.[23] Nonetheless, there is convincing evidence that the development of new public health technologies facilitates international cooperation that promotes the use of these technologies.

International institutions play a central role in international cooperation, as they serve as a forum for the interactions of powerful actors and knowledge communities, and because their own formal rules and membership can drive cooperation beyond contagion. The evidence presented in this thesis suggests that strategies focused on creating and using formal rules within international institutions, are likely to spur cooperation. International institutions create an environment more favourable to international cooperation. Institutions reduce the transaction costs of cooperation, legitimate certain actions, facilitate issue-linkage, reduce incentives to cheat and enhance the value of reputations.[24] By linking issues, representing the poor, and adhering to formal decision-making processes, international institutions in health have successfully expanded cooperation beyond contagion and the interests of powerful actors. In particular, international institutions offer the most promise for driving cooperation on diseases for which there is little contagion. That is because the decision-making process of autonomous and independent institutions, and their formal rules offer the greatest opportunity for changing the drivers of cooperation in the absence of the shifting cost-benefit calculations of leading actors, or changes in the level of externality associated with a disease. Formal decision-making rules in international institutions made possible cooperation on biological standards, smallpox eradication, nutrition and tobacco control. Throughout the cases examined, international institutions have succeeded in creating decision-making rules that allowed weaker members to shape cooperation, and that allowed non-contagious diseases to become priorities.

Possible: manufacturing crisis and communicating externality

[23] AE Birn, 'Gates's grandest challenge: transcending technology as public health ideology', Lancet, (2005) vol. 366, no. 9484, Aug 6, pp. 514-9.
[24] Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy*. P. 245

Possible strategies, supported with mixed results by findings in this thesis, include efforts to create a perception of crisis (either moral, health, or economic), and to demonstrate the externalities of disease (including disease burden). These strategies have been among the most commonly employed by disease advocates. Despite the low levels of international externality, the perception of an economic crisis related to under-nutrition and moral crisis related to a lack of access to HIV/AIDS treatment were key drivers of cooperation. For both nutrition and HIV/AIDS, the perception of crisis, as promoted by knowledge communities, was quickly followed with major increases in international financing. However, communicating a sense of crisis has not consistently driven international cooperation. For example, despite the perception of a health crisis after the pandemic influenza of 1918, no significant cooperative action was taken. Similarly, cooperation did not follow the early perception among scientists (actively communicated) that a global and devastating epidemic of HIV/AIDS was emerging.

Unlikely: generating scientific consensus

The case-studies examined here demonstrate that the lag between scientific consensus and cooperation is long (Table 7.6), and the causal pathway is unconvincing. In all the cases examined, scientific consensus has not managed to lead cooperation to diverge from contagion or the self-interests of powerful actors. In Cooper's accounts of the earliest international cooperation on health, there was a synergy between consensus and state interests.[25] In the case studies here, cooperation moved forward when there was a synergy between consensus and interests, but consensus does not explain the emergence of cooperation without coinciding interests. Cooperation has occurred without consensus, when interests and powerful actors align to push it forward, as was the case with HIV/AIDS treatment. At other times, cooperation has failed or been greatly delayed, even with long-standing consensus, as was the case with smallpox eradication and tobacco control (Table 7.6). Gaps in scientific consensus have been exploited when they diverge from state interests and preferences, as they were early in the HIV/AIDS epidemic.

[25] Cooper, 'International Cooperation in Public Health as a Prologue to Macroeconomic Cooperation'.

However, scientific consensus may be a driver of cooperation when that consensus causes states to redefine their interests. The case studies point to two cases in which consensus redefined state interests: a consensus reached at a meeting Athens in 1956 that DDT resistance would become widespread in 10 years, and a consensus reached in development communities in the late 1960s that under-nutrition was restraining economic development. In each of these cases, the consensus redefined state interests, making these interests favour international cooperation. These observations are in line with those by Haas, whose arguments are based on the view that concerns about 'who is to get what' shape the incorporation of scientific consensus into public policy.[26] The analysis in this thesis does not provide support for the more optimistic view that scientific consensus 'led national behavior to no longer be shaped by political concerns, but rather by a set of rules, dictated by accepted scientific knowledge.'[27] Rather than acting as an independent driver of cooperation, scientific consensus can buttress and complement contagion and state interests.

Trying to forge scientific consensus appears to be a poor strategy for pushing cooperation forward. Disease advocates have repeatedly tried to assert the existence of scientific consensus for areas often neglected in international cooperation on health, including chronic non-communicable diseases and mental health. While knowledge communities play an essential role in explaining the emergence of cooperation beyond contagion, their efforts are best directed at communicating new externalities, developing new technologies, or making use of the formal rules of international institutions.

Implications for future research

This thesis has proposed a theory for explaining international cooperation on health. And, it has proposed novel approaches for measuring international cooperation and the international

[26] Haas, 'Introduction: Epistemic Communities and International Policy Coordination'.
[27] Krasner, 'Structural Causes and Regime Consequences: Regimes as Intervening Variables'. P 203-204

externalities associated with disease in a comparable manner. The case studies in the preceding three chapters and the quantitative analysis have provided tests that affirm the importance of factors beyond rational self-interest in explaining the observed cooperation on health.

The health cooperation thesis, which seeks to explain cooperation beyond contagion, is based on a synthesis of discordant theoretical literatures in international relations, including those on hegemonic leadership, international institutions, and epistemic communities. To some extent, this approach is a modification of regime theory, though with sharper delineation among explanatory categories. These delineations avoid a laundry-list approach to explaining international cooperation, and allow for the relevance of specific drivers to be more clearly identified. The theoretical framework used here offers the advantage of avoiding subscription, at the outset of an inquiry on international cooperation, to one of the dominant theoretical schools in international relations theory. While the framework was formulated with specific relevance only to international cooperation on health, it may be useful for those seeking to explain cooperation on other issue areas.

For researchers interested in global health, the findings of this thesis point to many areas that demand further inquiry. First, this thesis has sought to explain variation in cooperation, not to assess strategies for increasing international cooperation on health. An assessment of the strategies for increasing cooperation on health will better guide the efforts of advocates. Second, while this thesis has identified the critical functions of international institutions and knowledge communities, it has not identified the elements of organizing or managing these institutions or knowledge communities that maximises their efficacy. Studies of these institutions and communities may provide strategies for leveraging their strengths and maximising their health impact. Third, the metrics for assessing cooperation and for assessing the degree of international externality associated with diseases (contagion) can, and should, be improved upon. Chapter 3 has offered many suggestions for improvement of these metrics. In particular, metrics based on the impact of cooperation on population health, not merely its scale, may better inform global

health decisions. For example, even though much greater cooperation went in to efforts to eradicate malaria than smallpox from the 1950s to the 1970s, the health and economic impact of smallpox eradication has been much greater. Higher levels of cooperation, do not necessarily lead to corresponding improvements in population health. Revised metrics may seek inputs on cooperation that go beyond the scale of financing, and the existence of regulation and research and surveillance efforts. To explain and guide international cooperation on health, we will need better evaluations of the impact of cooperation on population health. Answering the questions above, and those addressed in this thesis, can contribute to constructing international health policies and priorities that keep more people alive, including those – like the baby introduced in the introduction – who are afflicted by diseases not addressed by international cooperation.

Works Cited

'Bibliography of the technical work of the Health Organization of the League of Nations, 1920-1945', *Bulletin of the Health Organization*, (1945) no. 11, pp. 1-237.

'Cholera vaccines', *Wkly Epidemiol Rec*, (2001) vol. 76, no. 16, Apr 20, pp. 117-24.

'Opening Statement: Congressman Doug Bereuter', in *Subcommittee on International Monetary Policy and Trade: FY2002 Authorization Requests and the activities of the African Development Bank, the International Monetary Fund and the World Bank in Africa* (Washington DC: 2001).

Abbott, K. W. & D. Snidal, 'Why States Act through Formal International Organizations', *The Journal of Conflict Resolution*, (1998) vol. 42, no. 1, pp. 3-32.

Adler, E. & P. M. Haas, 'Conclusion: Epistemic Communities, World Order, and the Creation of a Reflective Research Program', *International Organization*, (1992) vol. 46, no. 1, Winter.

Allen, C. E., 'World Health and World Politics', *International Organization*, (1950) vol. 4, no. 1, Feb.

Antia, Rustom, Roland R Regoes, Jacob C Koella & Carl T Bergstrom, 'The role of evolution in the emergence of infectious diseases', *Nature*, (2003) vol. 426, no. 6967, Dec 11, pp. 658-61.

Arce M, D. G. & T. Sandler, 'Health-promoting alliances', *European Journal of Political Economy*, (2003) vol. 19, pp. 355-75.

Ascher, C. S., 'Current Problems in the World Health Organization's Program', *International Organization*, (1952) Jan 1.

Axelrod, Robert M., *The evolution of cooperation*, New York: Basic Books, 1984.

Axnick, N.W. & J.M. Lane, 'Costs associated with theprotection of the United States against smallpox', (Geneva: WHO, 1972).

Balinska, Marta, 'Assistance and not mere relief: the Epidemic Commission of the League of Nations, 1920 - 1923', in Weindling, Paul, ed., *International Health Organisations and Movements, 1918-1939* Cambridge: Cambridge University Press, 1995.

Barnett, M. N. & M. Finnemore, 'The Politics, Power, and Pathologies of International Organizations', *International Organization*, (1999) vol. 53, no. 04, pp. 699-732.

Barrett, S., 'The Smallpox Eradication Game', *Public Choice*, (2006) vol. 130, pp. 179-207.

———, 'The Smallpox Eradication Game', *Public Choice*, (2007) vol. 130, no. 1, pp. 179-207.

———, *Why Cooperate?: The Incentive to Supply Global Public Goods*, Oxford: Oxford University Press, USA, 2007.

BBC, 2001. Annan declares war on AIDS, http://news.bbc.co.uk/1/hi/world/africa/1297474.stm. (accessed 23 March, 2010).

Beaglehole, Robert & Ruth Bonita, 'Global public health: a scorecard', *Lancet*, (2008) vol. 372, no. 9654, Dec 6, pp. 1988-96.

Behrman, Greg, *The Invisible People*, New York: Simon & Schuster, 2004.

Beitz, Charles, *Political Theory and International Relations*, Princeton: Princeton University Press, 1979.

Bendavid, E & J Bhattacharya, 'The President's Emergency Plan for AIDS Relief in Africa: evaluation of outcomes', *Ann Intern Med*, (2009) vol. 150, no. 10, pp. 688-95.

Berg, A, 'Sliding toward nutrition malpractice: time to reconsider and redeploy', *Annual review of nutrition*, (1993) Jan 1.

Berg, Alan, 'Malnutrition and National Development', *Foreign Affairs*, (1967) no. October.

Berg, Alan & Robert Muscat, *The nutrition factor: its role in national development*, Washington Dc: Brookings Institution, 1973.

