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Better Health is Purchasable: The History of Health Economics and
Public Health, 1958-1975.

by

Kevin Andrew Moos

DISSERTATION

Submitted in partial satisfaction of the requirements for the degree of

DOCTOR OF PHILOSOPHY

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in the

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by

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Dissertation Abstract

Better Health is Purchasable: The History of Health Economics and Public Health, 1958-1975.

Beginning with studies of the economic impact of malaria and ending with blood donation policy debates in the 1970s, this dissertation surveys the transformation of the economic analysis of health and the founding of health economics. Applying well-established economic concepts to healthcare and systematically analyzing what made it a topic uniquely suited to the expertise of economists, health economists re-oriented the field away from public health and laid claim to a topic that had previously been the purview of health professionals. Over the course of two decades the economic study of health became more a branch of economics and less a subfield of public health. By examining how the economic study of health first emerged among social scientists and public health workers as part of an advocacy program to attract more resources to health programs, this dissertation also seeks to call attention to relationships between public health and economics.

The chapters of the dissertation identify and examine three important historical developments in the economic analysis of health and healthcare that occurred between the late 1950s and the mid 1970s: the divergence of health economics from public health, the definition of healthcare and not disease as the primary topic of study, and the limits of economic discourse in public policy.

The dissertation also makes an argument supporting the relevance of the history of health economics to the health sciences and history more broadly. The development of health economics was not only a matter of academic discourse and the founding of a new discipline, but was also representative of fundamental economic changes in healthcare and society. Health economics developed as a politically powerful and academically influential discourse over the course of two decades, but the new discipline was not the driver of the economic trends it sought to explain. Health economists' recognition of the impact of healthcare institutions in contemporary society was representative not only of a turning point in public health and economic discourse, but also indicative of a fundamental shift in the economic and social organization of modern societies and the emergence of the postindustrial economy.

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Introduction

Although healthcare professionals had long since been interested in the financial dimensions of medical practice and the economics of public health programs, by the early 1960s a small group of economists interested in the economics of healthcare had begun to coalesce and agree that their differences with public health and medical researchers were substantial enough to warrant an independent conference. Between May 10 and May 12, 1962 this group of researchers met at the first Conference on the Economics of Health and Medical Care hosted by the University of Michigan.¹

The Medical Care Section of the American Public Health Association (APHA) had been sponsoring an annual economic section for the previous several years but had done so as part of its own yearly meetings. The seventy participants at the Michigan conference were thought to represent “virtually all the economists who were attempting at that time to apply economic concepts and analytical methods to problems in the field of health and medical care.”² Unlike the relatively eclectic academic bunch of social scientists who had previously attended APHA conferences under the designations “health economist,” “medical economist” or “public health economist,” the researchers who gathered in Michigan in 1962 were formally trained in economics.³ The conference proceedings published two years later explained the differences between public health economics and health economics that were exposed during APHA

1. Bureau of Public Health Economics, *The Economics of Health and Medical Care. Proceedings of the Conference on the Economics of Health and Medical Care May 10-12, 1962* (Ann Arbor: The University of Michigan, 1964).

2. Donald E. Yett, *Research on Health Economics; Report of a Survey* (Washington, DC: US Public Health Service, 1966), 2.

3. Bureau of Public Health Economics, *The Economics of Health and Medical Care*, V.

conferences. Along with these explanations came their expressed desire for a new meeting:

Understandably, differences in the way the economists viewed the field and defined the particular problems, to say nothing of language barriers, created some unhappiness on the part of the health workers. The economists, however, were encouraged by the growth of their group and were stimulated by the exchanges of views which occurred at these meetings. They agreed that a working conference, limited to economists, would be a useful step in the further definition of the role of the economist in research into health and medical care problems.⁴

While Selma Mushkin served as the chairwoman of both the APHA meetings and the Michigan conference, her efforts to organize the latter were aided by a planning committee that included economists Rashi Fein and Herbert Klarman. The conference was sponsored by the Bureau of Public Health Economics and the Department of Economics at the University of Michigan and funding was provided by the National Institutes of Health and the U.S. Public Health Service. The choice of the University of Michigan as the host institution resulted from the university's position as one of the first to have graduate training in health economics and the leading role its researchers had played in the study of healthcare.⁵ The journal *Public Health Economics* (1944)⁶ and the Bureau of Public Health Economics (1948) were both founded by Nathan Sinai, Professor of Public Health at the University of Michigan.⁷ Hoping to attract graduate students and researchers, the Bureau of Public Health Economics placed an advertisement in the December 1961 edition of the *American Economic Review*, one of the most prestigious journals

4. Ibid., V.

5. Academic staff at the Bureau of Public Health Economics included: Robin Barlow, Kenneth Boulding, S.J. Axelrod, and Nathan Sinai.

6. Bureau of Public Health Economics, *Public Health Economics* 1, no. 1 (1944): 1-57.

7. University of Michigan, "Bureau of Public Health Economics," *The University of Michigan, an Encyclopedic Survey Vol 4*, ed. Wilfred B. Shaw (Ann Arbor: University of Michigan, 2000), 1533.

for academic economics. The advertisement notified readers of the creation of a new graduate program “offered in conjunction with the bureau’s research program on social factors associated with the provision of health services for the aged which had been initiated under a five-year grant from the Ford Foundation.”⁸ Indicative of multidisciplinary participation in the field it explained that “Academic appointments as research assistant are available to a limited number of students in economics and several other social sciences.”⁹

By December 1965 the researchers who had been meeting regularly at conferences since the early 1960s decided a break with public health had finally become necessary. At the fourth meeting of the APHA sponsored economics session conference participants decided that future meetings would be held “on an informal basis” and would take place at the annual meetings of the American Economic Association instead of at the APHA annual meeting.¹⁰ According to a bibliographic survey of the field published in 1966 by economist Donald E. Yett of the USC Graduate School of Business Administration, “The location and timing were designed to facilitate participation by trained economists, although no effort was made to exclude other interested persons.”¹¹ The economic study of health in the mid 1960s was a new and fast changing discipline, such that “any survey must be regarded as perishable.”¹²

In this dissertation I will analyze the history of the economic analysis of health and the development of this emerging discipline, health economics, which grew rapidly into a social

8. “Notes.” *The American Economic Review* 50, no. 5 (Dec., 1960): 1155.

9. Ibid.

10. Yett, *Research on Health Economics*, 2.

11. Ibid.

12. Agnes Brewster, “Forward,” in Yett, *Research on Health Economics*.

science and branch of academic economics. Beginning with early twentieth century efforts to quantify the costs to society of infectious disease, I chronicle and examine the development of the economic study of health as a topic that first emerged among social scientists and public health workers as part of an advocacy program to attract more resources to health programs. Three sets of research questions will guide the analysis presented in this dissertation and prompt a closer look into how health developed as an economic topic in the post-war era. The first and most fundamental set of questions aims to elucidate how the group of researchers described above founded a new social science discipline apart from the public health and medical communities that had previously studied health as an economic phenomenon. These questions drive my initial inquiry: How was the economic understanding of medical care and health transformed from its origins in public health scholarship and medicine to a topic of professional economic analysis? What intellectual continuity and divergence existed between public health economics and the group of economists who founded health economics? The first half of the dissertation will dissect in greater detail how health increasingly became a topic of interest to professionally trained economists who were less interested in advocacy and more devoted to developing the field as a science and health as a natural and economic phenomenon.

The first half of the dissertation demonstrates the continuity and divergence between early twentieth century social medicine and the 1960s health economists that applied post-war developments in academic economics and redefined health and medicine as economic phenomena. More specifically, this dissertation examines two long-term movements relating to the history of health economics and its development over the course of the twentieth century: the heterodox origins of the field in public health and the transformation of health economics into a professionally-recognized economic discipline in the 1960s. Although the new generation of

health economists identified the origins of their work in welfare economists such as Arthur Pigou and post-war quantitative economics, my work seeks to demonstrate the development of the field in the early twentieth century by non-economists and its initial connection to the primary health problem of the twentieth century: infectious disease. However, the economic analysis of health and medicine as a branch of public health was ultimately transformed from its origins in social medicine by researchers who were more interested in the economics of healthcare services than the diseases they were designed to treat.

Economists in the 1960s did not study chronic disease and health only to advance the efficient allocation of resources devoted to healthcare or improve the health of populations. From the early 1960s onwards economists sought to understand scientifically the unique characteristics of healthcare as a commodity and its role in what was increasingly a postindustrial economy. Continuing with the topic of what distinguished health economics from public health, a second set of research questions explores the value of health and the status of health as a commodity. What type of commodity is health? How did health economics define healthcare as a commodity subject to social scientific analysis? What were the consequences of the professionalization of the economic study of health by economists and how health was analyzed as a commodity?

While the professionalization of the economic analysis of health did represent an intellectual revolution in the academic analysis of health, the development and influence of health economics did not supplant the tradition of economic analysis that preceded it or the politics of the healthcare industries it analyzed. A third set of research questions will focus on the influence of health economics on health policy and politics. What happened to the tradition of social medicine and public health research following the professionalization of the economic study of health? How did policy priorities change as a result of the definition of healthcare as a

commodity and the influence of economists? How were economic analyses employed to criticize and support health policies? What was the perceived importance of economic efficiency relative to other competing priorities such as health and safety?

The Economics of Healthcare and the Econometric Revolution in the 1950s

The attendees of the 1962 Michigan conference and the 1965 APHA meeting were hardly the first economists or public health researchers to recognize the potential impact of disease on the broader economy or the role that economic factors played in health. In the United States, from the 1920s onwards, healthcare representatives had become increasingly concerned with the growing costs of health services. As Paul Starr recounted in the *Social Transformation of American Medicine*, increasing concern in the first decades of the twentieth century about the costs and distribution of medical care led to one of the landmarks in the development of medical policy: The Committee of the Costs of Medical Care (CCMC).¹³ While professional medical care had been costly and beyond the reach of many well before the 1920s, the most burdensome financial implication of disease had shifted. Whereas the economic losses individuals suffered had previously resulted from the wages they lost while recovering from sickness, the cost of purchasing medical products and services began to far outweigh the money patients lost from not receiving their normal wages.¹⁴ As the American middle class grew, the costliness of professional medicine to this increasingly affluent group of citizens, a larger portion of population than in previous decades, brought attention to health as a cost problem to both individuals and society.

13. Paul Starr, *The Social Transformation of American Medicine; The Rise of a Sovereign Profession and the Making of a Vast Industry* (United States: Basic Books, 1982), 261-266.

14. *Ibid.*, 66-71.

Early efforts to understand the economics of disease occurred in an intellectual context unlike that of the 1960s and the political debates surrounding Medicare. As was especially the case in the United States before the New Deal, the early intellectual framework was largely removed from the politics of the welfare state and the professional economists who would come to define the post-1965 research and political agenda. Although some of the key figures in social medicine did not receive their academic appointments until the 1940s, academics and advocates who would later be associated with this intellectual tradition played key roles in the development of the economic understanding of health that would be challenged in the 1960s.¹⁵ Social medicine, a term in use since the nineteenth century, represented a diverse intellectual tradition in both Europe and the Americas, which frequently identified its origins in the writings of German scientist and reformer Rudolph Virchow and the belief that medicine should be a social science oriented towards social improvement and the amelioration of poverty.¹⁶ The aim of the Institute of Human Relations at Yale University, for example, was to integrate medicine into the study of social inequalities to better train physicians and make them, according to the physician and Dean of the Yale School of Medicine Milton Winternitz, “clinical sociologists.”¹⁷ Despite variations among particular national traditions, social medicine emphasized the socioeconomic origins of illness and the possibility of employing medicine as a social science to alleviate

15. Dorothy Porter and Roy Porter, “What Was Social Medicine? An Historiographical Essay,” *Journal of Historical Sociology* 1, no. 1 (March 1988): 90.

16. For a collection of essays on social medicine, see: NMP King, RP Strauss, HR Churchill, and SE Estroff, GE Henderson, et al, editors, *Patients, Doctors and Illness. Volume I: The Social Medicine Reader* (Durham: Duke University Press, 2005).

17. Dorothy Porter, “How did Social Medicine Evolve and Where is it Heading?” *PLOS Medicine* 3, no. 10 (October 2006): 1.

suffering.¹⁸

Undeterred by the increasing costliness of healthcare to society as a whole, health spending by both the US federal government and private organizations increased quickly in the decades following World War II. The average net profit from medical practice rose from just over \$8,000 in 1945 to \$32,000 in 1969, resulting in an annual increase in physician income of 5.9% during a time period when the consumer price index rose at an annual rate of 2.8%.¹⁹ “The post-war economic expansion,” according to Paul Starr, “meant that private doctors had all the business they could handle.”²⁰ Hospital construction also received unprecedented investment in the form of federal funding. In 1947 the Commission on Hospital Care, a private committee made up of members of industry and think tanks, recommended a massive program that would increase the number of hospital beds in the US by 40% at a capital investment of 1.8 billion dollars.²¹ Despite the large initial investment and annual operating cost, the benefits were assumed to be too obvious to merit empirical research let alone compare to investments in other fields.²²

While Congress expressed a general preference for increasing total health expenditures, believing medical care to be a popular and worthwhile social investment, many researchers began to doubt the investment was worth the return it would yield.²³ By the late-1950s even the

18. Ibid.

19. Starr, *The Social Transformation*, 354.

20. Ibid.

21. Starr, *The Social Transformation*, 349.

22. Ibid.

23. For a discussion of public investment in healthcare see: Starr, *The Social*

1946 Hospital Construction and Survey Act (Hill-Burton Act), a cornerstone of American health policy that provided funding for hospital construction, was increasingly treated with skepticism. The physician and researcher Milton Roemer's analysis of the relationship between the availability of hospital beds and patient care questioned the post-war policy of hospital construction and put the legacy of the Hill-Burton Act in serious doubt.²⁴ The Hill-Burton Act was amended in 1955 not only to provide funds for hospital construction, but also to support research on hospital administration and finance. The advent of expensive new procedures made treatment more costly just as medical care became available to a larger portion of the population as a result of the expansion of the number of insured under Medicare and Medicaid. Unlike the privately funded CCMC, publically funded researchers at the US Public Health Service and universities throughout the United States began investigating more rigorously what contributed to increased spending and how to allocate funds appropriately. Although similar concern is evident in the CCMC reports of nearly forty years prior, research in the 1960s was dominated by the emergence of a new academic discipline, health economics, and the dynamics created by an increase in the public contribution to total health spending. While the problem of cost was not new in the 1960s, the emergence of a specialized and quantitatively trained group of economists who both employed recently developed techniques in economics and advocated for their independence as an academic discipline changed both the form and content of healthcare debates and produced a vast and quickly changing body of knowledge.²⁵

Transformation, 335-378.

24. Milton Roemer and M. Shain, "Hospital Costs Relate to the Supply of Beds," *Modern Hospital* 59, no. 4 (April 1959): 71-73.

25. A notable exception to the neglect of healthcare by academic economists: Milton Friedman and Simon Kuznets, *Income from Independent Professional Practice* (New York: National Bureau of Economic Research, 1945).

The first journal dedicated to the economics of health, *Public Health Economics* demonstrated the discipline's base in public health departments and government. Founded by Nathan Sinai in 1944 at the University of Michigan, *Public Health Economics* published researchers such as Selma Mushkin, who first defined health economics in 1958 and was a committed social reformer who held positions in the U.S. Public Health Service (USPHS) and the Social Security Administration.²⁶ In 1962 the U.S. Public Health Service published the first volume of the Health Economics Series, which by the authors' own admission demonstrated that "knowledge of this single item of expenditure is incomplete, scattered, and fragmented."²⁷ *Public Health Economics* was likewise intellectually fragmented and was largely limited to publishing paragraph-length news stories that summarized research published in trade journals and reporting on recent legislative debates in the U.S. Congress. Compared to the *American Economic Review* and other economic journals, *Public Health Economics* was more journalistic than analytical in its approach to the economics of health.

By the early 1960s the intellectual foundation of health economics had shifted away from social medicine and towards a new generation of professionally trained, more quantitatively oriented economists. In the 1950s a revolution in the conceptualization of professional economics gathered momentum as econometrics and quantitative methods began to change the orientation of the field much like Keynesianism had in the 1930s and 1940s.²⁸ The origins of the

26. Selma Mushkin, "Towards a Definition of Health Economics," *Public Health Reports* 73, no. 9 (September, 1958): 785-793.

27. U.S. Public Health Service, Health Economics Branch, *Health Care Financing and Utilization. Source Book of Data Through 1961* (Washington, DC: US Government Printing Office, 1962), V.

28. William J. Barber, "Postwar Changes in American Graduate Economics," in *The Post-1945 Internationalization of Economics*, ed. AW Coats (USA: Duke University Press,

“econometric revolution” had roots in the formation of the Econometrics Society and the establishment of the Cowles Commission in the 1930s, but had not developed an institutional affiliation or lasting relationship to economics at large until after the Second World War.²⁹ The Cowles Commission, as its motto ‘theory and measurement’ indicated, was dedicated to linking economic theory to mathematical as well as statistical practice and counted Kenneth Arrow as one of its members.³⁰

Econometrics, as well as the training in the prerequisite advanced mathematical techniques, came to have a larger impact on the transformation of graduate level studies than Keynesianism had as the number of PhD graduates expanded.³¹ Nonetheless, the initial impact of this revolution was somewhat muted in the immediate postwar years by the relatively small number graduates and the dominant role played by the four largest producers of economics PhDs. The four largest producers of PhD graduates (Harvard, Columbia, Chicago and Wisconsin) accounted for approximately 39% of national output.³² At the same time, the forty-four departments that graduated fewer than twenty doctorates between 1946 and 1951 collectively totaled only four more degree recipients than Harvard, which was by far the largest economics faculty.³³

In the late 1950s reformers such as the physician Milton Roemer published landmark

1997), 12-28.

29. Barber, “Postwar Changers,” 19.

30. Carl F. Christ, "The Cowles Commission Contributions to Econometrics at Chicago: 1939–1955," *Journal of Economic Literature* 32, no. 1 (1994): 30–59.

31. Barber, “Postwar Changers,” 19.

32. *Ibid.*, 17.

33. *Ibid.*

studies that would influence policy and research debates over the next two decades.³⁴ However, many interested in health economics increasingly published in economic journals and cited economist Kenneth Arrow's 1963 article in the *American Economic Review*, "Uncertainty and the Welfare Economics of Medical Care," as the founding moment of the new discipline.³⁵ Discontinuity between social medicine and professional health economics involved not only a preference for quantitative methods, but also a change away from the methods and theoretical orientation of actuarial researchers Louis Dublin and Alfred Lotka that had guided early and mid-century research.³⁶

Public Health Economics in the 1950s

Before this econometric revolution had been fully incorporated into the training of economists, or the large increase in the number of economics students studying healthcare, physicians and public health researchers incorporated the study of the economics of health within a different specialist discourse focused on public health administration and international health. The jump in economics enrollment of the mid 1960s was preceded by a similar upswing of interest in the economic issues of health documented by a large number of professional publications dating from around 1950. Unlike the health economics as performed by economists, this mid-century tradition largely situated itself in relation to the tradition of social medicine dating back to the mid-nineteenth century.

34. Roemer, "Hospital Costs Relate to the Supply of Beds," 1959.

35. Kenneth Arrow, "Uncertainty and the Welfare Economics of Medical Care," *American Economic Review* 53, no. 5 (December 1963): 941-973.

36. Louis Dublin, Alfred Lotka and Mortimer Spiegelman, *The Money Value of a Man* (New York: Ronald Press Company, 1946).

To better contextualize the intellectual developments detailed in the chapters of this dissertation, the following section of the introduction will provide an overview of how health was analyzed by public health researchers. By focusing on several key figures in public health in the decade prior to the founding of health economics, this section is intended to provide the reader with an appreciation of the diversity of views that existed within public health. Additionally, the analysis of the history of public health in the 1950s allows for a more comprehensive understanding of the significance of health economics and how it differed from the public health discipline that preceded it.

The first edition of John J. Hanlon's textbook *Principles of Public Health Administration* (1950) advanced the argument that economics should play a central role in public health research and administration and summarized the status of economic concerns in the discipline.³⁷ Seeking to provide a general introduction to the methods of public health, Hanlon believed that economic concerns could be incorporated within the social medicine paradigm. Hanlon, a physician with a Master's of Public Health, based his textbook on the argument that for the contemporary physician “No longer is it adequate merely that the health officer be a good diagnostician and therapist.”³⁸ Hanlon largely echoed the insistence of nineteenth century social medicine that social science was integral to the understanding of health. He began his book by asserting that “Should the physician, on the other hand, have a deep-seated wish to participate in the promotion of the well-being of the public in masse through the work of the increasing numbers of public health agencies,” he must learn more about the additional fields, “even the existence” of which

37. John Hanlon, *Principles of Public Health Administration* (Saint Louis: Mosby Company, 1950).

38. *Ibid.*, 9.

he was not aware during his medical education.³⁹ Dedicating his first chapter to “The Philosophy of Public Health,” Hanlon emphasized the direct continuity between social medicine and his work by citing Salomon Neumann's 1847 assertion that “medical science is intrinsically and essentially a social science.”⁴⁰ Hanlon viewed his work as part of this tradition of making medicine into social science, which he believed was only recently accepted by the medical community.

Mid-century physicians and public health researchers did not incorporate econometric techniques and economic theory into the social medicine paradigm and continue business as usual. Important to their conception of the role economics as a discipline and social phenomenon could play in health was the defense of the value of health in relation to individual and national economic performance. Many cautioned that life and health could not be measured in economic terms alone while others left it more implicit that health itself was inherently valuable. Formulations of health's ultimate value were by no means simple even within the group of researchers who were associated with social medicine.