Bhunu, C P, W Garira & Z Mukandavire, 'Modeling HIV/AIDS and tuberculosis coinfection', *Bull Math Biol*, (2009) vol. 71, no. 7, Oct 1, pp. 1745-80.
Bhunu, C P, W Garira, Z Mukandavire & M Zimba, 'Tuberculosis transmission model with chemoprophylaxis and treatment', *Bull Math Biol*, (2008) vol. 70, no. 4, May 1, pp. 1163-91.
Birn, AE, 'Gates's grandest challenge: transcending technology as public health ideology', *Lancet*, (2005) vol. 366, no. 9484, Aug 6, pp. 514-9.
Brilliant, Larry B, *The Management of Smallpox Eradication in India: A Case Study and Analysis*, Ann Arbor: University of Michigan Press, 1985.
Brimnes, Niels, 'BCG vaccination and WHO's global strategy for tuberculosis control 1948-1983', *Soc Sci Med*, (2008) vol. 67, no. 5, Aug 31, pp. 863-73.
Bristow, A. F., T. Barrowcliffe & D. R. Bangham, 'Standardization of biological medicines: the first hundred years, 1900–2000', *Notes and Records of the Royal Society*, (2006) vol. 60, Sept 8, pp. 271-89.
Brundtland, Gro Harlem, 'Speech on burden of disease concept', (Geneva, Switzerland: 1998).
Bruno, M. & W. Easterly, 'Inflation's Children', (Washington DC: World Bank, 1996).
Burnbaum, Philip, 'Action Memorandum for the Administrator: Proposed Africa Regional Project to Provide $2.0 Million to Complete the W.H.O. Ethiopia Smallpox Eradication Program (ESEP)', (Washington DC: USAID, 1976).
Busby, Joshua W., 'From Benign Neglect to Moral Awakening: Donor Responses to HIV/AIDS', in *The Policy and Politics of HIV/AIDS* (Princeton University: 2006).
Bush, George W, 2003. State of the Union Address, 28 January, http://www.washingtonpost.com/wp-srv/onpolitics/transcripts/bushtext_012803.html. (accessed 23 March, 2010).
Canning, David, 'The economics of HIV/AIDS in low-income countries: the case for prevention', *J Econ Perspect*, (2006) vol. 20, no. 3, Dec 21, pp. 121-42.
Carson, Rachel, 'Silent Spring I - III: a reporter at large', *New Yorker*, (1962).
CDC, Eradication of Malaria in the United States, http://www.cdc.gov/malaria/history/index.htm#eradicationus. (accessed 10 February, 2009).
———, 'HIV Prevalence Estimates - United States, 2006', *MMWR*, (2008) vol. 57, no. 39, 3 October.
Chen, L., T. Evans & R. Cash, 'Health as a Global Public Good', in Kaul, I., I. Grunberg & M. A. Stern, eds., *Global public goods: international cooperation in the 21st century*,Oxford University Press, 1999.
Chisholm, B., ' The role of WHO, past, present, and future', *American journal of public health and the nation's health*, (1951) vol. 41, no. 12, Dec, pp. 1460-3.
Chisholm, Brock, 'The World Health Organization', *British Medical Journal*, (1950) May 6, 1950.
Chretien, Jean-Paul, David L Blazes, Rodney L Coldren, Michael D Lewis, Jariyanart Gaywee, Khunakorn Kana, Narongrid Sirisopana, Victor Vallejos, Carmen C Mundaca, Silvia Montano, Gregory J Martin & Joel C Gaydos, 'The importance of militaries from developing countries in global infectious disease surveillance', *Bull World Health Organ*, (2007) vol. 85, no. 3, Mar 1, pp. 174-80.
Christakis, Nicholas A & James H Fowler, 'The spread of obesity in a large social network over 32 years', *N Engl J Med*, (2007) vol. 357, no. 4, Jul 26, pp. 370-9.
———, 'The collective dynamics of smoking in a large social network', *N Engl J Med*, (2008) vol. 358, no. 21, May 22, pp. 2249-58.
Cleaver, H., 'Political Economy of Malaria De-Control', *Economic and Political Weekly*, (1976) vol. 11, no. 36, September, pp. 1463-73.
Clemens, M. A., C. J. Kenny & T. J. Moss, 'The Trouble with the MDGs: Confronting Expectations of Aid and Development Success', *World Development*, (2007) vol. 35, no. 5, pp. 735-51.
Cohn, E J, 'Assessing the costs and benefits of anti-malaria programs: the Indian experience', *Am J Public Health*, (1973) vol. 63, no. 12, Dec 1, pp. 1086-96.

Collin, J., 'Tobacco Politics', *Development*, (2004) vol. 47, no. 2, pp. 91-96.
Collin, J., K. Lee & K. Bissel, 'The framework convention on tobacco control: the politics of global health governance', *Third World Quarterly*, (2002) vol. 23, no. 2, pp. 265-82.
Cooper, R. N., 'International Cooperation in Public Health as a Prologue to Macroeconomic Cooperation', *Can Nations Agree? Issues in International Economic Cooperation*, Washington D.C.: Brookings Institution, 1989.
Cueto, Marcos, 'Cold war, deadly fevers: malaria eradication in Mexico, 1955-1975', *Johns Hopkins University Press*, (2007) Jan 1, p. 264.
Dale, Henry, 'Biological Standardisation', in *Address at Annual General Meeting, National Institutes for Medical Research* (London: 1939).
Davies, Sara, *Global Politics of Health*, Boston: Polity, 2010.
Department of Error, 'Department of Error', *Lancet*, (2009) vol. 374, no. 9703, p. 1744.
Diekmann, O, J Heesterbeek & J Metz, 'On the definition and the computation of the basic reproduction ratio R0 in models for infectious diseases in heterogeneous populations', *Journal of Mathematical Biology*, (1990) vol. 28, pp. 365-82.
Dietrich, John W., 'The Politics of PEPFAR: The President's Emergency Plan for AIDS Relief', *Ethics & International Affairs*, (2007) vol. 21, no. 3, pp. 277-92.
Doll, R. & A. B. HILL, 'Smoking and carcinoma of the lung; preliminary report', *British Medical Journal*, (1950) vol. 2, no. 4682, Sep 30, pp. 739-48.
Easterly, W., 'The cartel of good intentions: the problem of bureaucracy in foreign aid', *The Journal of Policy Reform*, (2002) vol. 5, no. 4, pp. 223-50.
Eisenhower, Dwight D., 1958. Annual Message to the Congress on the State of the Union, January 9, 1958, http://www.eisenhowermemorial.org/speeches/19580109%20State%20of%20the%20Union.htm. (accessed 10 February, 2010).
Elbe, S, 'AIDS, security, biopolitics', *International Relations*, (2005) Jan 1.
Epstein, Steven, *Impure Science: AIDS, Activism, and the Politics of Knowledge*, Berkeley, California: University of California Press, 1996.
———, *Impure Science: AIDS, Activism, and the Politics of Knowledge*', 1998.
Erikson, Susan L, 'Getting political: fighting for global health', *Lancet*, (2008) vol. 371, no. 9620.
Ezrahi, Y., 'Utopian and pragmatic rationalism: The political context of scientific advice', *Minerva*, (1980) vol. 18, no. 1, pp. 111-31.
Ezzati, M., S. J. Henley, M. J. Thun & A. D. Lopez, 'Role of smoking in global and regional cardiovascular mortality', *Circulation*, (2005) vol. 112, no. 4, Jul 26, pp. 489-97.
Ezzati, M., A. D. Lopez, A. Rodgers, S. Vander Hoorn & C. J. Murray, 'Selected major risk factors and global and regional burden of disease', *Lancet*, (2002) vol. 360, no. 9343, Nov 2, pp. 1347-60.
Feachem, R. G. & O. J. Sabot, 'An examination of the Global Fund at 5 years', *Lancet*, (2006) vol. 368, no. 9534, pp. 537-40.
Fenner, F., D.A. Henderson, I. Arita, Z. Jezek & I.D. Ladnyi, 'Chapter 7: Developments in vaccination and control between 1900 and 1966', *Smallpox and its eradication*, *History of International Public Health*, Geneva: World Health Organization, 1988.
———, 'Chapter 8: The incidence and control of smallpox between 1900 and 1958', *Smallpox and its eradication*, *History of International Public Health*, Geneva: World Health Organization, 1988.
———, 'Chapter 31: Lessons and benefits', *Smallpox and its eradication*, Geneva: World Health Organization, 1988.
———, *Smallpox and its eradication*, Geneva: World Health Organization, 1988.
Fienstein, Charles H., Peter Temin & Gianni Toniolo, *The European Economy Between the Wars*, Oxford: Oxford University Press, 1997.
Finnemore, M., 'Redefining development at the World Bank', in Cooper, Fredrick & Randall Packard, eds., *International Development and the Social Sciences: essays on the history and politics of knowledge*, Berkeley: University of California Press, 1997.

Floyd, Katherine & Andrea Pantoja, 'Financial resources required for tuberculosis control to achieve global targets set for 2015', *Bull World Health Organ*, (2008) vol. 86, no. 7, Jul 1, pp. 568-76.

Foege, W, J Millar & D.A. Henderson, 'Smallpox eradication in West and Central Africa', *Bull World Health Organ*, (1975) vol. 52, pp. 209-12.

Fogel, R & S Engerman, 'A model for the explanation of industrial expansion during the nineteenth century: with an application to the American iron industry', *The Journal of Political Economy*, (1969) vol. 77, no. 3, pp. 306-28.

Francis, D P, 'Toward a comprehensive HIV prevention program for the CDC and the nation', *Jama*, (1992) vol. 268, no. 11, Sep 15, pp. 1444-7.

Fraser, Christophe, Christl A Donnelly, Simon Cauchemez, William P Hanage, Maria D Van Kerkhove, T Déirdre Hollingsworth, Jamie Griffin, Rebecca F Baggaley, Helen E Jenkins, Emily J Lyons, Thibaut Jombart, Wes R Hinsley, Nicholas C Grassly, Francois Balloux, Azra C Ghani, Neil M Ferguson, Andrew Rambaut, Oliver G Pybus, Hugo Lopez-Gatell, Celia M Alpuche-Aranda, Ietza Bojorquez Chapela, Ethel Palacios Zavala, Dulce Ma Espejo Guevara, Francesco Checchi, Erika Garcia, Stephane Hugonnet, Cathy Roth & WHO Rapid Pandemic Assessment Collaboration, 'Pandemic potential of a strain of influenza A (H1N1): early findings', *Science*, (2009) vol. 324, no. 5934, Jun 19, pp. 1557-61.

Frieden, T. R. & M. R. Bloomberg, 'How to prevent 100 million deaths from tobacco', *Lancet*, (2007) vol. 369, no. 9574, May 19, pp. 1758-61.

Friedman, S & S Mottiar, 'A rewarding engagement? The treatment action campaign and the politics of HIV/AIDS', *Politics & Society*, (2005) Dec 31.

Gallup, J L & J D Sachs, 'The economic burden of malaria', *Am J Trop Med Hyg*, (2001) vol. 64, no. 1-2 Supplement, pp. 85-96.

GAO, 'Malaria Control in Developing Countries: Where Does it Stand? What is U.S. Role', ed. Conahan, Frank (Washington DC: U.S. General Accounting Office, 1982).

———, 'Factors Contributing to Low Vaccination Rates in Developing Countries - Report to Congressional Requesters', (Washington DC: United States General Accounting Office, 1999).

Garrett, L., *HIV and National Security: Where are the Links?*, Washington DC: Council on Foreign Relations, 2005.

Gates Foundation, 2007. Priority Health Strategies, www.gatesfoundation.org/GlobalHealth/Grantseekers/GH_Strategy/Strategy_Grantmaking.htm. (accessed July 4, 2007).

Gauri, Varun & Peyvan Khaleghian, 'Immunization in Developing Countries: Its Political and Organizational Determinants', *World Development*, (2002) vol. 30, no. 12, pp. 2109-32.

GEG, 'Preliminary Report of a High-Level Working Group, 11-13 May 2008', (Oxford: Global Economic Governance Programme, 2008).

Gellman, Barton, 'The Belated Global Response to AIDS in Africa'. *Washington Post*, July 5 2000.

Geoffard, Pierre-Yves & Tomas Philipson, 'Disease Eradication: Private versus Public Vaccination', *The American Economic Review*, (1997) vol. 87, no. 1, Mar 1, pp. 222-30.