Hanlon's analysis and advocacy of the social medicine tradition, while stressing the importance of economics and the social sciences in health, did nonetheless depart from the tradition of social medicine embraced by many of his contemporaries and predecessors who also addressed the economic value of health. Unlike many of his contemporaries, Hanlon denied health as a value separate from the economic or goal in and of its self. Henry Sigerist had similarly asserted that “Health is not a goal in itself” and emphasized how “The world had been

39. Ibid.

40. Ibid., 19.

deprived of endless spiritual values by the illness and premature death of creative individuals.”⁴¹ Hanlon also stressed that health alone was not a final goal and elaborated a utilitarian framework in which health had value only to the extent that it also fostered efficiency. Likewise, life itself had no inherent value separate from the economic spheres of human activity. Describing the state of public health philosophy in 1950, Hanlon noted a shift from the earlier sanitarian focus on the physical environment towards action and the understanding of the complexities of the social environment.⁴² Health, according to Hanlon, had undergone a re-evaluation and was no longer a self-sufficient goal: “Increasingly it is realized that health in itself has real value only as it promotes efficiency and happiness.”⁴³ The economic conditions of human life required to maintain this efficiency and happiness required a keen attention to fiscal issues since “A sound financial policy for public health services therefore must take into consideration not only humanitarian and social gains, but also the economic advantages derived therefrom.”⁴⁴ Citing and re-formulating ideas presented in Dublin’s and Lotka’s publications on the economic value of life, Hanlon did not caution or affirm that life or health should be considered an inherent good outside of economic issues, which was an approach unlike many of his social medicine contemporaries. Hanlon cited corroboration by the Committee on Health Problems and Education that health had value only to the extent that it promoted efficiency and happiness. He again repeated, “Of themselves, life and health are valueless, their true value depending upon the

41. Henry Sigerist, *Medicine and Human Welfare* (New Haven: Yale University Press, 1971), vii.

42. Hanlon, *Principles of Public Health Administration*, 22.

43. *Ibid.*

44. *Ibid.*, 60.

activities engaged in by virtue of them.”⁴⁵

Hanlon's utilitarian approach to health that valued it only in its relation to the promotion of efficiency nonetheless inverted the relationship between economics and health advocated by most his public health contemporaries. For C.E.A. Winslow and many others, economic growth and efficiency were neither sufficient nor independently valued apart from their ability to improve the health of a population. Winslow's eighty-nine-page monograph *The Cost of Sickness and the Price of Health*, published by the World Health Organization (WHO) in 1951, surveyed the importance of academic attempts to understand the economic importance of disease much like the British malariologist John Sinton had in his publications on the economic importance of malaria in India.⁴⁶ Unlike either Sinton or Hanlon, however, the organizing conviction of the book was the connection between disease and poverty. As a result of the perceived success of technical discussions at the Fourth World Health Assembly on the topic of “Education and training of medical and public-health personnel,” the Executive Board of the WHO had requested that similar technical discussions be held at future Health Assemblies.

Winslow's book was prepared for the opening conversation at the Fifth World Health Assembly on the topic of “the economic value of preventative medicine.”⁴⁷ In the book, Winslow placed health above the need of economic efficiency, but recognized the ability of economic arguments to attract support for health projects.⁴⁸ It was easier to find the economic support

45. Hanlon, *Principles of Public Health Administration*, 61.

46. C.E.A. Winslow, *The Cost of Sickness and the Price of Health* (Geneva: World Health Organization, 1951), 7.

47. Ibid.

48. Ibid.

necessary to maintain an effective health program if, according to Winslow, “it can be shown that such a programme will not only enrich the individual human life but will also bring to the community which invests in health tangible economic benefits.”⁴⁹ Unlike Hanlon, Winslow was careful to note that “The values of health are not to be measured in monetary terms alone” as there is a “moral, not merely a financial, issue involved.”⁵⁰ Winslow, like many of his contemporary and future colleagues, was eager to use economics to underscore the potential benefits of health programs while also hoping to avoid reducing the value of health to only monetary measurement. Health was still considered “one of the fundamental rights of every human being.”⁵¹

Public health researchers such as Winslow and Hanlon were not the only ones interested in the connection between health and its value to broader economy. Government reports and bureaucratic debates concerning the prospects of a national health insurance system employed much of the same language and logic. The 1948 publication *The Nation's Health, A Report to the President* described the importance of health in terms of the American national economy and presented a case in favor of national health insurance not unlike the more detailed academic analysis Winslow would describe in his WHO publication three years later.⁵² Like Winslow, *The Nation's Health* promoted the economic dimensions of better health, but was careful to repeatedly call attention to the ultimate existence of human suffering that resulted from disease and disability.

49. Ibid., 10.

50. Ibid.

51. Ibid.

52. Oscar R. Ewing, *The Nation's Health; A Report to the President* (Washington, DC: US Government Printing Office, 1948).

After considering the arguments for and against national health insurance, Ewing found himself “compelled to recommend it” since “After all, we are dealing with human lives and human suffering and anguish.”⁵³ The value of health was also held to be of critical value to the individual and the American political tradition. While the value to the nation of better health for individual Americans might not always be clear, from the standpoint of individual it was vital:

The value of health to the individual cannot be overestimated. Poor health can deprive people of most of the enjoyment of life and can wreck family finances. The dollar and cents value of being able to work at best capacity is, in itself, enormous. It is an opportunity that should be guaranteed every man.

No man really has that quality of economic opportunity which is the tradition of our American democracy if, through being unable to obtain the health or medical services he needs, he suffers ill health or disability.⁵⁴

Like many early twentieth malariologists who produced reports that purported to show that malaria control and eradication projects would produce economic benefits, many researchers and government analysts promoted health projects as “a paying proposition.”⁵⁵

The suggestion that money spent on improving health would result in better profits or savings had been an argument used by health advocates since the beginning of the century to attract support for their projects and attention to the importance of health. Much of this literature focused on the role of government and public investment in health with an often explicitly stated belief that such arguments were likely to be more persuasive and were useful mostly in their ability to attract attention to health. Health, however, was still ultimately thought to be inherently valuable apart from its relations to economic performance. Unlike his contemporaries at the

53. *Ibid.*, xi.

54. *Ibid.*, 2.

55. Hanlon, *Principles of Public Health Administration*, 490.

WHO or others working for the public health services of national governments, Hanlon emphasized the potential of industry to ameliorate health problems as well as its early recognition of the economic potential of disease prevention. “Health is everybody's business,” according to Hanlon, but many of the most important precedents in the understanding of illness as an economic phenomenon came from the activities of different industries.⁵⁶

Of the industries who recognized disease prevention could improve business profits and increase the economic productivity of society as a whole, commercial life insurance was the first to suggest the power of industry to improve the health of society. The concept of social insurance as a means to address the problems of the poor, according to Hanlon, had origins prior to the welfare state in the techniques and business of commercial life insurance.⁵⁷ Hanlon also credited twentieth century insurance companies as among the first to realize that investing in health could yield better profits for their own businesses. “Private enterprise has long recognized the soundness of expenditures for health and safety,” which was best exemplified by the Metropolitan Life Insurance Company spending \$20,000,000 between 1911 and 1925 for health education, early diagnosis and nursing services among its policyholders.⁵⁸ This money spent was estimated to have saved the company and its policyholders \$43,000,000, which Hanlon believed proved “This is good business.”⁵⁹ Hanlon was by no means an outsider in the public health profession with his belief that investment would yield economic savings in the long term or contribute to better industrial performance. However, he was somewhat different than many of

56. *Ibid.*, 497.

57. *Ibid.*, 479.

58. *Ibid.*, 73.

59. *Ibid.*

his contemporaries in his explicit call to industry to ameliorate so many of the problems. “Health is everybody's business,” Hanlon argued, and industry should address potential sources of economic loss, such as illness, for their own self interest if nothing else.⁶⁰ Reporting on the results of a large survey project conducted by the National Association of Manufacturers, Hanlon pointed out that only 5 companies of the 1,625 who returned questionnaires failed to report that they considered their health programs “a paying proposition.”⁶¹ Given the intense interest the public had developed in matters of personal and national health combined with the high esteem with which industry is held, Hanlon stipulated that industry “can do itself a financial favor and at the same time achieve greater public esteem and provide valuable community leadership.”⁶²

Publishing a WHO monograph in 1951, one year after Hanlon's textbook, Winslow represented the more numerous group of researchers who supported health as a right that had a value that preceded its economic impact. Despite his belief that economic growth should support health and not vice versa, Winslow advanced his discussion of the relation between poverty and disease much in the same terms Hanlon had. Like Hanlon, Winslow cited the second edition of *The Money Value of Man* and analyzed how health could be considered an investment and paying proposition. A recurrent theme in both the work of Winslow and his contemporaries was that childhood and child rearing were personal and social investments. Heavily influenced by the *Money Value of Man*, as most mid-century researchers were, Winslow detailed how childhood represented an unproductive time in a person's life when society had to invest considerable resources before the individual was able to become productive. Individuals who died before they

60. Ibid., 489.

61. Ibid., 490.

62. Ibid.

were able to become productive and work long enough to pay back this investment represented a net loss to society, while those who lived longer were a social benefit. “It would be reasonable to assume,” according to Winslow, “that a death at 15 or under represents a net economic loss to society; that a death at the age of 40 represents a net economic gain; and that a death at the age of 65 represents a net gain more than twice as great.”⁶³

Winslow was not alone in his use of childhood to illustrate the tangible relevance of investing in health to prevent unnecessary deaths. Both Hanlon and the malariologist George Macdonald also discussed the importance of childhood as an investment. In an unpublished 1950 report for the WHO titled “Economic Importance of Malaria in Africa,” Macdonald had found that between one-third and one half of children who attended school were suffering from malaria. Macdonald explained:

The meaning of these figures is that the population spends a major part of its effort in the fruitless production and partial up-bringing of children who do not survive to become 'economic units' who are said to be the important group of the population. Lynn Smith summed up part of the situation in the statement that, as a result, every breadwinner had more mouths to feed than is the case in areas where persons in the dependent ages do not make up such high proportions of the population.^{64 65}

Nations that were able to make a relatively small investment in a sound public health program to prevent such deaths, such as the US or Sweden, “reaped a rich harvest in life capital as a result.”⁶⁶ Public health programs represented an economical way of breaking the relationship

63. Winslow, *The Cost of Sickness*, 11.

64. George Macdonald, “The Economic Importance of Malaria in Africa,” unpublished report, 1950, WHO/Mal/60 and Afr/Mal/Conf/16, Archives of the World Health Organization, Geneva, Switzerland.

65. *Ibid.*

66. *Ibid.*

between poverty and disease and, in the case of premature death, of preventing the loss of potentially productive individuals.

Winslow frequently returned to the potential for industry to profit from investments in health projects. Citing Hanlon's textbook, Winslow also pointed to the Metropolitan Life Insurance Company investment of twenty million US dollars and its estimated savings. He also referenced a 1949 article by CEA Winslow that explained how disease is not only a problem for those who suffer from it, but “also a problem of the business men who must deal and trade with those people.”⁶⁷ Winslow also drew from Paul Russell's computation that reported to demonstrate how malaria resulted in a 'malaria tax' on imports to the United States. The effects of illness on industry were not limited to infectious disease. Mental illness, including “minor emotional maladjustments” were thought to be a significant drain on industrial efficacy, which was supported by numerous mid-century studies of worker health.⁶⁸

Incommensurable Values and the History of Cost-Benefit Analysis

Although the histories of quantification, statistics and risk in medicine and science have been studied by academics such as Harry Marks, Jeremy Greene, Theodore Porter, Ian Hacking and many others, the history of health economics and economic topics in healthcare in general have been neglected by historians of medicine and the health sciences.⁶⁹ Among academic

67. Winslow, *The Cost of Sickness*, 21-22.

68. *Ibid.*, 40-41.

69. Harry M. Marks, *The Progress of Experiment: Science and Therapeutic Reform in the United States, 1900-1990* (Cambridge: Cambridge University Press, 1998).

Jeremy Greene, *Prescribing By Numbers: Drugs and the Definition of Disease* (Baltimore: John Hopkins University Press, 2008).

historians, no work has focused on the history of health economics or has attempted a history of health economic thought as has often been pursued by economists. Likewise, no historical work has attempted an economic history of healthcare and medicine despite the well-developed economic subfield of economic history that has produced an extensive academic literature on topics ranging from the history of economic development to the economic history of agriculture.⁷⁰ Nonetheless, several articles and book length works have approached the topic of quantification, economics and cost-benefit analysis and have provided analyses that contextualize or provide conceptual frameworks relevant to the research detailed in this dissertation. Of those studies, Theodore Porter's *Trust in Numbers: The Pursuit of Objectivity in Science and Political Life* provides the most relevant historical background regarding the origins of cost-benefit analysis that informed much of the early and mid-twentieth century scholarship on the economics of disease and healthcare.⁷¹

Despite a topical focus on the management of water resources and economic analysis as pioneered by engineers in the nineteenth and twentieth centuries, Porter's work emphasized the historical importance of the development of an intellectual apparatus ostensibly designed to weigh costs and benefits, but which also focused on judging values and incommensurable qualities. Porter's work emphasized that cost-benefit analysis is not suppose to prioritize one value over another, but, more precisely, "It is a method rather than a doctrine, an apparatus of the

Ian Hacking, *The Taming of Chance* (Cambridge: Cambridge University Press, 1990).