Gillespie, J, 'International organizations and the problem of child health, 1945-1960', *Dynamis*, (2003) Dec 31.

Gostin, L. O., 'International Infectious Disease Law: Revision of the World Health Organization's International Health Regulations', *Jama*, (2004) vol. 291, no. 21, June 2, p. 2633.

Greico, Joseph, *Cooperation among Nations: Europe, America and Non-Tariff Barriers to Trade*, Ithaca, New York: Cornell University Press, 1990.

Grieco, J. M., 'Anarchy and the Limits of Cooperation: A Realist Critique of the Newest Liberal Institutionalism', *International Organization*, (1988) vol. 42, no. 3, pp. 485-507.

Griffin, K, 'Foreign aid after the Cold War', in Corbridge, Stuart, ed., *Development: Critical Concepts in the Social Sciences*, London: Routledge, 2000.

Gwatkin, D. R., M. Guillot & P. Heuveline, 'The burden of disease among the global poor', *Lancet*, (1999) vol. 354, no. 9178, Aug 14, pp. 586-9.
Haas, P. M., 'Do Regimes Matter? Epistemic Communities and Mediterranean Pollution Control', *International Organization*, (1989) vol. 43, no. 3, Summer, pp. 377-403.
———, 'Introduction: Epistemic Communities and International Policy Coordination', *International Organization*, (1992) vol. 46, no. 1, pp. 1-35.
———, 'Epistemic Communities and the Dynamics of International Environmental Co-operation', in Rittberger, V. & P. Mayer, eds., *Regime Theory and International Relations*, New York: Oxford University Press, 1993.
Hackett, L. W., *Malaria in Europe*, London: Oxford University Press, 1937.
Haggard, S., 'Interests, Institutions, and Policy Reform', in Krueger, Anne O., ed., *Economic Policy Reform: The Second Stage*, Chicago: University of Chicago Press, 2000.
Hartley, David M, J Glenn Morris & David L Smith, 'Hyperinfectivity: a critical element in the ability of V. cholerae to cause epidemics?' *PLoS Med*, (2006) vol. 3, no. 1, p. e7.
Heffernan, J M, R J Smith & L M Wahl, 'Perspectives on the basic reproductive ratio', *J R Soc Interface*, (2005) vol. 2, no. 4, Sep 22, pp. 281-93.
Henderson, D.A., *Smallpox: the death of a disease: the inside story of eradicating a worldwide killer*, Amherst, New York: Prometheus Books, 2009.
Henderson, Donald A, 'Smallpox Eradication', in *Encyclopedia of Life Sciences* (Pittsburgh: 2005).
Henderson, R H, J Keja, G Hayden, A Galazka, J Clements & C Chan, 'Immunizing the children of the world: progress and prospects', *Bull World Health Organ*, (1988) vol. 66, no. 5, Jan 1, pp. 535-43.
Hockley, David, Jane Robinson & Roland Gleck, 'Biological Standards: measureing the potency of biological medicine', *Biologist*, (2004) vol. 51, no. 3.
Horton, Richard, 'The Plagues are Flying', *Health Wars: On the global front lines of modern medicine*, New York: New York Review of Books, 2003.
Howard-Jones, N., 'The scientific background of the International Sanitary Conferences, 1851-1938', in *History of International Public Health* (Geneva: World Health Organization, 1975).
———, 'International Public Health Between the Two World wars - The Organizational Problems', in *History of International Public Health* (Geneva: World Health Organization, 1978).
IDAB, 'Malaria eradication: report and recommendations of the International Development Advisory Board', (Washingtonn DC: IDAB, 1956).
Individual members of the Faculty of Harvard University, 'Consensus statement on antiretroviral treatment for AIDS in poor countries', *Topics in HIV Medicine*, (2001) vol. 9, pp. 14-26.
Institute of Medicine, *PEPFAR implementation : progress and promise*, Washington, DC: National Academies Press, 2007.
Jacobson, H. K., 'WHO: Medicine, Regionalism, and Managed Politics', *The Anatomy of Influence: Decision Making in International Organization*, New Haven: Yale University Press, 1973.
Jamison, D. T., *Priorities in Health: Disease Control Priorities Companion Volume*, Washington DC: World Bank Publications, 2006.
Jamison, D. T., J. Frenk & F. Knaul, 'International collective action in health: objectives, functions, and rationale', *Lancet*, (1998) vol. 351, no. 9101, pp. 514-7.
Jamison, DT, World Bank. & Disease Control Priorities Project., eds, *Disease control priorities in developing countries, 2nd edition*, New York; Washington, DC: Oxford University Press; World Bank, 2006.
Jeffery, G. M., 'Malaria control in the twentieth century', *Am J Trop Med Hyg*, (1976) vol. 25, no. 3, May 1, pp. 361-71.
Jha, P. & F. J. Chaloupka, *Curbing the Epidemic: governments and the economics of tobacco control*, Washington DC: World Bank, 1999.

Johnson, N. P. & J. Mueller, 'Updating the accounts: global mortality of the 1918-1920 "Spanish" influenza pandemic', *Bulletin of the history of medicine*, (2002) vol. 76, no. 1, Mar 5, pp. 105-15.
Jupille, J. & D. Snidal, 'The Choice of International Institutions: Cooperation, Alternatives and Strategies', *Social Science Research Network*, (2006) July 2006.
Kates, J, J Izazola & E Lief, 'Financing the response to AIDS in low- and middle- income countries: International assistance from the G8, European Commission and other donor Governments, 2007', (Menlo Park, CA: Kaiser Family Foundation, 2008).
Kates, J, JS Morrison & E Lief, 'Global health funding: a glass half full?' *Lancet*, (2006) vol. 368, no. 9531, Jul 15, pp. 187-8.
Kaul, I. & M. Faust, 'Global public goods and health: taking the agenda forward', *Bull World Health Organ*, (2001) vol. 79, pp. 869-74.
Keohane, R, 'Rational Choice Theory and International Law: Insights and Limitations', *The Journal of Legal Studies*, (2002) vol. XXXI, pp. S307-S19.
Keohane, R., 'The Demand for International Regimes', *International Organization*, (1982) vol. 36, no. 2, Oct 14, p. 32.
Keohane, R. O., 'The Analysis of International Regimes: Towards a European-American Research Programme', in Rittberger, V. & P. Mayer, eds., *Regime Theory and International Relations*, New York: Oxford University Press, 1993.
Keohane, R. O. & J. S. Nye, *Power and interdependence*, New York: Longman, 2001.
Keohane, Robert. O., *After Hegemony: Cooperation and Discord in the World Political Economy*, Princeton: Princeton University Press, 1984.
Kickbusch, I., 'The development of international health policies--accountability intact?' *Soc Sci Med*, (2000) vol. 51, no. 6, Sep, pp. 979-89.
Krasner, S. D., 'State Power and the Structure of International Trade', *World Politics*, (1976) vol. 28, no. 3, pp. 317-47.
———, 'Structural Causes and Regime Consequences: Regimes as Intervening Variables', *International Organization*, (1982) vol. 36, no. 2, Spring.
League of Nations, 'Provisional Health Committee. Minutes of the meeting of the Fourth Session, Geveva, 14-21 August 1922', (Geneva: 1922).
———, 'League of Nations Health Organization', (Geneva: Information Section, Leauge of Nations, 1931).
———, 'League of Nations Health Organization Malaria Commission', (Geneva: League of Nations Health Organisation, 1932).
Lee, Kelley, *The World Health Organization (WHO)*, New York and Abingdon: Routledge, 2009.
Levine, R., 'Eradicating Smallpox', *Millions saved: proven successes in global health*, Washington DC: Peterson Institute, 2004.
Levine, Ruth & Katherine Blumer, 'Following the Money: Toward Better Tracking of Global Health Resources', in *Report of the Global Health Resource Tracking Working Group* (Washington, D.C.: Center for Global Development, 2007).
Lieberman, Evan, *Boundaries of Contagion: How Ethnic Politics Have Shaped Government Responses to AIDS*, Princeton: Princeton University Press, 2009.
Litsios, Socrates, *The Tomorrow of Malaria*, Wellington, New Zealand: Pacific Press, 1996.
Log Cabin Republicans, 2000. Congressman Leach (R-IA) Proposes World Bank AIDS Trust Fund: To Fund Crucial Infrastructure-Building Efforts in Education, Prevention and Treatment, http://www.lcrga.com/news/World-Bank-AIDS-Trust-Fund-James-Leach/200001241454.shtml. (accessed 23 March, 2010).
Longini, Ira M, Azhar Nizam, Shufu Xu, Kumnuan Ungchusak, Wanna Hanshaoworakul, Derek A T Cummings & M Elizabeth Halloran, 'Containing pandemic influenza at the source', *Science*, (2005) vol. 309, no. 5737, Aug 12, pp. 1083-7.
Lopez, A. D., C. D. Mathers, M. Ezzati, D. T. Jamison & C. J. Murray, 'Global and regional burden of disease and risk factors, 2001: systematic analysis of population health data', *Lancet*, (2006) vol. 367, no. 9524, May 27, pp. 1747-57.

Lopez, Alan D., C. Mathers, M. Ezzati, D. T. Jamison & C Murray, eds, *Global burden of disease and risk factors*, Washington, DC: World Bank, 2006.

Lumsdaine, D, 'The intertwining of international and domestic politics', *Polity*, (1996) vol. 29, no. 2, pp. 299-306.

Lumsdaine, David, *Moral vision in international politics: the foreign aid regime, 1949-1989*, Princeton: Princeton University Press, 1993.

Lurie, P, P Hintzen & R Lowe, 'Socioeconomic obstacles to HIV prevention and treatment in developing countries: the roles of the International Monetary Fund and the World Bank', *Aids*, (1995) vol. 9, pp. 539-46.

MacDonald, George, 'Eradication of Malaria', *Public Health Reports*, (1965) vol. 80, no. 10, October, pp. 870-79.

Macfarlane, S., M. Racelis & F. Muli-Musiime, 'Public health in developing countries', *Lancet*, (2000) vol. 356, no. 9232, Sep 2, pp. 841-6.

Mackay, J. & M. P. Eriksen, *The Tobacco Atlas*, Geneva: WHO, 2002.

MacKellar, L., 'Priorities in global assistance for health, AIDS, and population', *Population and Development Review*, (2005) vol. 31, no. 2, pp. 293-312.

Madsen, T., 'The Scientific Work of the Health Organization of the League of Nations', *Bulletin of the New York Academy of Medicine*, (1937) August.

Mahler, H., 'Personal letter to Mr. Daniel Parker, Administrator, USAID. 12 September', (Geneva: 1975).

Manderson, Lenore, 'Wireless wars in the eastern arena: epidemiological surveillance, disease prevention and the work of the Eastern Bureau of the League of Nations Health Organisation, 1925-1942', in Weindling, Paul, ed., *International Health Organisations and Movements, 1918-1939* Cambridge: Cambridge University Press, 1995.

Mann, Jonathan, D Tarantola & Thomas Netter, *AIDS in the world*, Oxford: Oxford University Press, 1992.

Marmot, M., 'Social determinants of health inequalities', *Lancet*, (2005) vol. 365, no. 9464, pp. 1099-104.

Martens, W, L Niessen, J Rotmans, T Jetten & A. J. McMichael, 'Potential impact of global climate change on malaria risk.' *Environmental Health Perspectives*, (1995) vol. 103, no. 5.

Massad, Eduardo, Marcelo Nascimento Burattini, Francisco Antonio Bezerra Coutinho & Luiz Fernandes Lopez, 'Dengue and the risk of urban yellow fever reintroduction in São Paulo State, Brazil', *Rev Saude Publica*, (2003) vol. 37, no. 4, Aug 1, pp. 477-84.

Mattli, W. & T. Büthe, 'Setting International Standards: Technological Rationality or Primacy of Power?' *World Politics*, (2003) vol. 56, no. 1, pp. 1-42.

Mattli, Walter & Ngaire Woods, 'In Whose Benefit? Explaining regulatory change in global politics ', in Mattli, Walter & Ngaire Woods, eds., *The Politics of Global Regulation*, Princeton: Princeton University Press, 2008.

May, R M & R M Anderson, 'Transmission dynamics of HIV infection', *Nature*, (1987) vol. 326, no. 6109, Jan 1, pp. 137-42.

May, R M, S Gupta & A R McLean, 'Infectious disease dynamics: What characterizes a successful invader?' *Philos Trans R Soc Lond, B, Biol Sci*, (2001) vol. 356, no. 1410, Jun 29, pp. 901-10.

McCoy, G. W., 'International Standardization of Biological Products by the League of Nations', *American Journal of Public Health*, (1936) vol. 26, Dec 1936, pp. 1215 - 18.

McFarland, D, 'Review of child survival funding: 1980-1995.' *Current Issues in Child Survival Series*.

McIntyre, James & Peter Bourne, 'Memorandum to the President: Status Report - World Health Strategy', (Washington DC: 1978).

Merson, Michael H, 'The HIV-AIDS pandemic at 25--the global response', *N Engl J Med*, (2006) vol. 354, no. 23, Jun 7, pp. 2414-7.

Michaud, C. & C. J. Murray, 'External assistance to the health sector in developing countries: a detailed analysis, 1972-90', *Bull World Health Organ*, (1994) vol. 72, no. 4, pp. 639-51.

Miles, A. A., 'Biological standards and the measurement of therapeutic activity', *British medical bulletin*, (1951) vol. 7, no. 4, pp. 283-91.
Mills, Anne, Yoel Lubell & Kara Hanson, 'Malaria eradication: the economic, financial and institutional challenge', *Malar J*, (2008) vol. 7 Suppl 1, Jan 1, p. S11.
Mitrany, D., 'The Functional Approach to World Organization', *International Affairs (Royal Institute of International Affairs 1944-)*, (1948) vol. 24, no. 3, pp. 350-63.
Murray, C. J. L. & J. Frenk, 'Health metrics and evaluation: strengthening the science', *Lancet*, (2008) vol. 371, no. 9619, pp. 1191-99.
Murray, C. J., A. D. Lopez, B. Chin, D. Feehan & K. H. Hill, 'Estimation of potential global pandemic influenza mortality on the basis of vital registry data from the 1918-20 pandemic: a quantitative analysis', *Lancet*, (2006) vol. 368, no. 9554, Dec 23, pp. 2211-8.
Nielson, D. L. & M. J. Tierney, 'Delegation to International Organizations: Agency Theory and World Bank Environmental Reform', *International Organization*, (2003) vol. 57, no. 02, pp. 241-76.
North, D. C., 'Institutions', *Journal of Economic Perspectives*, (1991) vol. 5, no. 1, pp. 97-112.
OECD, 2004. Recent Trends in Official Development Assistance to Health, www.oecd.org/dataoecd/1/11/37461859.pdf. (accessed 10 March, 2010).
———, 2008. Development aid at its highest level ever in 2008, http://www.oecd.org/document/35/0,3343,en_2649_34487_42458595_1_1_1_1,00.html . (accessed 20 November, 2009).
OIHP, 'Questionnires [sic] on the Influenza pandemic of 1918-1919', in *L'Office International D'Hygiene Publique* (Geneva: World Health Organization Archives, 1920).
Ollila, E., 'Global health priorities—Priorities of the wealthy', *Global Health*, (2005) vol. 1, no. 6.
Olson, M., 'Increasing the Incentives for International Cooperation', *International Organization*, (1971) vol. 25, no. 4, Autumn, pp. 866-74.
One-hundred sixth congress of the United States of America, 'Global AIDS and Tuberculosis Relief Act of 2000', in *H.R. 3519* (United States: 2000).
Parker, R., 'The Global HIV/AIDS Pandemic, Structural Inequalities, and the Politics of International Health', Am Public Health Assoc, 2002).
PEPFAR, 'Emergency Plan for AIDS Relief, Fiscal Year 2005 Operational Plan', (Washington D.C.: 2005).
Perel, P., J. J. Miranda, Z. Ortiz & J. P. Casas, 'Relation between the Global Burden of Disease and Randomized Clinical Trials Conducted in Latin America Published in the Five Leading Medical Journals', *PLoS ONE*, (2008) vol. 3, no. 2, Jan 1, p. e1696.
Piot, P, T C Quinn, H Taelman, F M Feinsod, K B Minlangu, O Wobin, N Mbendi, P Mazebo, K Ndangi & W Stevens, 'Acquired immunodeficiency syndrome in a heterosexual population in Zaire', *Lancet*, (1984) no. 8394, Jul 14, pp. 65-9.
Piot, Peter, Richard G A Feachem, Jong-Wook Lee & James D Wolfensohn, 'Public health. A global response to AIDS: lessons learned, next steps', *Science*, (2004) vol. 304, no. 5679, Jun 24, pp. 1909-10.
Piot, Peter, Sarah Russell & Heidi Larson, 'Good politics, bad politics: the experience of AIDS', *Am J Public Health*, (2007) vol. 97, no. 11, Nov 1, pp. 1934-6.
Plank, S J & M L Milanesi, 'Infant feeding and infant mortality in rural Chile', *Bull World Health Organ*, (1973) vol. 48, no. 2, Jan 1, pp. 203-10.
Poku, N, 'The Global AIDS Fund: context and opportunity', *Third World Quarterly*, (2002) Dec 31.
Price-Smith, Andrew T., *Contagion and Chaos: Disease, Ecology, and National Security in the Era of Globalization*, Cambridge, Massachusets: MIT Press, 2009.
Prins, G., 'AIDS and global security', *International Affairs*, (2004) vol. 80, no. 5, pp. 931-52.
Radelet, S, 'A primer on foreign aid', *Center for Global Development Working Paper*, (2006) no. 92, July.
Radelet, S. & B. Siddiqi, 'Global Fund grant programmes: an analysis of evaluation scores', *Lancet*, (2007) vol. 369, no. 9575, May 26, pp. 1807-13.

Ragin, C. C., *The comparative method: Moving beyond qualitative and quantitative strategies*, Berkeley: University of California Press, 1989.

Ramaiah, T.J., 'Cost-benefit analysis of the intensified campaign against smallpox in India. ' *National Institute of Health Administration and Education bulletin*, (1976) vol. 9, pp. 169-203.

Ravishankar, Nirmala, Paul Gubbins, Rebecca J Cooley, Katherine Leach-Kemon, Catherine M Michaud, Dean T Jamison & Christopher J L Murray, 'Financing of global health: tracking development assistance for health from 1990 to 2007', *Lancet*, (2009) vol. 373, no. 9681, pp. 2113-24.

Rawls, John, *A theory of justice*, Original edn., Cambridge, Mass.: Belknap Press, 2005.

Rochon, P. A., A. Mashari, A. Cohen, A. Misra, D. Laxer, D. L. Streiner, J. M. Dergal, J. P. Clark, J. Gold & M. A. Binns, 'Relation between randomized controlled trials published in leading general medical journals and the global burden of disease', *CMAJ : Canadian Medical Association journal*, (2004) vol. 170, no. 11, May 25, pp. 1673-7.

Roehr, B, 'Report argues US should not pay more than rest of world to fight HIV/AIDS', *BMJ: British Medical Journal*, (2005) vol. 331, no. 7511, 30 July.

Rozenbaum, W, D Dormont, B Spire, E Vilmer, M Gentilini, C Griscelli, L Montagnier, F Barre-Sinoussi & J C Chermann, 'Antimoniotungstate (HPA 23) treatment of three patients with AIDS and one with prodrome', *Lancet*, (1985) vol. 1, no. 8426, Feb 23, pp. 450-1.

Russell, PF, *Man's Mastery Over Malaria*, Oxford: Oxford University Press, 1955.

Russett, Bruce, 'The marginal utility of income transfers to the Third World', *International Organization*, (1978) vol. 32, pp. 913-28.

Rutherford, GW, AR Lifson & NA Hessol, 'Course of HIV-1 infection in a cohort of homosexual and bisexual men: an 11-year follow up study', *British Medical Journal*, (1990) vol. 301, pp. 1183-88.

Sachs, J. D., *Macroeconomics and Health: Investing in Health for Economic Development*, Geneva, Switzerland: World Health Organization, 2001.

Sandler, T., *Global Collective Action*, Cambridge: Cambridge University Press, 2004.

Saraceno, B., M. van Ommeren, R. Batniji, A. Cohen, O. Gureje, J. Mahoney, D. Sridhar & C. Underhill, 'Barriers to improvement of mental health services in low-income and middle-income countries', *Lancet*, (2007) vol. 370, no. 9593, pp. 1164-74.

Schechter, M T, K J Craib, K A Gelmon, J S Montaner, T N Le & M V O'Shaughnessy, 'HIV-1 and the aetiology of AIDS', *Lancet*, (1993) vol. 341, no. 8846, pp. 658-9.

Schwartländer, B, I Grubb & J Perriëns, 'The 10-year struggle to provide antiretroviral treatment to people with HIV in the developing world', *Lancet*, (2006) no. 368, pp. 541-46.

Scrimshaw, N, C Taylor & J Gordon, 'Interactions of nutrition and infection', in *World Health Organization Monograph Series* (Geneva: WHO, 1968).

Sencer, JD & NW Axnick, 'Cost benefit analysis', *Proceedings of the International Symposium on Vaccination against Communicable Disease*, (1973) vol. March, pp. 37-46.

Shiffman, J., 'Donor funding priorities for communicable disease control in the developing world', *Health Policy and Planning*, (2006) vol. 21, no. 6, p. 411.

Shiffman, J. & S. Smith, 'Generation of political priority for global health initiatives: a framework and case study of maternal mortality', *Lancet*, (2007) vol. 370, no. 9595, pp. 1370-79.

Shiffman, Jeremy, 'Has donor prioritization of HIV/AIDS displaced aid for other health issues?' *Health Policy and Planning*, (2008) vol. 23, no. 2, Feb 29, pp. 95-100.

Shiffman, Jeremy, Tanya Beer & Yonghong Wu, 'The emergence of global disease control priorities', *Health Policy and Planning*, (2002) vol. 17, no. 3, Sep 1, pp. 225-34.

Shilts, R., *And the band played on: People, politics and the AIDS crisis*, London: Penguin, 1987.

Siddiqi, Javed, *World health and world politics : the World Health Organization and the UN system*, Columbia, SC: University of South Carolina Press, 1995.