70. Federico Giovanni, *Feeding the World: An Economic History of Agriculture, 1800-2000* (Princeton: Princeton University Press, 2008).

71. Theodore Porter, *Trust in Numbers: The Pursuit of Objectivity in Science and Political Life* (Princeton: Princeton University Press, 1996).

mind, a technique of thinking which helps its possessor to draw correct conclusions.”⁷² French engineers such as Claude-Louis Navier and Jules Dupuit were arguably the first to clearly articulate and quantitatively formulize methods of comparing costs and benefits in a systematic way that incorporated both economic considerations and physical characteristics. In the formative example of railroad construction, “physical parameters such as mechanical efficiency had to be made commensurable with the costs of construction, maintenance and loading and unloading.”⁷³ Who should pay and who should benefit from such large public expenditures made the issue of distributive justice paramount, which Navier sought to resolve by requiring fees be allocated to those who used the infrastructure projects the most.⁷⁴

Although French engineers in the nineteenth century may have been the first to apply cost-benefit techniques as a means of resolving the often politically contentious decision of whether or not to route a particular train or canal through one city or another, studies initially pursued, and then required, by the U.S. Army Corps of Engineers advanced the use of calculations that involved both economic and non-economic factors beyond an occasionally used practice. The requirement that public projects conduct a cost-benefit analysis, debated and legislated by the U.S. Congress in the Flood Control Acts of 1936 and 1939, established the precedent of examining expenditures according to rationalized economic principles.⁷⁵ With a large number of local governments requesting federal funding, both the U.S. Congress and the Army Corps of Engineers agreed regarding the necessity of establishing a means of verifying

72. J.M. Keynes, "Introduction to the Series," in D. H. Robertson, *Money* (New York: Harcourt, Brace and Company, 1922,) v–vi. Cited in Porter, *Trust in Numbers*, 187-188.

73. *Ibid.*, 59.

74. *Ibid.*, 60.

75. *Ibid.*, 155.

that projects receiving public funds were worthwhile. Such a calculation offered the possibility that not only would the projects be worthwhile, but also comparable among themselves, as the benefits and costs of a project in one region could be compared against those proposed in other areas.

Porter's analysis of the codification of cost-benefit analysis in American law contributes two key observations regarding the origins of such forms of economic analysis and their use. As previewed in the first pages of this introduction and explored in greater depth below, cost-benefit analysis and the economic analysis of water projects in general was first employed and developed by professionals practicing in the field, namely engineers, and not by professional economists. From early nineteenth century France to the 1939 Flood Control Act, civil engineers developed and employed economic techniques and arguments unrelated to academic economic discourse. It was not until the 1950s that the Army Corps of Engineers began hiring significant numbers of economists.⁷⁶ Secondly, even as economists increasingly published on the topic of water projects in the 1950s, the discourse was more of a bureaucratic than an academic one.⁷⁷ As detailed by Porter, cost-benefit analysis provided a way of structuring relationships between federal bureaucracies and provided a standardized way of communicating between funding bodies such as Congress and branches of the federal government directly involved in program implementation. Detailed but not explicitly analyzed by Porter, the cost-benefit analysis of water projects was also closely related to the growing role of the federal government in the funding and building of national transportation infrastructure and the political need to resolve funding disputes over access to resources. The building of flood control projects and waterways used for

76. *Ibid.*, 187.

77. *Ibid.*

transporting people and goods occurred in the context of a large expansion in the role of government spending in the US economy after the onset of the Great Depression that offers a compelling analogy to the history of health economics.

The history of the economic analysis of social programs and government spending, neglected by academic historians, did attract attention from mid-century researchers interested in the development of cost-benefit and other quantitative techniques.⁷⁸ Although lacking the social and historical context provided by Porter and typical of contemporary academic works on historical topics, they nonetheless represent the only useful secondary sources relevant to a dissertation examining the history of health economics. This body of secondary literature, which Porter drew upon heavily in his own analysis, offered a more detailed and technical analysis of the origins and functions of economic analysis among engineers in the nineteenth and twentieth centuries. In addition to its influence on Porter's study, this body of literature was cited by nearly every health economist in the early 1960s.

American researchers in the mid-twentieth century identified the foundations of such forms of economic analysis in the early nineteenth century United States. According to economist Lawrence Hines, the Secretary of the Treasury during the Thomas Jefferson administration, Albert Gallatin, explained in 1808 how the benefits of a transportation project could be measured and compared to the tolls collected in order to understand if the community involved truly benefited.⁷⁹ Gallatin's treatise may have detailed the general usefulness of applying a cost-benefit approach to public investment in transportation infrastructure but,

78. J. Hammond, *Benefit-Cost Analysis and Water Pollution Control* (Stanford: Stanford University Press, 1958).

79. Lawrence G. Hines, "Precursors to Benefit-Cost Analysis in Early United States Public Investment Projects." *Land Economics* 49, no. 3. (August 1973): 310.

according to Hines, “In spite of flashes of economic insight, it is a most uneven document.”⁸⁰ While the first seventeen pages consisted of well-reasoned arguments supporting national transportation funding, the second section of one hundred and eighty pages consisted of an unwieldy mix of responses to questionnaires, observations extolling the virtues of projects, and state acts to promote transportation.⁸¹ Far more empirically sound and detailed in their analyses were reports produced in the early nineteenth century on the economic consequences of canal projects such as the Chesapeake and Delaware Canal.⁸² The monetary benefits of the canal, still incomplete, were estimated to total \$77,616 in labor and a \$100,000 capital savings in wagons. The estimated labor savings of \$77,616 was thought to be directly attributable to the completion of the canal, but so were additional more difficult to enumerate benefits such as improved control over shipping and the resulting decreases in “pilfering, breakage and waste.”⁸³ Early reports on the benefits of transportation projects focused most on the ‘internal benefits,’ which were described as the direct improvements that resulted such as decreased transportation costs and income from tolls.⁸⁴ Little attempt was made to quantify other ‘external’ benefits, but the impact of these transportation projects on economic growth and income generation were not entirely neglected as part of the general argument in favor of investing public funds.⁸⁵ Robert Fulton and others cited the enhancement of land values in areas near public projects as an additional benefit

80. Hines, 311.

81. Ibid.

82. Ibid., 312.

83. Ibid.

84. Ibid., 313.

85. Ibid.

that would likely accrue as a result of improving transportation infrastructure. Summarizing his analysis, Hines argued “A review of the early 19th century reports of projects and proposals for internal improvements affords striking evidence of the development of economic concepts and analysis in response to pragmatic need.”⁸⁶ Providing a compelling parallel to the history of health economics as analyzed in this dissertation, Hines explained that economics in the early twentieth century was just beginning to emerge as an independent discipline in colleges and universities, leaving to engineers and supporters of transportation projects the task of investigating and demonstrating the economic benefits of their proposal.⁸⁷

Dissertation Outline

The four chapters of the dissertation are organized both thematically and chronologically to examine the research themes identified in the first portion of this introduction: the origins of the economic analysis of health in the first decades of the twentieth century, the professionalization of the field by economists, and the limits of this new professional discourse in public policy. Although the origins of public health economics and the tradition of social medicine in the first decades of the twentieth century will be referred to throughout the dissertation, the chapters will focus on the period between the start of the Malaria Eradication Program in 1955 and regulatory efforts in the mid 1970s to regulate the safety and economics of blood donation.

Constituting the first half of the dissertation, chapters 1 and 2 will examine the history of the WHO’s Malaria Eradication Program and attempts by both public health researchers and economists to understand the economic significance of malaria. Although these chapters examine

86. *Ibid.*, 317.

the history of economic thought as it concerned malaria and economic development, the focus on malaria stems not from the large impact of this particular disease on health, but from the central role of malaria in the history of health economics and the economic understanding of disease in general. The history of the Malaria Eradication Program, officially begun in 1955 and ended in 1969, provides a compelling case study of how the development of health economics as a professional discipline influenced debates on economic and humanitarian values in health during the transitional years when economists began to systematically apply recent developments in economics to medical services and health.

Beginning on the cusp of the founding of health economics as an economic discipline, the first chapter focuses on the first attempt of the World Health Organization to estimate the economic value of malaria eradication. After analyzing the history of the economic analysis of malaria and its origins in early twentieth century public health literature, the chapter ends with the report of Dr. Sonti Dakshinamurty, which sought to demonstrate the economic soundness of the goal of global eradication.

The author of the first textbook of social medicine in India, Dakshinamurty pursued a global study of the economic importance of malaria eradication to provide evidence for financial supporters that malaria eradication was a project with economic benefits that could both be quantified and shown to surpass the resources necessary to achieve eradication. Although Dakshinamurty would struggle to collect sufficient data and support to produce a convincing report, his study nonetheless demonstrated both the growing importance of such estimates as well as the longer-term tradition within public health of conducting economic studies. While economists from the 1960s onwards would trace their intellectual lineage to Arrow's 1963 article published in the *American Economic Review*, this portion of the dissertation will demonstrate the

87. Ibid.

heterodox origins of the economic study of health among public health and medical professionals.

Frustrated but undeterred by Dakshinamurthy's report, which was described by the Director of Malaria Unit as "amateurish," the W.H.O. commissioned the economist Michael Kaser to conduct a new study they hoped would be more convincing and professional. Titled "The Beginnings of Health Economics and the End of the Malaria Eradication Program," the second chapter analyzes the growing preference that economic topics be studied by economists. Focusing on the transition away from the economic analysis of health as a branch of public health and towards the beginnings of health economics as a new discipline, the chapter underscores both the continuity and divergence between how researchers in the 1960s analyzed the economics of malaria as compared to the public health research that preceded it. While both groups of researchers believed health could be improved with the application of additional resources and new public campaigns, the intellectual orientation of economists such as Burton Weisbrod questioned whether or not improved health and decreased mortality were sufficient justification. Recalling Herman Biggs' early twentieth-century assertion that public health is purchasable, Weisbrod began his landmark 1961 book *The Economics of Public Health* with the qualification "Better health is purchasable-at a price!" Surveying the new economic and demographic research published in the 1960s and 1970s that evaluated the impact of the Malaria Eradication Program, the second chapter details how economic analysis increasingly undermined support for eradication and contributed to the final withdrawal of funding in 1972.

The third chapter of the dissertation will continue to analyze how health economics diverged from the tradition of social medicine and departed from the intellectual foundations developed to understand malaria and infectious disease. As previewed in the first pages of this introduction, by the mid 1960s a consensus had developed among economists that their research

interests were sufficiently distinct from public health to justify meeting at an annual economic conference instead of the yearly APHA meeting. Despite the decision to distance themselves from public health both economists and public health researchers had reached a consensus that chronic illness, especially heart disease, was the most economically and medically urgent problem facing the American healthcare system. In this chapter analysis will focus on the professionalization of health economics in the mid 1960s and how economists agreed with public health researchers regarding the importance of chronic illness and yet pursued a different research program.

While the first half of the dissertation examined the history of an international health program focused on the eradication of an infectious disease and an international organization, chapter three examines how the professionalization of health economics occurred as part of a domestic, American research program. While recognizing the large impact of chronic illnesses, professional economists in the 1960s did not focus on the economics of particular diseases, but rather on the systems of health services that were emerging to treat cardiovascular disease and cancer. Examining foundational works such as Kenneth Arrow's 1963 article "Uncertainty and the Welfare Economics of Medical Care," referred to by contemporaries as the founding moment of health economics, this chapter seeks to clarify how economists came to see health as commodity in ways that differed from public health and social medicine. More devoted towards developing their field as an economic science, economists focused their research on the theoretical refinement of their field and the analysis of health services. Unlike public health researchers, economists viewed their work not only as a means of improving the health of populations, but also as a study of the post-industrial service economy.

Despite the growth of health economics as an academic discipline in the 1960s, social

medicine as a critical intellectual tradition was not entirely replaced by an economic worldview. The fourth chapter of the dissertation will investigate the persistence of public health research and social medicine through a study of the economics of blood in the 1970s. Although not professionally trained in economics or quantitative methods, the British researcher Richard Titmuss published an economic and statistical critique of the economic organization of blood donor systems in the United States that demonstrated the limitations of applying economic analysis to health topics. Intended as a critique of capitalism and market-based systems of healthcare, Titmuss demonstrated how organizing blood donation around the use of paid donors was both more dangerous and inefficient than economists had realized. Unlike the academic studies analyzed in previous chapters of this dissertation, Titmuss' work quickly caught the attention of both investigative journalists and the US government as the FDA rushed to implement reform.

In this chapter I will examine the blood transfusion and hepatitis controversy of the 1970s as an important episode in the history of health economics that demonstrated the continued relevance of public health and social medicine to public policy. Although his work was criticized by economists, the influence of Titmuss on public debate in the US demonstrated the clear political and popular appeal of the heterodox researchers who criticized pro-market and theoretically oriented economic accounts of the relationship between health and economics. Moreover, the significant public attention and the relatively rapid pace of reform to blood donation practices also demonstrated public limitations imposed on economic analysis when medical problems, such as disease transmission, coexisted with economic concerns. While health economics may have replaced public health research in regards to how health phenomena should be understood academically, it did not entirely replace medical concerns in the realm of

regulation, policy and law.

Read together, the four chapters of this dissertation provide an account of the evolving relationship between economics and public health as academic discourses as well as the evolving authority of economic methodology in the organization of healthcare. Research in the history of the health sciences has yet to critically examine the lasting influence of Hanlon, Winslow and others who first advocated for the economic study of disease. And yet, the attempt of these researchers to justify the economic benefits of public health programs would intertwine with the politics of the Cold War to initially secure funding for a global health program and ultimately contribute to the founding of a new discipline.

The historical lens this dissertation provides is not intended to oversimplify significant shifts in the history of the health sciences and reduce cultural and institutional developments to economic factors and economic discourse. On the contrary, the analysis offered in this dissertation suggests that similarly historic shifts in disciplinary and institutional values relating to the economics of health began in the 1960s that merit study alongside the wealth of recent scholarship on the histories of race, gender and culture as they relate to the history of medicine and global health. In light of recent developments in American healthcare policy and the near permanence of the economic organization of healthcare as a national political controversy and financial burden for patients, it stands to reason that contemporary debates would benefit from a more rigorous review of the historical actors and topics that first integrated economics and health. To better ascertain how the humanitarian and economic values that energized health professionals in the late 1950s have shifted and their effect on medicine, this dissertation begins with the analysis of the first global attempt to both eradicate a disease and understand the economic dynamics of health.

Chapter 1

Better Health is Purchasable: The World Health Organization's First Attempt to Estimate the Cost of Malaria and the Value of Eradication

The scientific discoveries and practical achievements of the past decade have stirred the imagination and roused our expectations for the future. They have also served to confirm that health is purchasable.¹

Marcolino Candau
Director-General, 1953-1973
World Health Organization

In May of 1955 the Eighth World Health Assembly (WHA) met in Mexico City and announced the first attempt to eradicate a disease globally. Adopted with forty-six votes in favor and only two against, resolution WHA 8.30 authorized the World Health Organization to begin the Malaria Eradication Program (MEP) and allowed the Director-General of the WHO, Dr. Marcolino Candau, to begin soliciting donations from WHO member states and philanthropic foundations. "The World Health Organization," delegates had decided, "should take the initiative, provide technical advice, and encourage research and coordination of resources in the implementation of a program having as its ultimate objective the world-wide eradication of malaria."²

Malaria had been considered a public health problem of international importance and an impediment to development since well before World War II, but had not previously attracted the

1. World Health Organization, *The Second Ten Years of the World Health Organization, 1958-1967* (Geneva: World Health Organization, 1968), IX.

2. World Health Organization, *Handbook of Resolutions and Decisions of the World Health Assembly and the Executive Board* (Geneva: World Health Organization), 13.

funding or political support necessary to coordinate a large-scale eradication effort.³ The Pan American Sanitary Conference had already adopted its own eradication plan in 1954, but the 1955 resolution nonetheless appeared to delineate a turning point in the administrative approach and reasoning applied to justify an internationalist health program. When the WHO formally took over coordinating activities in 1957 eradication programs had been initiated on every continent except Africa.⁴ The WHO was encouraged by the initial results of wartime DDT use by the US Army and successful post-war spraying campaigns in countries such as Venezuela as well as American financial support. As a result, the WHO began an ambitious effort in the 1950s to apply aggressive eradication strategy and international administrative techniques to a problem that had proved nearly intractable in many tropical areas.⁵ The WHO believed its global eradication program would help decrease malaria morbidity rates that had remained stubbornly high since the early twentieth century due to limited health infrastructure and a lack of funds in colonial and recently independent states to purchase insecticides.

The WHO's effort to maintain a global eradication program nonetheless faced an existential threat nearly as soon as the 1955 resolution was approved: large scale eradication required both funding and international political support that did not match the immediate resources of the WHO or the countries targeted by the MEP. Some public health researchers doubted the feasibility of eradication while others considered attempts to promote health projects

3. JA Najera, "Malaria and the Work of the WHO," *Bulletin of the World Health Organization* 67, no. 3 (1989): 229-243.

4. Leonard J. Bruce-Chwatt, "The Challenge of Malaria: Crossroads or Impasse?" in *Tropical Medicine from Romance to Reality, Proceedings of a Conference 12-14 December 1977*, ed. Clive Wood (London: Academic Press, 1978), 28.

5. S. Litsios, "Arnoldo Gabadon's Independent Path for Malaria Control and Public Health in the Tropics: A Lost 'Paradigm' for WHO," *Parassitologia* 40, no.1-2 (1998): 231-238.

as investments an unnecessary distraction from humanistic principles and the real human suffering caused by disease. Generous funding and enthusiastic support was initially provided by the United Nation's Children's Fund (UNICEF) and the United States. However, the global scale of the problem and the lack of financial support from countries other than the US threatened the long-term viability of the project. When WHO representatives met with the UNICEF's Executive Board in 1958 to request continued financial support and provide an update on the state of malaria therapeutics, they were asked to justify why the MEP should receive additional funding. What economic benefits, the Executive Board of UNICEF asked, would result from funding this particular program?

This chapter focuses on the history of the WHO's attempt to respond to this question and the tradition of public health economics that examined the damages caused by malaria. More specifically, it examines the attempt to re-frame malaria as an economic phenomenon and explain eradication as an investment in health that would yield financial returns. Intending to demonstrate the economic value of the MEP, the WHO initiated a study in the spring of 1958 to quantitatively prove the potential benefits of eradicating malaria. Quickly suggesting two candidates to lead a study that would help convince donors of the economic necessity of global malaria eradication, the WHO envisioned a straightforward, temporally short and simple task that would call attention to the global malaria problem and attract much needed funding. The potential benefits of eradication seemed numerous. "As such only very little is required," wrote one WHO analyst, "but this should click the issue and convince financiers."⁶ With little mention

6. Memorandum, file M2/180/4, Archives of the World Health Organization, World Health Organization, Geneva, Switzerland.

of the humanitarian basis of such an intervention the WHO embarked on its first attempt to quantitatively demonstrate the economic benefits of their proposed eradication program.

The history of malaria has been documented extensively and numerous historians have correctly pointed to Cold War politics and post-war economic development as root causes of US support for the WHO. And yet, relatively little research has focused on the long-term history of economic arguments used to understand malaria and their broader significance in the history of economic thought and the social sciences.^{7 8}This chapter begins with a brief survey of academic scholarship chronicling malaria eradication within the context of the Cold War. However, the ultimate purpose of this research project is not to better understand the history of eradication or international development, but to locate malaria as an important topic in the history of health economics and the economic understanding of disease in general. As the malariologist and director of the WHO Malaria Unit Leonard Bruce-Chwatt wrote:

Of all the human diseases malaria is the one that gave rise to the greatest number of attempts to quantify its direct and indirect adverse effects on socio-economic conditions.⁹

7. For general histories of malaria eradication and more in-depth analysis of the Cold War see: Marcos Cueto, *Cold War, Deadly Fevers: Malaria Eradication in Mexico, 1955-1979* (Baltimore: John Hopkins University Press, 2007); and Randall Packard, *The Making of a Tropical Disease; A Short History of Malaria* (Baltimore: John Hopkins University Press, 2007).

8. For four articles that specifically focus on malaria and development, see: Randall Packard, "Roll Back Malaria, Roll in Development? Reassessing the Economic Burden of Development," *Population and Development Review* 35, no. 1 (March 2009): 53-87; and Randall Packard, "Malaria Blocks Development' Revisited. The Role of Disease in the History of Agricultural Development in the Eastern and Northern Transvaal Lowveld, 1890-1960," *Journal of Southern African Studies* 27, no. 3 (September 2001): 591-612; and Randall Packard, "No Other Logical Choice': Global Malaria Eradication and the Politics of International Health in the Post-War Era," *Parassitologia* 40, no. 1-2(1998): 217-229; and Ira Klein, "Development and Death: Reinterpreting Malaria, Economics and Ecology in British India," *Indian Economic and Social History Review* 38, no. 2 (2001): 147-179.

9. Bruce-Chwatt, "The Challenge of Malaria," 39.

Rather than locating the origins of such analyses in post-war international health and development, I examine the influence of early public health economics on the first years of the MEP as part of a broader study of the history of health economics.

The WHO research project was novel in its global scope, but influential malariologists had long since proposed that malaria eradication was a potentially profitable enterprise. Malariologists working for colonial governments, such as John Sinton, had begun describing malaria as an impediment to economic development in the early twentieth century as they expanded on the scholarship initially developed in the US that viewed eradication as a good investment.¹⁰ Other malariologists, such as George Macdonald and Ronald Ross, primed public health researchers for such quantitative approaches by providing the important methodological precedent of applying mathematical models to the understanding of malaria epidemics and treatment.^{11 12} Industry, too, developed malaria as an economic disease as it addressed the problem of malaria sickening its workforce and sought to determine if prevention could increase the amount of labor available for productive purposes.

10. John Sinton's three-part study analyzed throughout this chapter: John Sinton, "What Malaria Costs India, Nationally, Socially and Economically," *Records of the Malaria Survey of India* 5 (September 1935): 223-264; and "What Malaria Costs India, Nationally, Socially and Economically-(Contd.)," *Records of the Malaria Survey of India* 5 (December 1935): 413-489; and "What Malaria Costs India, Nationally, Socially and Economically," *Records of the Malaria Survey of India* 6, (1936): 91-169.

11. For examples of George Macdonald's epidemiological research on malaria, see: George Macdonald and G. Davidson, "Dose and Cycle of Insecticide Applications in the Control of Malaria," *Bulletin of the World Health Organization* 15, no. 3,4,5 (1956): 369-387; George Macdonald, "Epidemiological Basis of Malaria Control," *Bulletin of the World Health Organization* 15, : (1956): 613-626; and George Macdonald, *The Epidemiology and Control of Malaria* (London: Oxford University Press, 1957).