Sikkink, Kathryn, 'Codes of Conduct for Transnational Corporations: The Case of the WHO/UNICEF Code ', *International Organization*, (1986) vol. 40, no. 4, Autumn, 1986, pp. 815-40.
Simmons, B, 'Compliance with international agreements', *Annual Review of Political Science*, (1998) vol. 1, pp. 75-93.
———, 'The international politics of harmonization: the case of capital market regulation', *International Organization*, (2001) vol. 55, no. 3, pp. 589-620.
Smith, D, F McKenzie, R Snow & S Hay, 'Revisiting the basic reproductive number for malaria and its implications for malaria control', *PLOS Biology*, (2007) vol. 5, no. 5, p. e42.
Snidal, D, 'The limits of hegemonic stability theory', *International Organization*, (1985) vol. 39, no. 4, pp. 579-614.
Snow, R. W. , M. Craig, U. Deichmann & K. Marsh, 'Estimating mortality, morbidity and disability due to malaria among Africa's non-pregnant population.' *Bull World Health Org*, (1999) vol. 77, pp. 624-40.
Soper, Fred, 'General Principles of the Eradication Programmes in the Western Hemisphere', *Journal of the National Malaria Society*, (1951) vol. 10, p. p.185.
Soper, Fred L., 'Some aspects of the WHO's programs in the Americas', *American journal of public health and the nation's health*, (1951) vol. 41, no. 12, pp. 1464-8.
Sridhar, D. & R. Batniji, 'Misfinancing Global Health', *Global Economic Governance Programme Working Paper*, (2007) vol. WP 2007.
———, 'Misfinancing global health: a case for transparency in disbursements and decision making', *Lancet*, (2008) vol. 372, no. 9644, Sep 27, pp. 1185-91.
Sridhar, Devi, *The Battle Against Hunger*, Oxford: Oxford University Press, 2008.
Stein, A. A., 'Coordination and Collaboration: Regimes in an Anarchic World', *International Organization*, (1982) vol. 36, no. 2, Spring.
Stern, A. M. & H. Markel, 'International efforts to control infectious diseases, 1851 to the present', *Jama*, (2004) vol. 292, no. 12, pp. 1474-9.
Stuckler, D., L. King, H. Robinson & M. McKee, 'WHO's budgetary allocations and burden of disease: a comparative analysis', *Lancet*, (2008) vol. 372, no. 9649, pp. 1563-69.
Taubenberger, Jeffery K & David M Morens, '1918 Influenza: the mother of all pandemics', *Emerging Infect Dis*, (2006) vol. 12, no. 1, pp. 15-22.
Taylor, A. L. & D. W. Bettcher, 'WHO Framework Convention on Tobacco Control: a global good for public health', *Bull World Health Organ*, (2000) vol. 78, pp. 920-29.
The Economist, 'Snuffed out'. *The Economist*, 5 July 2007.
The White House, 'New Directions in International Health Cooperation: A Report to The President', ed. Bourne, Peter G. (Washington DC: 1978).
UN Security Council, 'Security Council Resolution 1308: on the responsibility of the Security Council in the maintenance of international peace and security: HIV/AIDS and international peacekeeping operations', in *S/RES/1308 (2000)*2001).
United Nations General Assembly, 'Prevention and control of acquired immunodeficiency syndrome (AIDS)', in *A/RES/42/8* 1987).
———, 'Declaration of commitment on HIV/AIDS', in *Resolution A/RES/S-26/2*2001).
United States Institute of Medicine, 'America's Vital Interest in Global Health', (Washington DC: Institute of Medicine, 1997).
USAID, 'Report on the health, population and nutrition activities of the Agency for International Development, 1967/1968', (Washington DC: USAID, U.S. Dept of Health and Human Services, 1969).
———, 'Annual Budget Submission FY 1981, Development Support Bureau, Office of Nutrition', (Washington DC: USAID, 1979), 93.
Vaughan, J. P., S. Mogedal, G. Walt, S. E. Kruse, K. Lee & K. de Wilde, 'WHO and the effects of extrabudgetary funds: is the Organization donor driven?' *Health Policy and Planning*, (1996) vol. 11, no. 3, pp. 253-64.
Waxman, A., 'The WHO Global Strategy on Diet, Physical Activity and Health: The controversy on sugar', *Development*, (2004) vol. 47, no. 2, pp. 75-82.
Waxman, H. A., 'The Future of the Global Tobacco Treaty Negotiations', 2002), 936-39.

Wedel, Janine R., *Collision and collusion: the strange case of Western aid to Eastern Europe*, New York: Palgrave, 2001.
Weindling, P., 'Philanthropy and World Health: The Rockefeller Foundation and the League of Nations Health Organisation', *Minerva*, (1997) vol. 35, no. 3, pp. 269-81.
Weinstein, I., 'An outbreak of smallpox in New York City', *American Journal of Public Health*, (1947) vol. 37, pp. 1376-84.
WHO, 'Constitution of the World Health Organization', (1946).
———, *The First Ten Years of the World Health Organization*, Geneva: World Health Organization, 1958.
———, 'Smallpox eradication: Minutes of the twenty-third session of the Executive Board', (Geneva: World Health Organization, 1959), 472-87.
———, *The Second Ten Years of the World Health Organization*, Geneva: World Health Organization, 1968.
———, 'Handbook of Resolutions and Decisions of the World Health Assembly and the Executive Board, Volume 1: 1948-1972', (Geneva: WHO, 1973).
———, 'DDT and its Derivatives', in *Environmental Health Criteria* (Geneva: World Health Organization, 1979).
———, 'WHO Framework Convention on Tobacco Control', (Geneva: WHO, 2003).
———, *Global tuberculosis control: surveillance, planning, financing*, Geneva: World Health Organization, 2007.
———, 'The Global Burden of Disease: 2004 Update', (Geneva: World Health Organization, 2008).
———, 2009. Assessing the severity of an influenza pandemic, http://www.who.int/csr/disease/swineflu/assess/disease_swineflu_assess_20090511/en/index.html. (accessed 22 January, 2010).
WHO Maximizing Positive Synergies Collaborative Group, Badara Samb, Tim Evans, Mark Dybul, Rifat Atun, Jean-Paul Moatti, Sania Nishtar, Anna Wright, Francesca Celletti, Justine Hsu, Jim Yong Kim, Ruairi Brugha, Asia Russell & Carissa Etienne, 'An assessment of interactions between global health initiatives and country health systems', *Lancet*, (2009) vol. 373, no. 9681, pp. 2137-69.
Winslow, C. E., 'International health. I. Introductory remarks', *American journal of public health and the nation's health*, (1951) vol. 41, no. 12, Dec 1, pp. 1455-9.
World Bank, *World Development Report 1993: Investing in Health*, Washington DC: The World Bank, 1993.
World Economic Forum, 'Global Risks 2010', (Geneva: World Economic Forum, 2010).
World Health Organization, 'Smallpox eradication programme. Report by the Director-General.' in *Official Records of the World Health Organization* (Geneva: WHO, 1963).
———, 'Report on the smallpox eradication programme.' in *Official Records of the World Health Organization* (Geneva: 1965), 309-20.
———, 'Special Programme on AIDS: Progress Report Number 1', (Geneva: World Health Organization, 1987).
Yach, D. & D. Bettcher, 'The globalization of public health, II: The convergence of self-interest and altruism', *American Journal of Public Health*, (1998) vol. 88, no. 5, eng, pp. 738-41.
Yarchoan, R, R W Klecker, K J Weinhold, P D Markham, H K Lyerly, D T Durack, E Gelmann, S N Lehrman, R M Blum & D W Barry, 'Administration of 3'-azido-3'-deoxythymidine, an inhibitor of HTLV-III/LAV replication, to patients with AIDS or AIDS-related complex', *Lancet*, (1986) vol. 1, no. 8481, Mar 15, pp. 575-80.
Young, O. R., *Compliance and Public Authority*, Baltimore: Johns Hopkins University Press, 1979.
Young, O. R. & G. Osherenko, 'Testing Theories of Regime Formation: Findings from a Large Collaborative Research Project', in Rittberger, V. & P. Mayer, eds., *Regime Theory and International Relations*, New York: Oxford University Press, 1993.
Zacher, Mark & Tania Keefe, *The Politics of Global Health Governance: United by Contagion*, New York: Palgrave Macmillan, 2008.

Zacher, Mark W. & Brent Sutton, *Governing global networks : international regimes for transportation and communications*, *Cambridge studies in international relations ; 44*, Cambridge: Cambridge University Press, 1996.

Zeltner, T., D. Kessler, A. Martiny & F. Randera, 'Tobacco Company Strategies to Undermine Tobacco Control Activities at the World Health Organization', (Geneva: WHO, 2000).

Interviews with the following persons have informed this thesis:

Armstrong, Tim (WHO); Geneva, 7 November 2007

Baeza, Cristian (World Bank); Washington DC, 23 May 2007

Beaglehole, Robert (Formerly WHO); London, 3 December 2007

Bettcher, Doug (WHO); Geneva, 7 November 2007

Borowitz, Michael (DFID); London, 30 January 2008

Cagliuri, Ruth (Australia); London, 13 September 2007

Evans, Tim (WHO); Geneva, 7 November 2007

Feachem, Richard (Global Fund); San Francisco, 9 September 2008

Frenk, Julio (Formerly WHO, Harvard); Oxford, 19 October, 2007

Mallinga, Steven (Uganda); 11 May, 2008

Mathers, Colin (WHO); London, 3 December 2007

Ngilu, Charity (Kenya); Nairobi, 5 July 2008

Novotny, Tom (Formerly US Government); New York, 17 February 2009

Pramming, Stig (Oxford Health Alliance); London, 13 September 2007

Reddy, Srinath (Public Health Foundation of India); Oxford, 11 May, 2008

Ross, Alex (WHO); Geneva, 8 November 2007

Saraceno, Benedetto (WHO); Geneva, 7 November 2007

Smith, Ian (WHO); Geneva, 8 November 2007

Songane, Francisco (Mozambique); Bamako, 18 November 2008

Van Ommeren, Mark (WHO); Geneva, 7 November 2007

Yach, Derek (Formerly WHO, Pepsico); by telephone, 23 September 2007

In addition, countless conversations with persons involved with events discussed in this thesis have shaped this analysis.

Appendices

Appendix 3A: Data Sources for Ro, Basic Reproductive Number

Disease	Ro
Cholera	Note an average value of 6.1 reported Hartley, David M, J Glenn Morris & David L Smith, 'Hyperinfectivity: a critical element in the ability of V. cholerae to cause epidemics?' PLoS Med, (2006) vol. 3, no. 1, p. e7.
Chronic NCD	NA
Diarrhoeal Dz	NA – many different causes and pathologies; Note that value for cholera is 6.1 as above
Guinea Worm	NA
HIV	Note that values reported early in epidemic were 5-6 for homosexual men in the United States 4.0 to 11.2 for heterosexual populations in Africa, and 11 in higher risk groups in Western countries (prostitutes, people with other sexually transmitted infections) – see Anderson & May. 8.52 is the average for all reported values, though excluding high-risk groups a value of 3(2-5 range in non-high-risk) is more appropriate for considering population-wide threats. Anderson, R M, R M May & A R McLean, 'Possible demographic consequences of AIDS in developing countries', Nature, (1988) vol. 332, no. 6161, Mar 17, pp. 228-34. Anderson, R M & R M May, 'Population biology of infectious diseases: Part I', Nature, (1979) vol. 280, no. 5721, Aug 2, pp. 361-7. May, R M & R M Anderson, 'Transmission dynamics of HIV infection', Nature, (1987) vol. 326, no. 6109, Jan 1, pp. 137-42.
Immunisation	Here, the basic reproductive number is based on the basic reproductive numbers for the diseases protected against in childhood vaccines. The disease and corresponding average reported value of Ro are listed here (MMR and DPT are the two key childhood vaccines) MMR: Measles (15), Mumps (5.5), Rubella (6) ; DPT: Diptheria (6.5), Pertussis (14.5), Tetanus (NA); (Average = 9.5) WHO and CDC, History and Epidemiology of Global Smallpox Eradication, http://www.bt.cdc.gov/agent/smallpox/training/overview/pdf/eradicationhistory.pdf. (accessed 10 February, 2010).
Influenza (1918)	Mills, Christina E, James M Robins & Marc Lipsitch, 'Transmissibility of 1918 pandemic influenza', Nature, (2004) vol. 432, no. 7019, Dec 16, pp. 904-6.
Influenza (seasonal)	Reports value of 1.3 Chowell, G, M A Miller & C Viboud, 'Seasonal influenza in the United States, France, and Australia: transmission and prospects for control', Epidemiol Infect, (2008) vol. 136, no. 6, Jun 1, pp. 852-64.; See also Chowell, Gerardo, Hiroshi Nishiura & Luís M A Bettencourt, 'Comparative estimation of the reproduction number for pandemic influenza from daily case notification data', J R Soc Interface, (2007) vol. 4, no. 12, Feb 22, pp. 155-66.
Influenza H1N1	Reports value of 1.5 Yang, Yang, Jonathan D Sugimoto, M Elizabeth Halloran, Nicole E Basta, Dennis L Chao, Laura Matrajt, Gail Potter, Eben Kenah & Ira M Longini, 'The transmissibility and control of pandemic influenza A (H1N1) virus', Science, (2009) vol. 326, no. 5953, Oct 30, pp. 729-33.
Influenza H5N1	Note that 2.37 is the average value reported Ward, M P, D Maftei, C Apostu & A Suru, 'Estimation of the basic reproductive number (R0) for epidemic, highly pathogenic avian influenza subtype H5N1 spread', Epidemiol Infect, (2009) vol. 137, no. 2, Feb 1, pp. 219-26.