12. For a general history of mathematical modeling and epidemics and an overview of Macdonald's contributions, see: Tamara Awerbuch, "Evolution of Mathematical Models of Epidemics," *Annals of the New York Academy of Sciences* 740, (December 1994): 232-241.

Beginning with research from the early twentieth century and ending with Dakshinamurty's report submitted to the WHO in 1958, this chapter is the first half of a two chapter study on the history of malaria as it relates to the history of health economics. This chapter examines the public health tradition of economic analysis that influenced early support for the MEP and was employed by Dakshinamurty and others hoping to attract funds for malaria eradication. The second chapter will detail the transition away from public health economics and the consequences of the professionalization of the economic study of health in the 1960s. Premised on the belief that public health is purchasable," the official motto of the New York Health Department in the early twentieth century, public health officials and researchers beginning with Hermann Biggs posited disease as a largely removable evil subject to economic analysis.

Through an examination of the WHO's first attempt to demonstrate the economic gains to be had from malaria eradication I chronicle the status of public health economics on the cusp of transformation by professional economists. Hoping to convince financiers that malaria eradication was a worthwhile investment, the WHO employed malariologist Dr. Sonti Dakshinamurty to translate "from deaths to dollars" the monetary value of eradication. Debate over the cost of poor health to the broader economy helped attract attention to the problem of financing international health projects, but also posed troubling questions to the WHO and supporters of eradication. Should health interventions be justified with economic or humanitarian principles? Are economists or public health researchers most qualified to assess the appropriate balance of economic and humanitarian concerns in health projects? What is the ultimate value of health? Although supporters of malaria eradication would continually assert that the value of health could never be measured in financial terms alone, by the early 1970s an increasing

number of researchers had relented and accepted that “Humanitarian arguments now require support from economic arguments.”¹³

Origins of the Eradication Project

Although the Eighth World Health Assembly approved the founding of the MEP by an overwhelming majority, the program nonetheless suffered from a lack of support and firm commitment to the long-term financing needed to pursue such an ambitious goal. The proposed appropriation of funds, complained a Liberian delegate, “was not even a drop in the ocean.”¹⁴ The vote count in favor of the program also belied the colonial politics present in 1955: Africa was represented by only three independent countries and the metropolitan governments of Belgium, France, Portugal, Spain and the United Kingdom.¹⁵ Even the colonial governments of the European colonial powers expressed frustration at not having been consulted before the resolution.¹⁶ The relationship between economic development and malaria was expressed early in plans that conspicuously left Africa on the periphery of WHO efforts. Africa, many of the early proponents of the MEP suggested, was not ready for eradication due to the lack of infrastructure and resources needed to coordinate such a complex campaign. The MEP approved in 1955 placed the WHO at the center of eradication efforts, but did not provide it with the authority to directly implement the program or stable sources of funding. An initial draft of the MEP, submitted by a group of 28 countries, proposed a role for the WHO as the directing and

13. Gladys Conly, “The Impact of Malaria on Economic Development. A Case Study,” *The American Journal of Tropical Medicine and Hygiene* 21, No. 5 (1972): 668.

14. PI Trigg and AV Kondrachine, “Malaria Control in the 1990s,” *Bulletin of the World Health Organization* 76, no. 1 (1998): 11.

15. *Ibid.*, 12.

16. *Ibid.*

coordinating authority, but the final resolution only provided a mandate to provide technical advice, coordinate resources and establish a Malaria Eradication Special Account to collect private and public contributions.

The impetus to demonstrate that economic gains would come from the MEP originated in the need to collect sufficient funds to pay for a costly international program, the scarcity of donors willing to contribute and the origin of the funding. Between 1950 and 1972 US contributions totaled approximately \$1.2 billion, which constituted over half of all total expenditures.¹⁷ The US ultimately provided the majority of funding, but initial planning at the World Health Assembly and estimates provided during US congressional hearings did not anticipate the extent to which the effort would rely on American financing.

According to the historian Marcos Cueto, three general themes were discussed during the 1957 congressional hearings on the funding of the MEP: the role of foreign aid, the social implications of eradication and the economic aspects of malaria eradication.¹⁸ Epidemiologist Fred Lowe Soper would later explain to UNICEF's Executive Board that malaria was ultimately an economic disease. Staff of the International Cooperation Administration (ICA) echoed Soper's view and testified that eradication made economic sense for all parties involved. For countries such as the US, the eradication campaign would free developed nations from a "malaria tax," which was estimated to be 5% of the price paid for imported goods from malarial countries and cost American importers \$300 million. In general, disease was thought to be a significant threat to American economic well-being since it harmed exporters. The State

17. Bruce-Chwatt, "The Challenge of Malaria," 219.

18. Cueto, *Cold War, Deadly Fevers*, 49-67.

Department's Director of International Trade offered a more direct appraisal: the US could not “sell unless others buy.” “Good health contributes to economic progress,” wrote a unit of the same trade department when considering the role of international health in economic development.¹⁹

In the 1950s the State Department attested that malaria represented an international economic problem for the United States. These proclamations were not novel formulations of the economic implications of disease. In 1948 George Marshall had declared at the Fourth International Congress on Tropical Medicine and Malaria in Washington, DC that it was vital to address diseases such as malaria, which held millions inefficient and weak and prevent the maximum production of foodstuffs.²⁰ Debate between supporters of population control programs and advocates of malaria eradication programs did not intensify until the mid 1960s. Still, the US State Department had already begun arguing against the neo-Malthusian notion that malaria eradication was allowing the poor and sickly to reproduce more quickly than they would otherwise be able. Rebutting a relationship between malaria and population growth that was debated in early twentieth century colonial India, the State Department argued were more economically productive and thus better able to avoid the problems associated with poverty and overpopulation.²¹

19 . Ibid., 20.

20. George C. Marshall, “Address of Welcome by the Honorable George C. Marshall, Secretary of State,” in *Proceedings of the Fourth International Congress on Tropical Medicine and Malaria*, ed. Division of International Congress, US Dept. of State (Washington, DC: Department of State, 1948), 1-4.

21. Cueto, *Cold Wars, Deadly Fevers*, 58.

The International Development Advisory Board (IDAB) and the ICA created subcommittees to explore how the US could support international health and development.²² These committees were established in response to a State Department request to come up with new projects that would help balance the recent expansion of Soviet aid to the developing world. Henry van Zile Hyde, head of the Technical Cooperation Administration within the US State Department, prepared a report that was key to the decision to contribute millions to the WHO's eradication campaign. Hyde would later explain that "They supported the WHO resolution calling for a global malaria eradication program which they saw as primarily humanitarian and had seized the opportunity to use IDAB as a way to mobilize US financial support."²³ Hyde's report, however, was not based on humanitarian principles but on economic and political analysis.²⁴

Researchers gave testimony before Congress on the topic of malaria eradication and caught the attention of the Eisenhower Administration. Paul Russell, among others, delivered affirmations of the economic importance of malaria, which were supported by the recent and historical interest of American corporations in tropical health. From 1950 onwards the *Industrial Tropical Health Conference*, sponsored by the Harvard School of Public Health, was convened on a yearly basis to bring together members of industry who believed health programs

22. Harry Cleaver, "Malaria and the Political Economy of Public Health," *International Journal of Health Services* 7, no. 4 (1977): 571.

23. J. Jackson, "Cognition and the Global Malaria Eradication Program," *Parassitologia* 40, no. 1-2 (1998): 199.

24. *Ibid.*, 199.

were in their interests.²⁵ Industrial delegates representing international corporations together with prominent academics, including Fred Soper, voted to form a permanent organization: the Industrial Council for Tropical Health, based at Harvard. Among the topics discussed at the conference were the economic necessity of industry addressing the problem of international health, as well as the need to protect their own employees from diseases impacting the populations around them. Another prominent consideration was the recognition that the social sciences were more important to public health than had previously been recognized.

Russell, Soper and other malariologists continued to stress the economic implications of their work to garner economic and political support. However, they were nonetheless against obscuring humanistic principles. Their focus remained dedicated to underscoring the ultimate value of human life and health behind promises of economic growth or other economic indicators. Describing the attitude of health professionals who did not entirely approve of the economic justifications, Russell explained that “to many it would appear that whether malaria eradication turns in an economic or social profit is beside the point, provided that it is the best method of combatting this debilitating disease which robs men, women and children of their fundamental right to health.”²⁶

I. Jackson describes and historicizes the common intellectual origins of early supporters of eradication in philanthropic foundations such as the Rockefeller Foundation and international

25. Harvard School of Public Health and The Industrial Council for Tropical Health, *Proceedings of the First Industrial Tropical Health Conference, Harvard School of Public Health, December 8-10, 1950 at Boston Massachusetts* (New York: Robert Kelly Publishing Corporation, 1951).

26. Paul Russell, “Presumed Effects of Malaria Eradication and Economic and Social Conditions,” 1958, file M2/180/5, Archive of the World Health Organization, Geneva, Switzerland.

organizations such as the League of Nations. Members of an epistemic community, according to Jackson, do not necessarily need to share a common method of promoting their beliefs, which demonstrates “a strong belief in the humanitarian imperative of their principles and proposed agendas.”²⁷ Supporters of the MEP certainly shared a common belief in the humanitarian benefits of health projects. On the other hand, the lack of participation by key community members, such as George Macdonald, suggests a more fractious scientific community existed in the mid 1950s than was described by Jackson. The shared assumptions of this particular community regarding the humanitarian principles of eradication may not have necessitated the continual affirmation of their particular ethical platform within the scientific literature they held in common. However, the promotion of their scientific and humanistic beliefs did require a campaign to promote their project within a variety of different bureaucracies and political communities. More nuanced in their private correspondences than in public testimonies, a genuine challenge nonetheless began to emerge as proponents of the campaign tried to balance economic arguments and the necessities of attracting sufficient funding with the humanitarian urgency of malaria as a disease.

Initial funding for the MEP and the request to demonstrate the economic benefits of the program came not from the US Congress, but from UNICEF. The Rockefeller Foundation and the World Bank were unconvinced of the feasibility of eradication and did not support the project, UNICEF provided enthusiastic support from an early point in the campaign and dedicated over half of its budget in some years to the effort.²⁸ Acting as a funding and support source for other organizations that directly planned and administered international programs,

27. Jackson, “Cognition and the Global Malaria Eradication Program,” 200.

28. Cueto, *Cold War, Deadly Fevers*, 36.

UNICEF evolved from a small office in UN headquarters to a financially strong and flexible organization with its own headquarters in New York.²⁹ Led by an American Executive Director, Maurice Tate, who had previously worked in business and international relief projects for the American Red Cross in World War Two, UNICEF received substantial donations from the United States. UNICEF even recruited Eleanor Roosevelt to act as one of the first lobbyists for humanitarian foreign aid in Congress. In 1956 alone the United States contributed \$14.5 million to UNICEF, which was almost three times what it had given to the WHO and PASB combined.³⁰

At a UNICEF Executive Board meeting in 1958, the Board informed WHO representatives that obtaining information on the economic value of malaria control and eradication would be helpful in determining whether or not they would provide additional resources. Director-General Candau detailed his impressions in a memorandum sent to WHO Headquarters in Geneva:

I feel that some members did respond sympathetically to UNICEF continuing to support the Malaria Eradication Programme in a substantial way. While no statement to that effect has been recorded, it was the feeling of some of the members, particularly Mr. Almeida who is also the Chairman of the Programme Committee, that information on the benefits deriving from control and eradication of malaria and the role it plays in the economic development of countries would be useful to the Board members when the Board comes to discuss its future policy of financial support to Malaria Eradication.³¹

WHO representatives did not commit themselves to providing such an estimate when directly asked by the UNICEF Chairman. Still, they did reply that a study could be conducted, which they would try to have available in time for the September 1958 meeting of the Board. Providing

29. *Ibid.*, 37.