Disease	Ro
Malaria	Note a range of 1-3000 reported in analysis (based on environmental conditions), with a median value of 115 Smith, D, F McKenzie, R Snow & S Hay, 'Revisiting the basic reproductive number for malaria and its implications for malaria control', PLOS Biology, (2007) vol. 5, no. 5, p. e42.
Mental Health	NA
Nutrition	NA
Plague	Reports value of 2.8-3.5 Nishiura, Hiroshi, Markus Schwehm, Masayuki Kakehashi & Martin Eichner, 'Transmission potential of primary pneumonic plague: time inhomogeneous evaluation based on historical documents of the transmission network', J Epidemiol Community Health, (2006) vol. 60, no. 7, Jul 1, pp. 640-5.
Pneumonia	NA – many different causes and pathologies
Polio	WHO and CDC, History and Epidemiology of Global Smallpox Eradication, http://www.bt.cdc.gov/agent/smallpox/training/overview/pdf/eradicationhistory.pdf. (accessed 10 February, 2010).
Smallpox	WHO and CDC, History and Epidemiology of Global Smallpox Eradication, http://www.bt.cdc.gov/agent/smallpox/training/overview/pdf/eradicationhistory.pdf. (accessed 10 February, 2010).
TB	Bhanu reports a value of 1.54 under normal conditions, Blower reports 4.47 as a median, and Basu reports a value of 2.0 for XDR TB. Blower, S M, A R McLean, T C Porco, P M Small, P C Hopewell, M A Sanchez & A R Moss, 'The intrinsic transmission dynamics of tuberculosis epidemics', Nat Med, (1995) vol. 1, no. 8, Aug 1, pp. 815-21. Bhunu, C P, W Garira, Z Mukandavire & M Zimba, 'Tuberculosis transmission model with chemoprophylaxis and treatment', Bull Math Biol, (2008) vol. 70, no. 4, May 1, pp. 1163-91. Basu, Sanjay, Gerald H Friedland, Jan Medlock, Jason R Andrews, N Sarita Shah, Neel R Gandhi, Anthony Moll, Prashini Moodley, A Willem Sturm & Alison P Galvani, 'Averting epidemics of extensively drug-resistant tuberculosis', Proc Natl Acad Sci USA, (2009) vol. 106, no. 18, May 5, pp. 7672-7.
Tobacco	NA
Yellow Fever	Reports value of 1.6 (based on Brazil outbreaks only) Favier, C, N Degallier, M G Rosa-Freitas, J P Boulanger, J R Costa Lima, J F Luitgards-Moura, C E Menkès, B Mondet, C Oliveira, E T S Weimann & P Tsouris, 'Early determination of the reproductive number for vector-borne diseases: the case of dengue in Brazil', Trop Med Int Health, (2006) vol. 11, no. 3, Mar 1, pp. 332-40.

Appendix 4A:
Calculating Contagion and Cooperation Indices, 1918 – 1957

Contagion Index, 1918

Disease	Ro	Prevention	Ie	CFR	CF Score	Treatment	Is	Contagion Index
Cholera	6.1	0.25	1.525	3	5	0.5	2.5	2.358333333
Chronic NCD	0	0	0	NA	0	0.5	0	0
Malaria	115	0	0	13	6	0.5	3	1
Nutrition	0	1	0	NA	0	0.25	0	0
Pandemic influenza	3.4	1	3.4	2.5	5	1	5	5.066666667
Plague	3.15	0.5	1.57	55	9	0.5	4.5	3.07
Population Control	0	0	0	0	0	0	0	0
Smallpox	6	0.25	1.5	20	8	1	8	4.166666667
TB	1.54	1	1.54	33	8	1	8	4.206666667
Tetanus		0	0	18	7	1	7	2.333333333
Typhus	5	0.5	2.5	15	7	1	7	4.833333333
Yellow fever	1.6	0.5	0.8	15	7	1	7	3.133333333

Health Cooperation Index, 1918

Disease	**1918 funding (millions USD)**	**1918 funding (millions 2008 USD)**	**CF**	**Agreement**	**% adopting**	**Cr**	**Research**	**Reporting**	**Cs**	**HCI**
Cholera	0	0	0	1	1	2	0.5	1	1.5	3.5
Chronic NCD	0	0	0	0	0	0	0	0	0	0
Malaria	0	0	0	0.5	0.2	0.7	0.5	0	0.5	1.2
Nutritional	0	0	0	0	0	0	0	0	0	0
Pandemic influenza (1918)	0	0	0	0	0	0	0	0	0	0
Plague	0	0	0	1	1	2	0.5	1	1.5	3.5
Population control	0	0	0	0	0	0	0	0	0	0
Smallpox	0	0	0	0	0	0	0	0	0	0
TB	0	0	0	0	0	0	0	0	0	0
Tetanus	0	0	0	0	0	0	0	0	0	0
Typhus	20.59	289.97	7.45	0	0	0	1	0.5	1.5	8.95
Yellow fever	US campaign ends 1914	0	0	1	1	2	0.5	1	1.5	3.5

Contagion Index, 1939

Disease	Ro	Prevention	Ie	CFR	CF Score	Treatment	Is	Contagion Index
Cholera	6.1	0.25	1.525	3	5	0.5	2.5	2.358333333
Chronic NCD	0	0	0	NA	0	0.5	0	0
Influenza (seasonal)	1.3	1	1.3	2.5	5	1	5	2.966666667
Malaria	115	0	0	13	6	0.5	3	1
Nutrition	0	1	0	NA	0	0.25	0	0
Plague	3.15	0.5	1.57	55	9	0.5	4.5	3.07
Population Control	0	0	0	0	0	0	0	0
Smallpox	6	0.25	1.5	20	8	1	8	4.166666667
TB	1.54	1	1.54	33	8	1	8	4.206666667
Tetanus		0	0	18	7	1	7	2.333333333
Typhus	5	0.5	2.5	15	7	1	7	4.833333333
Yellow fever	1.6	0.5	0.8	15	7	1	7	3.133333333

Health Cooperation Index, 1939

Disease	1938 funding (millions USD)	1939 funding (millions 2008 USD)	CF	Agreement	% adopting	Cr	Research	Reporting	Cs	HCI
Cholera		0	0	1	1	2	0.5	1	1.5	3.5
Chronic NCD		0	0	0.5	0	0.5	0	0	0	0.5
Influenza (seasonal)		0	0	0	0	0	0	0	0	0
Malaria	0	0	0	0.5	0.2	0.7	0.5	0	0.5	1.2
Nutrition	0	0	0	0.5	0	0.5	1	0	1	1.5
Plague		0	0	1	1	2	0.5	1	1.5	3.5
Population Control	0	0	0	0	0	0	0	0	0	0
Smallpox	0	0	0	0	0	0	0	0	0	0
TB	0	0	0	0	0	0	0	0	0	0
Tetanus		0	0	0	0	0	0	0	0	0
Typhus		0	0	0	0	0	0	0	0	0
Yellow fever		0	0	1	1	2	0.5	1	1.5	3.5

Appendix 4B: International Biological Standards.

Reproduced from Dale, Henry, 'Biological Standardisation', in *Address at Annual General Meeting, National Institutes for Medical Research* (London: 1939). P. 566

INTERNATIONAL BIOLOGICAL STANDARDS

No.	Standard preparation	Adopted in	International unit milligrams	International distributing centre
1	Diphtheria Antitoxin	1922	0·0628	State Serum Institute, Copenhagen.
2	Tetanus Antitoxin	1928	0·1547	
3	Antidysentery Serum (Shiga)	1928	0·0500	
4	Antipneumococcus Serum (Type I) ..	1934	0·0886	
5	,, ,, (Type II) ..	1934	0·0894	
6	Staphylococcus α-Antitoxin	1934	0·500	
7	Gas Gangrene Antitoxin (perfringens) ..	1931	0·2660	
8	,, ,, ,, (Vibrion Septique)	1934	0·2377	
9	,, ,, ,, (oedematiens) ..	1934	0·2681	
10	,, ,, ,, (histolyticus) ..	1935	0·3575	
11	Old Tuberculin	1931	—	
12	Diphtheria Antitoxin for Flocculation Test	1935	—	
13	Vitamin A (mixed carotenes)	1931	0·001	National Institute for Medical Research, Hampstead, London.
	(pure β-carotene)	1934	0·0006	
14	,, B_1 (adsorption product of vitamin B_1)	1931	10·0	
	(pure synthetic vitamin B_1) ..	1938	0·003	
15	,, C (*l*-ascorbic acid)	1934	0·05	
16	,, D (irradiated ergosterol solution) ..	1931	1·0	
	(calciferol)	1934	0·000025	
17	Arsphenamine	1925	—	
18	Neoarsphenamine	1925	—	
19	Sulpharsphenamine	1925	—	
20	Insulin (dry insulin hydrochloride)	1925	0·125	
	(pure crystalline insulin)	1935	0·0455	
21	Pituitary (posterior lobe) powder	1925	0·5	
22	Digitalis	1925	80·0	
23	Ouabain	1928	—	
	Oestrus-producing hormones:			
24	(i) -oestrone	1932	0·0001	
25	(ii) -oestradiol monobenzoate	1935	0·0001	
26	Androsterone (for male hormone)	1935	0·1	
27	Corpus Luteum Hormone (progesterone) ..	1935	1·0	
28	Chorionic Gonadotrophin	1938	0·1	
29	Serum Gonadotrophin	1938	—	
30	Thyrotrophin	1938	—	
31	Prolactin, Galactin or Mammotrophin ..	1938	—	

Note that during the Second World War, standards were adopted for Penicillin in 1944, Heparin in 1942 and Vitamin E in 1941.