30. Cueto, *Cold War, Deadly Fevers*, 37.

31. Marcolino Candau, memorandum, 28 March 1958, file M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

such a report to the UNICEF Executive Board, it was believed, was in the interests of the WHO as it would “strengthen the hands of some members in supporting the Malaria Eradication Programme.”³²

The prospect of demonstrating the economic basis of malaria eradication was not especially worrisome to Candau. Outlining the shape of the research project that would be carried out, Candau sent a memorandum to WHO indicating the data of data that would need to be collected:

The objective of this document is to highlight loses and benefits with simple, clear and convincing data from various countries and communities, like plantations and mines where such evaluation in man days or work days is done.³³

The WHO's successful advocacy of malaria eradication in the 1950s was in no small part made possible by the election of Candau as Director General two years before the Eighth World Health Association meeting in Mexico in 1955. Candau had previously worked on anti-malarial projects for the Rockefeller Foundation in Brazil and had graduated from John Hopkins University. He was also viewed favorably by the US State Department which judged his efforts as similar to American traditions of philanthropy and public health.³⁴ For Candau, proving his conviction of the economic benefits of eradication did not represent an epochal shift in public health philosophy. It would also not require a large-scale research project, but rather the modest appeasement of UNICEF and other potential donors, namely the US Congress. This view was largely shared by Emilio Pampana who, as Director of Malaria Eradication, conceived of the project primarily as a way to attract funding and public attention to malaria.

32. Ibid.

33. Marcolino Candau, memorandum, 28 March 1958, file M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

34. Cueto, *Cold War, Deadly Fevers*, 40-41.

WHO staff viewed the task of calculating the economic value of malaria eradication as important and relatively straightforward. Decades of public health scholarship that focused on estimating the economic losses due to malaria and research emphasizing the cost of sickness to societies and individuals was not an uncommon focus of social science research in the first half of the 1950s. This research proved to have an important influence on the initial formulation of the project and most often studied the impact of infectious disease on developing countries. In fact, several influential papers on the topic were conducted by the WHO in the 1950s.³⁵ Regardless of the precise topic or country being studied, the relation between sickness and society was framed in terms of a basic relationship between illness and lost potential: illness produced a burden that obstructed individual and national development. For the colonial and developing countries of the first half of the twentieth century, the negative consequences of disease, referred to as costs or losses, were thought to result from their impact on labor and the ability of workers to participate fully in the production of exportable goods.³⁶ The formulation of disease as a burden was analyzed in terms of economic development and the cost to society that resulted from slower economic growth was poverty. Without this burden, it was thought, societies would be economically wealthier. While implicit, the precise benefits to be had from removing this burden were not estimated.

35. For examples of WHO reports involving the economic analysis of malaria, see: George Macdonald, "The Economic Importance of Malaria in Africa," unpublished report, 1950, file WHO/Mal/60 and Afr/Mal/Conf/16; and DM Blair, "Report on Malaria Control in Southern Rhodesia," unpublished report, 1950, file M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

36. US Department of State, *Point Four: Cooperative Program for Aid in the Development of Economically Undeveloped Areas* (Washington, DC: US Department of State, 1950).

The project to estimate the economic value of eradication was not a matter of conducting novel research or a significant paradigm shift. But rather, it required the collection and systematization of this somewhat diffuse body of research: “Would it not be desirable, now that the eradication programme raises so much interest throughout the world, to invite someone to prepare a general review article on this question which would include all the evidence on the subject?”³⁷ The audience interested in the report, the writer of this memorandum suggested, would be wider than just the Executive Board of UNICEF. The report was “of considerable interest to public health workers, but may also be adapted and used very efficiently for public information purposes.”³⁸

The discussion of who would lead the WHO project revolved around two physicians and experienced mosquito researchers: Dr. Sonti Dakshinamurty and Dr. H. Floch.³⁹ Floch was suggested as the first candidate and Dakshinamurty as a secondary candidate should Floch decline. WHO correspondences in the spring of 1958 leading up to the start of the research project also highlighted a choice between two types of experts: a physician with training in malaria research or an economist. No economists were named as potential candidates, but researchers with training in economics or public health were both suggested as viable options. In the addendum added on to his account of the UNICEF Executive Board, the Assistant Director General suggested that an economist would perhaps be better for a long-term study, perhaps in a

37. Memorandum, 19 March 1958, file M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

38. Ibid.

39. For examples of Floch’s research publications, see: H. Floch, “Antimalarial campaign in French Guiana,” *Bulletin of the World Health Organization* 11, no. 4-5 (1954): 579; and H. Floch and P. Fauran, “Sensibilité aux insecticides chlorés des larves de *Culex fatigans* et d’*Anopheles aquasalis* en Guyane Française,” *Bulletin of the World Health Organization* 18, no. 4 (1958): 667-673.

country like Ethiopia “where areas untouched by malaria control will benefit from it and by no other economic improvement.”⁴⁰

Sonti Dakshinamurty, John Sinton and the First Estimates of the Value of Eradication

On June 12, 1958 the Indian physician and malariologist, Dr. Sonti Dakshinamurty, arrived in Geneva as a short-term consultant to the WHO. Working in the Division of Malaria Eradication, a unit directed by the soon to be retiring Emilio Pampana, he explained in a letter to the malariologist George Macdonald that he was “to write up a document on 'The Economic and Social Losses caused by malaria, and the advantages in this field which would be brought about by the eradication of the disease.’”⁴¹

At the time of his appointment Dakshinamurty had already accumulated several decades of experience as a malaria expert in both the Indian public health service and international organizations.⁴² Dakshinamurty began his career in international health working for a project organized by the Rockefeller Foundation (1930-1932) to coordinate health services in rural India while also working as 'Lecturer in Public Health' at Andhra Medical College (1931-1938). Working at the district and state levels, Dakshinamurty served as the first Director of Public Health (1954-1955) for the state of Andhra. In malaria specific work, Dakshinamurty was the Malaria Officer of the Madras state (1942-1945) and served at the Wynaad Malaria Field Station (1939-1940). It was international education and experience, however, that most directly led

40. Memorandum, 28 March 1958, file M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

41. Sonti Dakshinamurty to George Macdonald, file M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

42. Curriculum Vitae of Sonti Dakshinamurty, file M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

Dakshinamurty to the WHO project to estimate the value of malaria eradication. Appointed in 1940, Dakshinamurty worked until 1942 as the Deputy Director of the League of Nations Health Organization's Far Eastern Bureau in Singapore. In 1947 he completed a PhD in entomology at the London School of Hygiene and Tropical Medicine under the direction of PA Buxton. Between 1952 and 1957 Dakshinamurty worked on multiple WHO projects both in the field and in Geneva. In Iraq, he was team leader of a malaria control project from 1952-1953 and then worked as a consultant in Alexandria, Egypt on a malaria project from 1953 to 1954. As Professor of Preventative and Social Medicine at Andhra Medical College (1955-1962), Dakshinamurty returned to work for the WHO as a consultant to the Statistical Studies Division in Geneva where he collaborated on a report entitled “Statistical Methodology in Malaria Work.”⁴³ Throughout this period he also published numerous papers in the *Journal of Indian Malariology* as well as articles on preventative and social medicine in both Indian and international journals. Dakshinamurty was equally active in medical education and would later publish the first textbook in India on social medicine titled *Preventative and Social Medicine in India*.⁴⁴

A strong publication record, multiple advanced degrees, direct experience in malaria control and interest in international health contributed to Dakshinamurty's selection as the head of the WHO's research project. But so did the orientation of his work and vocal support for mid-century intellectual currents in social medicine. His emphasis on the role of the social sciences in medicine, pre-war training in public health, and self-identification as a social scientist placed his

43. Sonti Dakshinamurty, “Statistical Methodology in Malaria Work,” unpublished report, file MAL/174/HS/58, Archives of the World Health Organization, Geneva, Switzerland.

44. Sonti Dakshinamurty, *Introduction to Preventative and Social Medicine. An Epidemiological and Bio-Social Approach* (Kakinada, India: Educational Enterprises, 1962).

research squarely within the academic tradition of the founders and early staff of the WHO. Dakshinamurty's two-volume textbook focused on how to introduce social medicine to medical students throughout their basic education. The text was replete with affirmations of the role social science should play in medicine and outlined important historical developments in the field. Frequently citing the work of René Sand and other figures in early century social medicine, Dakshinamurty envisioned a future “where medical and para-medical personnel and social workers form a team of social scientists.”⁴⁵ ⁴⁶ Dakshinamurty began his textbook with the history of social medicine from Rudolf Virchow forward, “who promulgated the views that the health of the people was a matter of concern to society and, that society had an obligation to protect and ensure the health of its members.”⁴⁷ The text described the different emphases promulgated in different historical periods of intellectual development (hygiene, sanitation, public health, preventative medicine) and concluded that there is ultimately “a tradition of humanism throughout these areas, which is the very soul of medicine.”⁴⁸ Dakshinamurty's textbook provided a brief introduction to statistics in the appendix and academic publications from the period demonstrate the importance he accorded to epidemiology and statistics in the practice of medicine as a social science.

Dakshinamurty may have lacked any formal training in economics, but he was well versed in quantitative methods. Shortly after arriving in Geneva, Dakshinamurty began corresponding with public health and economic researchers whose methodologies he found

45. *Ibid.*, 13.

46. René Sand, *Advance to Social Medicine* (Great Britain: Staples Press Ltd, 1952). Cited in Dakshinamurty, 1961

47. Dakshinamurty, *Introduction to Preventative and Social Medicine*, 15

48. *Ibid.*, 9.

potentially useful for his own project. The noted malariologist George Macdonald, professor and director of the Ross Institute at the London School of Hygiene and Tropical Medicine, was among the first he contacted to solicit data and advice on pursuing a project devoted to the economics of malaria eradication.⁴⁹ Macdonald's quantitative work, which aimed to produce mathematical models to definitively demonstrate that malaria eradication was possible, was often cited as the intellectual justification for a global eradication program in the years leading up to the Eighth World Health assembly. However, Macdonald quickly responded with a less than enthusiastic letter. In this letter to Dakshinamurty, Macdonald insisted that economic considerations were at best a distraction from the problems posed by disease that deserved attention regardless of their financial impacts:

Dear Dr. Dakshinamurty,

Thank you for writing me and sending the note on The Economic and Social Losses caused by Malaria. I am sorry, however, that I cannot be very helpful in writing this up because I have always taken the attitude that economic and social matters should be considered secondary to the fact that individuals suffer from disease which in some cases can prove fatal. Disease deserves to be tackled on this account. Any other emphasis on writing up the economic and social losses is likely to distract attention from the more important matter. If any flaws can be found in the kind of economic and social losses this may be taken as good reason for being inactive over a disease which in fact deserves attention on its own account.

I do, however, consider that the economic and social losses are very considerable and hear with interest that you are going into it, but I have not collected any elaborate material. There is, no doubt, material in our library which, of course, we should be delighted to have you look at any time you wish.

Yours Sincerely,

G. Macdonald⁵⁰

49. Sonti Dakshinamurty to George Macdonald, 13 June 1958, file M2/180/4/, Archives of the World Health Organization, Geneva, Switzerland.

50. George Macdonald to Sonti Dakshinamurty, file M2/180/5, Archives of the World Health Organization, Geneva, Switzerland.