Appendix 5A:
Calculating Contagion and Cooperation Indices, 1948-1976

1948:
Contagion Index

Disease	Ro	Prevention	Ie	CFR	CF Score	Treatment	Is	Contagion Index
Chronic NCD	0	0	0	NA	0	0.5	0	0
Malaria	115	0	0	13	6	0.5	3	1
Nutrition	0	1	0	NA	0	0.25	0	0
Population Control	0	0	0	0	0	0	0	0
Smallpox	6	0.25	1.5	20	8	1	8	4.166666667
TB	1.54	1	1.54	33	8	1	8	4.206666667

Health Cooperation Index

Disease	1948 funding (millions USD)	1948 (millions 2008 USD dollars)	CF	Agreement	% adopting	Cr	Research	Reporting	Cs	HCI
Chronic NCD		0	0	0	0	0.5	0.5	0	0.5	0.5
Malaria	0	0	0	0.5	0	0.5	0.5	0	0.5	1
Nutrition	40	353.98	9.1	0	0	0	0.5	0	0.5	9.599802079
Population control	0	0	0	0	0	0	0.5	0	0.5	0.5
Smallpox	0	0	0			0	0.5	0	0.5	0.5
TB	4	35.40	0.91	0.5	0	0.5	0.5	0	0.5	1.909980208

1957:
Contagion Index

Disease	Ro	Prevention	Ie	CFR	CF Score	Treatment	Is	Contagion Index
Chronic NCD	0	0	0	NA	0	0.5	0	0
Malaria	115	0	0	13	6	0.5	3	1
Nutrition	0	1	0	NA	0	0.25	0	0
Polio	6	0.25	1.5	10	6	1	6	3.5
Smallpox	6	0.25	1.5	20	8	1	8	4.166666667
TB	1.54	0.5	0.77	33	8	0.5	4	2.103333333

Note that during the interim from 1948 to 1957, Note that TB prevention and treatment emerged (rifampicin and pyrazinamide), leading to a lower contagion index for that disease.

Health Cooperation Index

Disease	1957 funding (millions USD)	1957 (millions 2008 USD dollars)	CF	Agreement	% adopting	Cr	Research	Reporting	Cs	HCI
Chronic NCD		0	0	0	0	0.5	0.5	0	0.5	0.5
Malaria	40.97	312.75	8.04	0.5	0.4*	0.9	1	0.5	0.5	10.439
Nutrition	0	0	0	0	0	0	0.5	0	0.5	0.5
Polio	0	0	0	0	0	0	0.5	0.5	1	1
Smallpox	0.079	0.603	0.0155	0	0	0	0.5	0	0.5	0.5155
TB	0	0	0	0	0	0.5	0.5	0	0.5	0.5

Note that by 1957, approximately 40% of malarious countries had a malaria eradication programme in place (see Siddiqi)

Note also that reported USAID funding for malaria is not annualized. I assume that funds were evenly distributed from 1957 to 1969 when the program gave 407 billion in bilatarel aid (See Shiffman 2002) = 31.3 million. An alternative, which takes figures from the GAO report, leads to a figure of 28.6 million each year (677.3 million bilateral + 181.2 million research from 1950 to 1981). This figure excludes 131 million in US contributions to muiltlateral agencies. Notably, the latter figure likely underestimates annual US contributions to 1976 since the programs slowed greatly after 1964.

1967:
Contagion Index

Disease	Ro	Prevention	Ie	CFR	CF Score	Treatment	Is	Contagion Index
Chronic NCD	0	0	0	NA	0	0.5	0	0
Malaria	115	0	0	13	6	0.5	3	1
Nutrition	0	1	0	NA	0	0.25	0	0
Polio	6	0.25	1.5	10	6	1	6	3.5
Smallpox	6	0.25	1.5	20	8	1	8	4.166666667
TB	1.54	0.5	0.77	33	8	0.5	4	2.103333333

Health Cooperation Index

Disease	1957 funding (millions USD)	1957 (millions 2008 USD dollars)	CF	Agreement	% adopting	Cr	Research	Reporting	Cs	HCI
Chronic NCD		0	0	0	0	0.5	0.5	0	0.5	0.5
Malaria	45.5	291.67	7.497	0.5	0.75	1.25	1	0.5	1.5	10.248
Nutrition	0	0	0	0	0	0	0.5	0	0.5	0.5
Polio	0	0	0	0	0	0	0.5	0.5	1	1
Smallpox	7.03	45.064	1.158	1	0.99	1.99	1	1	2	5.148
TB	0	0	0	0	0	0.5	0.5	0	0.5	0.5

Note that by 1967, all countries participated in the smallpox eradication programme, except China. Not also that by 1967, approximately 75 percent (111 of 148) originally malarious countries had eradication programs in place.

Appendix 5B:
Financing malaria and smallpox eradication campaigns: In annual USD

	Malaria				Smallpox			
Year	WHO Regular Budget	WHO Voluntary Funds	Other UN Funds	Bilateral Funds[1]	WHO Regular Budget	WHO Voluntary Funds	Other UN Funds	Bilateral Funds
1955	119	0	2283		9	0	38	
1956	420	0	3450		5	0	74	
1957	533	28	9112		13	0	66	
1958	528	3027	10108		30	285	83	
1959	533	3749	9070		0	0	64	
1960	511	3894	9323		60	104	162	
1961	250	3778	10525		33	96	0	
1962	2409	2539	8955		61	4	0	
1963	4404	815	8029		84	5	38	
1964	5699	-159	7729		75	317	15	
1965	4701	904	7047		100	25	16	
1966	5207	984	7000		112	41	18	
1967	6218	894	7084		2396	194	526	3912
1968	6661	1009	6680		2729	256	117	4164
1969	6871	310	6500		2890	234	83	4334
1970	5427	53	5421		2988	375	62	3918
1971		85			3070	608	35	2378
1972		157			3304	728	448	1398
1973		252			3168	845	0	998
1974		257			3051	3127	0	1087
1975		1307			3060	8065	632	1494
1976		388			3548	6629	118	189
1977		973			2181	6724	471	98
1978		7134			736	4365	0	388
1979		2118			443	5491	0	0
Total	50491	34496	118316	677300	34146	38518	3066	24358

Note: All figures in thousands of USD, not adjusted for year. 'Other UN Funds' includes UNICEF, UNDP and PAHO. Note that UN Funds for Malaria from 1959 to 1966 reflects UNICEF funding only. All figures reflect expenditures except smallpox funding from 1970 to 1979, which reflects commitments. The negative figure for WHO Voluntary funds for smallpox in 1964 reflects a deduction made for the regular budget funds that were transferred to the Malaria Eradication Special Account (Voluntary). The following years saw such transfers: 1962 ($2 mil), 1963 ($4mil) and 1964 (5.363 mil); these funds are shown as regular budget expenditures.

Sources: Fenner, F., D.A. Henderson, I. Arita, Z. Jezek & I.D. Ladnyi, *Smallpox and its eradication*, Geneva: World Health Organization, 1988. See Tables 9.3, 10.7 and 10.8; GAO, 'Malaria Control in Developing Countries: Where Does it Stand? What is U.S. Role', ed. Conahan, Frank (Washington DC: U.S. General Accounting Office, 1982).

[1] Reliable annualized data on bilateral commitments to malaria eradication could not be located. The United States provided almost all bilateral support for malaria eradication, and the figure for US support is reflected in the total as $677,300,000.

Financing malaria and smallpox eradication campaigns: In 2008 USD

	Malaria				Smallpox				
Year	WHO Regular Budget	WHO Voluntary Funds	Other UN Funds	Bilateral Funds	WHO Regular Budget	WHO Voluntary Funds	Other UN Funds	Bilateral Funds	Conversion factor
1955	952	0	18264		72	0	304		0.125
1956	3307.08	0	27165.35		39.37	0	582.67		0.127
1957	4068.70	213.74	69557.25		99.23	0	503.81		0.131
1958	3911.11	22422.22	74874.07		222.22	2111.11	614.81		0.135
1959	3919.11	27566.17	66691.17		0	0	470.58		0.136
1960	3702.89	28217.39	67557.97		434.78	753.62	1173.91		0.138
1961	1785.71	26985.71	75178.57		235.71	685.71	0		0.140
1962	17085.10	18007.09	63510.63		432.62	28.36	0		0.141
1963	30797.20	5699.30	56146.85		587.41	34.96	265.73		0.143
1964	39303.44	-1096.55	53303.44		517.24	2186.20	103.44		0.145
1965	31979.59	6149.65	47938.77		680.27	170.06	108.84		0.147
1966	34483.44	6516.55	46357.61		741.72	271.52	119.20		0.151
1967	39858.97	5730.76	45410.25		15358.97	1243.58	3371.79	25076.92	0.156
1968	40865.03	6190.18	40981.59		16742.33	1570.55	717.79	25546.01	0.163
1969	39947.67	1802.32	37790.69		16802.32	1360.46	482.55	25197.67	0.172
1970	29983.42	292.81	29950.27		16508.28	2071.82	342.54	21646.40	0.181
1971		449.73			16243.38	3216.93	185.18	12582.01	0.189
1972		805.12			16943.58	3733.33	2297.43	7169.23	0.195
1973		1211.53			15230.76	4062.5	0	4798.07	0.208
1974		1117.39			13265.21	13595.65	0	4726.08	0.230
1975		5186.50			12142.85	32003.96	2507.93	5928.57	0.252
1976		1458.61			13338.34	24921.05	443.60	710.52	0.266
1977		3438.16			7706.71	23759.71	1664.31	346.28	0.283
1978		23390.169			2413.11	14311.47	0	1272.13	0.305
1979		6247.78			1306.78	16197.64	0	0	0.339
Totals	325950.53	198002.46	820678.55	4607483	168065.29	148290.28	16260.20	134999.94	

Note: All figures in thousands of 2008 USD. Explanations and sources from table above (in unadjusted dollars) apply.

Appendix 5C: WHO Funding for smallpox and malaria, 1955-1970

Source: Fenner, F., D.A. Henderson, I. Arita, Z. Jezek & I.D. Ladnyi, *Smallpox and its eradication*, Geneva: World Health Organization, 1988. P. 383

Table 9.3. Expenditure[a] of funds placed at the disposal of WHO from all sources, for all purposes, for malaria eradication, 1955–1970; for smallpox control, 1955–1958; and for smallpox eradication, 1959–1970 (thousands of US$)

Year	WHO regular budget			All funds at disposal of WHO[b]		
	Total	Malaria	Smallpox	Total	Malaria	Smallpox
1955	9 275	119	9	17 441	2 402	47
1956	9 983	420	5	18 451	3 870	79
1957	12 091	533	13	21 142	9 673	79
1958	13 237	528	30	28 016	13 664	113
1959	14 655	533	0	30 636	13 353	64
1960	16 624	511	60	33 126	13 729	320
1961	19 202	250	33	38 064	14 553	179
1962	24 165	2 409	61	45 659	13 903	297
1963	29 784	4 404	84	54 803	13 247	292
1964	33 869	5 699	75	58 505	13 269	542
1965	38 346	4 701	100	63 124	12 652	233
1966	43 440	5 207	112	72 354	13 191	426
1967	51 340	6 218	2 396	80 557	14 195	3 117
1968	55 563	6 661	2 729	89 940	14 350	3 101
1969	61 687	6 871	2 890	95 172	13 682	3 207
1970	67 191	5 427	2 988	107 530	10 849	3 425
Summary totals[c]						
1955–1958	44 586	1 600 (3.6%)	57 (0.1%)	85 050	29 609 (34.8%)	318 (0.4%)
1959–1966	220 085	23 714 (10.8%)	525 (0.2%)	396 271	107 897 (27.2%)	2 353 (0.6%)
1967–1970	235 781	25 177 (10.7%)	11 003 (4.7%)	373 199	53 076 (14.2%)	12 850 (3.4%)

[a] Source: see Table 9.2.

[b] Identified in the *Official Records of the World Health Organization* as the "integrated international health programme". This includes disbursements under the regular effective working budget, the technical assistance component of UNDP, the Voluntary Fund for Health Promotion and other funds administered by WHO, including funds in trust, Revolving Sales Fund, Real Estate Fund, etc. It does not include bilateral aid.

[c] 1955 was the first year of the global malaria eradication programme; 1959 was the first year of the global smallpox eradication programme; 1967 was the first year of the Intensified Smallpox Eradication Programme.

Appendix 6A
Development assistance for health, disbursements from multilateral and bilateral sources

Year	2008 USD (Billions)	1990 USD (Billions)	2007 USD (Billions)
1976	2.432074303	1.64	
1977	2.758328173	1.86	
1978	3.351517028	2.26	
1979	3.707430341	2.5	
1980	4.063343653	2.74	
1981	4.211640867	2.84	
1982	4.285789474	2.89	
1983	4.315448916	2.91	
1984	4.285789474	2.89	
1985	4.285789474	2.89	
1986	4.374767802	2.95	
1987	4.508235294	3.04	
1988	4.760340557	3.21	
1989	5.309040248	3.58	
1990	5.768833849	3.89	5.59
1991	5.64499484		5.47
1992	6.305469556		6.11
1993	6.821465428		6.61
1994	8.008255934		7.76
1995	8.26625387		8.01
1996	8.359133127		8.1
1997	8.689370485		8.42
1998	8.926728586		8.65
1999	10.11351909		9.8
2000	11.03199174		10.69
2001	11.24871001		10.9
2002	12.8379773		12.44
2003	13.98348813		13.55
2004	16.09907121		15.6
2005	18.47265222		17.9
2006	19.59752322		18.99
2007	22.4871001		21.79

Sources: For data from 1976-1990, see Michaud, C. & C. J. Murray, 'External assistance to the health sector in developing countries: a detailed analysis, 1972-90', *Bull World Health Organ*, (1994) vol. 72, no. 4, pp. 639-51.

For data from 1990-2006, see Ravishankar, Nirmala, Paul Gubbins, Rebecca J Cooley, Katherine Leach-Kemon, Catherine M Michaud, Dean T Jamison & Christopher J L Murray, 'Financing of global health: tracking development assistance for health from 1990 to 2007', *Lancet*, (2009) vol. 373, no. 9681, pp. 2113-24.

Both sources provide data for 1990. When converted to 2008 dollars, the reported funding for 1990 is 6.17 billion based on 1976-1990 funding data, or 5.76 billion based on 1990-2007 data. All 1976-1990 data has been divided by a correction factor of 1.10 to improve comparability of the data. Reported funding in 2008 dollars here includes this correction factor.

Appendix 6B:
Calculating Contagion and Cooperation Indices, 1976-2006

Contagion Index, 1976

Disease	Ro	Prevention	Ie	CFR	CF Score	Treatment	Is	Contagion Index
Chronic NCD	0	0	0	NA	0	0.5	0	0
Diarrhoeal Dz	NA	0	0	0	0	0	0	0
Immunisation	9.5	0.25	2.375	1.76	4	0.5	2	3.041666667
Malaria	115	0	0	0.3	6	0.5	3	1
Mental Health	0	1	0	NA	0	0.5	0	0
Nutrition	0	1	0	NA	0	0.25	0	0
Polio	6	0.25	1.5	10	6	1	6	3.5
Population Control	0	0	0	0	0	0	0	0
Smallpox	6	0.25	1.5	20	8	1	8	4.166666667
TB	1.54	0.5	0.77	33	8	0.5	4	2.103333333
Tobacco	0	0.5	0	NA	0	0.5	0	0

Health Cooperation Index, 1976

Disease	1976 funding (millions USD)	1976 funding (millions 2008 USD)	CF	% multilat	Agreement	% adopting	Cr	Research	Reporting	Cs	HCI
Chronic NCD			0		0.5	0	0.5	0.5	0	0.5	1
Diarrhoeal Dz	507	1906.01	48.99	90.9	0	0	0	0.5	0	0.5	49.49
Immunisation	65.7	246.99	6.34		1	1	2	0.5	0.5	1	3
Malaria**	34.8	130.82	3.363		0.5	0	0.5	0.5	0	0.5	4.36
Mental Health		0	0		0	0	0	0	0	0	0
Nutrition	59	221.80	5.70	59.7	0	0	0	0.5	0	0.5	6.20
Polio*	0	0	0		0	0	0	0.5	0.5	1	1
Population control	122.8	461.65	11.86	15.6	0	0	0	0.5	0	0.5	12.36
Smallpox	10.5	39.4	1.01		1	1	2	1	1	2	5.01
TB	5	18.79	0.48		0.5	0	0.5	0.5	0	0.5	1.48
Tobacco	0	0	0		0	0	0	0	0	0	0

1990

Contagion Index, 1990

Disease	Ro	Prevention (0-1)	Ie	CFR	ID CFScore	Tx (0-1)	Is	%DALY (2004) / If	Index - with If (DALY)	Index - without If
Chronic NCD	0	0	0	NA	0	0.5	0	34.9	5.81	0
Diarrhoeal Dz		0	0		0	0	0		0	0
HIV	3.5	1	3.5	85	10	1	10	0	6.83	6.83
Immunisation	9.5	0.25	2.375	1.76	4	0.5	2	1.3	3.25	3.04
Malaria	115	0	0	0.3	6	0.5	3	2.2	1.36	1
Maternal Conditions	0	0	0	NA	0	0.25	0	2.6	0.43	0
Mental Health	0	1	0	NA	0	0.5	0	13.1	2.18	0
Nutrition	0	1	0	NA	0	0.25	0	16.8	2.8	0
Onchoceriasis		0	0	0	1	0.25	0.25	0	0.083	0.083
Pneumonia	1	0.25	0.25	0.9	3	0.25	0.75	6.4	1.56	0.5
Polio	6	0.25	1.5	10	6	1	6	0	3.5	3.5
Population Control	0	0	0	0	0	0	0		0	0
TB	1.54	0.5	0.77	33	8	0.5	4	2.2	2.47	2.10
Tobacco	0	0.5	0	NA	0	0.5	0	3.9	0.65	0

Health Cooperation Index, 1990

Disease	1990 funding (millions USD)	1990 funding (millions of 2008 USD)	CF	Agreement	% adopting	Cr	Research (0-1)	Reporting	Cs	HCI
Chronic NCD	3.42	5.59	0.14	0.5	0	0.5	0.5	0	0.5	1.14
Diarrhoeal Dz	55	90.01	2.31	0	0	0	0.5	0	0.5	2.81
HIV	184.8	302.45	7.77	0.5	0	0.5	0.5	0	0.5	8.77
Immunisation	199.8	327.00	8.40	1	1	2	0.5	0.5	1	11.40
Malaria	46.8	76.59	1.96	0	0	0	0.5	0	0.5	2.46
maternal and child	369.4	604.58	15.54	0.5	0	0.5	0.5	0	0.5	16.54
Mental Health	15.4	25.20	0.64	0	0	0	0	0	0	0.64
Nutrition	446.4	730.60	18.78	0	0	0	0.5	0	0.5	19.28
Onchoceriasis	35.1	57.44	1.47	0	0	0	0.5	0	0.5	1.97
Pneumonia	12.5	20.45	0.52	0	0	0	0.5	0.5	1	1.52
Polio	5	8.18	0.21	1	1	2	1	1	2	4.21
Population control	936	1531.91	39.38	0	0	0	0.5	0	0.5	39.88
TB	15.9	26.02	0.66	0.5	0	0.5	0.5	0	0.5	1.66
Tobacco		0	0	0	0	0	0	0	0	0

2005
Contagion Index, 2005

Disease	Ro	Prevention	Ie	CFR	CF Score	Treatment	Is	%DALY (2004) / If	Index - with If	Index no If
Chronic NCD	0	0	0	NA	0	0.5	0	34.9	5.81	0
Guinea Worm		0	0	0	1	0.25	0.25	0	0.083	0.083
HIV	3.5	1	3.5	85	10	0.5	5	0	5.16	5.16
Immunisation	9.5	0.25	2.375	1.76	4	0.5	2	1.3	3.25	3.04
Influenza H5N1	2.37	1	2.37	81	10	0.5	5	0	4.03	4.03
Malaria	115	0	0	0.3	6	0.5	3	2.2	1.36	1
Maternal Conditions	0	0	0	NA	0	0.25	0	2.6	0.43	0
Mental Health	0	1	0	NA	0	0.5	0	13.1	2.18	0
Nutrition	0	1	0	NA	0	0.25	0	16.8	2.8	0
Onchoceriasis		0	0	0	1	0.25	0.25	0	0.083	0.083
Plague	3.15	0.5	1.575	5	6	0.5	3	0	2.74	2.57
Pneumonia	1	0.25	0.25	0.9	3	0.25	0.75	6.4	1.56	0.5
Polio	6	0.25	1.5	10	6	1	6	0	3.5	3.5
SARS	2.95	1	2.95	13.2	7	1	7	0	5.28	5.28
TB	1.54	0.5	0.77	33	8	0.5	4	2.2	2.47	2.103
Tobacco 2005	0	0.5	0	NA	0	0.5	0	3.9	0.65	0
Tobacco 2007	0	0.5	0	NA	0	0.5	0	3.9	0.65	0
Yellow Fever	1.6	0.5	0.8	15	7	1	7	0	3.13	3.13

Health Cooperation Index, 2005

Disease	2005 funding (millions of USD)	2005 funding (millions of 2008 USD)	Cf	Agreement	% adopting	Cr	Research	Reporting	Cs	HCI
Chronic NCD**	399	437.02	11.23	0.5	0	0.5	0.5	0	0.5	12.23
Guinea Worm		0	0			0			0	0
HIV	3086	3380.07	86.89	0.5	0	0.5	0.5	0	0.5	87.89
Immunisation	296.2	324.42	8.33	1	1	2	0.5	0.5	1	11.33
Influenza H5N1		0	0	1	1	2	1	1	2	4
Malaria	782.5	857.06	22.03	0.5	0	0.5	0.5	0	0.5	23.03
maternal and child	622.8	682.146	17.53	0.5	0	0.5	0.5	0	0.5	18.53
Mental Health		0	0	0	0	0	0	0	0	0
Nutrition	119.5	130.88	3.36	0.5	0	0.5	0.5	0	0.5	4.36
Onchoceriasis		0	0			0			0	0
Plague		0	0	1	1	2	0	1	1	3
Pneumonia		0	0	0	0	0	0.5	0.5	1	1
Polio	214.1	234.50	6.02	1	1	2	1	1	2	10.02
SARS	0	0	0	1	1	2	1	1	2	4
TB	315.9	346.00	8.89	0.5	0	0.5	0.5	0	0.5	9.89
Tobacco 2005		0	0	1	0.98	1.98	0.5	0	0.5	2.48
Tobacco 2007	62.5	68.455	1.75	1	0.98	1.98	0.5	0	0.5	4.23
Yellow Fever		0	0	1	1	2	0.5	1	1.5	3.5

Appendix 6C: 1976 Disbursements by disease area for international institutions

	Health Planning	Integrated Health Service Delivery	Nutrition	Family Planning	Environmental Sanitation	Communicable Disease Control	Disaster and Refugee Relief	Total
WHO	28,156	35,958	3,432	6,091	16,239	49,034		139,910
PAHO	10,218	4,088	3,774	6,351	12,205	2,713	0	39,349
UNICEF	0	0	9,034	0	13,502	30,035	0	52,571
UNDP	0	8,600	0	600	7,800	4,000	0	20,000
World Bank	0	0	19,000	6,800	231,600	0	0	257,400
Inter-American Development Bank	0	28,700	0	0	80,400	0	0	109,100
Asian Development Bank	0	0	0	0	74,200	0	0	74,200
African Development Fund	0	14,540	0	0	25,500	0	0	40,040
Total	38,374	91,886	35,240	19,842	461,446	85,782	0	732,570

Note that communicable diseases are 11.7% of disbursements from International Institutions. They are 35% of WHO expenditures, 57.1% of UNICEF expenditures, 20% of UNDP expenditures. The World Bank and the Regional Development Banks directed 68% of their funds to environmental sanitation.

Data from: The White House, 'New Directions in International Health Cooperation: A Report to The President', ed. Bourne, Peter G. (Washington DC: 1978). P. 187-189