Macdonald's refusal to directly take part in the study did not originate from doubts he had regarding the feasibility of eradication, beliefs in the economic insignificance of malaria or support for the WHO. In fact, Macdonald had written a report for the WHO only eight years prior on the economic impact of malaria in Africa and was a regular member of the WHO's Expert Committee on Malaria.⁵¹ With decades of experience debating the scientific study and social implications of malaria, Macdonald was also likely aware of the difficulties of examining the economics of malaria eradication. His official report describing the First Malaria Conference in Equatorial Africa (1950), described the contentious problem of the economic analysis of malaria: "The amount of information relating to the economic importance of malaria in Africa is small and not always reliable. This lack of basic data is the main cause of the lack of unanimous consensus of opinion with regard to the appraisal of this most prevalent disease."⁵² The importance of malaria as an economic factor was not all that was questioned, as some attendees doubted whether it was a serious disease among Africans at all.

Similarly important to understanding the context of Macdonald's refusal is his strong support for the campaign and the urgency he attached to beginning it quickly. Despite the strong support from UNICEF and the US Congress, this was not a universally held position at the time. A report from the Institute of Current International Affairs in New York that made its way to the WHO soon after the conference described two schools of thought that disagreed on fundamental issues of how malaria should be addressed as a health problem:

51. George Macdonald, "The Economic Importance of Malaria in Africa."

52. World Health Organization, *First Malaria Conference in Equatorial Africa* (Geneva, World Health Organization, 1951).

One might be called the “conservative” or “pessimist,” or “defeatist”; and would espouse the local administration's view that a high value should be placed on acquired immunity... The opposed might be named “aggressive”, or “positive”, or “hurry-up” school. The political aspect of this cleavage was obvious: the proponents of 'hurry up to save the lives of native children' could claim humanistic, democratic motives and they would be able to asperse the more conservative approach as cold blooded-calling for hesitation when people were dying. The conservatives on the other hand, would have to stick to science, and leave ethics out except in terms of long-run betterment.⁵³

That Macdonald belonged to the “hurry-up” group that emphasized humanistic values serves to underscore the significance of his opposition to Dakshinamurty's project. Macdonald was unwilling to participate in an attempt to emphasize the economic benefits of eradication even though it may have added an increased sense of urgency to the MEP and potentially attracted additional funding. He cautioned that the failure of such a project to demonstrate the economic benefits of eradication could ultimately hamper the effort to control a disease that directly causes individual human suffering, Macdonald's reluctance to deviate from humanistic principles and scientific research illustrates the extent to which economic arguments, which had been applied to malaria since the early twentieth century and he too had developed in his 1950 WHO report, still troubled malariologists. Since only a fraction of the funding estimated to be necessary for eradication had actually been contributed by donors as of June 1958, Macdonald's doubts were not based on the firm standing of a campaign that had already won widespread financial support, but on a political calculation and his worry that malaria's status as a disease thought to be significant could be undermined if economic reports demonstrated quantitatively that its economic impact were not as profound as the human suffering it entailed.

53. Institute of Current International Affairs, “Malaria Conference in Africa,” unpublished report, file M2/180/5, Archives of the World Health Organization, Geneva, Switzerland.

Dakshinamurty's response to Macdonald recognized the importance of continued biological studies of malaria, which he noted "has preoccupied all field and laboratory studies for the past several decades," but reaffirmed the importance of social medicine and his prospective study.⁵⁴ He also specifically described the sort of data he needed and the project he planned to pursue. Comparing malaria to tuberculosis as a social disease, he countered Macdonald's claim that economics was a distraction, asserting "social pathology deserves consideration with quantitative studies of social factors of malaria."⁵⁵ Although malaria was not caused by low standards of life, it nonetheless maintained them. It was not explicitly identified as an economic disease in the same sense proposed by members of the WHO, UNICEF and others, Dakshinamurty nonetheless incorporated the poverty resulting from the malaria within the framework of mid-century social medicine and recognized the difficulties individuals, families and communities would have if continually burdened with the disease. The research he hoped Macdonald and the Ross Institute would help perform was to collect data from plantations and mines which, being primarily commercial undertakings, "would be careful to weigh the losses of work-days and man-days with their expenditure on malaria control."⁵⁶ Since neither Macdonald or the Ross Institute had "collected any elaborate material" on the subject, Dakshinamurty proposed going to London to do it himself, since "This is exactly what I am doing here with regard to other directions-digging into files and periodicals all the time!"⁵⁷

54. Sonti Dakshinamurty to George Macdonald, file M2/180/5, Archives of the World Health Organization, Geneva, Switzerland.

55. Ibid.

56. Ibid.

57. Ibid.

Dakshinamurty described his research as an update to John Sinton's 1935 and 1936 publications. However, Sinton was by no means the first to use the economic implications of malaria as a way to garner support for public health projects. Although the “economic loss” caused by malaria was noted by the Italian malariologist Angelo Celli in 1899 and an early attempt to quantify economic damages was published in 1909 by the American researcher L.O. Howard, it was John Sinton's series of articles in 1935 and 1936 that systematically collected and analyzed the growing literature focused on economic aspects of malaria.⁵⁸ The three articles, totaling nearly two hundred pages and comprehensively surveying hundreds of both published and unpublished reports, rigorously outlined the intellectual underpinnings of many of the economic arguments employed by various branches of the US government, the WHO and members of industry in the post-war period. Writing to Sir Gordon Covell while awaiting a response from Macdonald, Dakshinamurty explained, “Since Sinton's Malaria Bulletin on 'What Malaria Costs India,' the need for an up-to-date evaluation by quantitative studies has arisen.”⁵⁹ Sinton's motivation for publishing the three articles reflected, like Dakshinamurty, a desire to draw attention to malaria and his hope of increased financial commitment to the disease. “The necessity for drawing attention to the grave danger which malaria places in the way of progress of India,” Sinton wrote in the forward to the first of the three articles, “was one of the reasons for

58. For examples of this early twentieth century literature, see: Angelo Celli, *Malaria According to the New Researches*, trans. Joseph Eyre (London: Longmans, Green, and Co., 1900), 18; or: *La malaria secondo le nuove ricerche* (Roma: Società editrice Dante Alighieri, 1899); and LO Howard, *Economic Loss to the People of the United States through insect that Carry Disease, Bulletin of the U.S. Department of Agriculture Bureau of Entomology no. 78*, (Washington, DC: Government Printing Office, 1909).

59. Sonti Dakshinamurty to Sir Gordon, 27 June 1958, file M2/180/6, Archives of the World Health Organization, Geneva, Switzerland.

the compilation of the article.”⁶⁰ Much like the WHO in the late 1950s, Sinton also hoped the study would “prove of value to those workers who have to represent to the financial authorities the necessity, the urgency, and the economic importance of anti-malarial measures.”⁶¹

Although articles focused on India constituted the single largest body of scholarship, Sinton's work pointed to malaria control efforts in the United States in the first decades of the twentieth century as important precedents that were thought to be applicable to India. Both the first attempt to quantify, in dollars, the losses caused by malaria as well as the formulation of eradication as a profitable investment were developed in response to public health projects in the southern United States. In 1919, for example, Wickliffe Rose wrote in *The Journal of the American Medical Association* “for the average town in our Southern States having a thousand or more inhabitants and a reasonably high infection rate, malaria control by anti-mosquito measures is economically feasible; it is, in fact, a sound business proposition.”⁶² The profitable aspects of antimalarial measures were also emphasized in the work of Abraham Wallerstein Fuchs in 1922. Fuchs classifications would play an important part in economics debates of the 1960s and early 1970s over whether funds spent on eradication should be considered an investment or a continual expenditure. According to Fuchs:

The money spent for anti-malaria work is an investment, not an expenditure, and a profitable investment at that, is shown in following tabulation (Table VIII). Profits from 73 percent up to over 1,000 percent are reported.⁶³

60. Sinton, “What Malaria Costs India,” 224.

61. Ibid.

62. Wickliffe Rose, “Field Experiments in Malaria Control” *Journal of the American Medical Association* 73, no. 19 (1919): 1414-1420.

63. AW Fuchs, *Railroad Malaria Surveys 1922: The Missouri Pacific Railroad. Public Health Bulletin No. 135* (Washington, DC: Government Printing Office, 1923).

Interest in such calculations was not confined to public health researchers and Fuchs cited several public officials praising the return on their investment in malaria control. The mayor of Union City, Texas exclaimed the “money spent was the best investment we have made during my regime” while the treasurer of the Roanoke Cotton Mills Co. proclaimed that “The money spent here in anti-malaria work has paid the quickest and most enormous dividends I have ever seen from any investment.”⁶⁴ The Rockefeller Foundation, which would later emerge as a skeptic of the global eradication program, also supported the view that eradication was also economically preferable to treatment with medication, stating in a 1932 report that “in every instance it proved to be less expensive to abolish malaria than to treat it with quinine.”⁶⁵ Summarizing the work of railway and construction companies operating in colonial countries to limit financial losses, Sinton remarked that “These instances of the benefits of malaria control on railway show that, in many foreign countries, it has been realized that such work is economically sound and is a paying proposition.”⁶⁶ After a long review of articles published by American researchers on the economic reasoning that supported eradication in the United States, Sinton concluded the second of his three articles observing “Although these statement were made regarding conditions in the United States, how much more highly are they applicable to India, where malarial conditions are so much more serious?”⁶⁷

64. Ibid.

65. Rockefeller Foundation, *Annual Report 1932* (New York: Rockefeller Foundation, 1932), 72. <https://www.rockefellerfoundation.org/app/uploads/Annual-Report-1932.pdf>

66 Sinton, “What Malaria Costs India,” 109.

67. Ibid., 158.

In addition to summarizing and presenting American research to an international audience who may have been less familiar with quantitative economic approaches to malaria, Sinton's publications also demonstrated the significant extent to which the methodological concerns and topics of debate that preoccupied the WHO in the late 1950s were already well developed by the early 1930s. By the mid-1930s researchers promoting anti-malaria campaigns had reached a general consensus that economic losses caused by malaria consisted of both 'direct' and 'indirect' losses. The accurate calculation of both these categories, Sinton and others agreed, was needed to accurately estimate the true, total economic loss. The indirect costs, defined as lost labor, production and efficiency, were considered to far surpass the direct costs associated with medication, hospitalization and other more easily countable expenses.

Undeterred by Macdonald's skepticism, Dakshinamurty's correspondences with other researchers revealed the support Dakshinamurty found among officials in the national health services of developing countries. Writing to Dr. DK Viswanathan, the WHO Regional Malaria Advisor for South East Asia, Dakshinamurty repeated the ultimate goal of the project was to convince financiers “with simple, clear and convincing data from various countries or communities, like plantations and mines where such evaluation in man days or work days is done.”⁶⁸ He also requested that Viswanathan send more specific information, such as any data recorded before and after an anti-malaria project, which could be used to infer the impact of expenditures.

68. Sonti Dakshinamurty to DK Viswanathan, file M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

Richard Daggy, The Arabian American Oil Company and Support for Estimating the Economic Costs of Malaria

While Dakshinamurty's letters to officials around the world did not always receive a response, many did write back with detailed reports indicating their support for his mission along with research they had done on the similar topics. Among those responses was that of Richard Daggy who included a soon-to-be published article based on 11 years of research. The paper was from a portion of his dissertation leading to a Doctor of Public Health Degree from Harvard University and based on his work for the Arabian American Oil Company (Aramco). His dissertation focused on the problem of malaria transmission near oases, originating in the conviction that malaria represented a threat to the economic and industrial development of certain portions of the country.⁶⁹ "With the early development of the Saudi Arabian oil fields and the introduction of modern technology," which Daggy discussed in the introduction to the article, "came a desire for improvement in general health and medical care" as the previous King requested the assistance of the Arabian American Oil Company. Between the spring and fall of every year the work efficiency of Aramco employees was impaired by sickness and hospitalization. This had prompted the company to address the problem prior to the King's request and subsequently led to a joint Aramco-government DDT spraying campaign. Since a census had never been performed in the areas of Saudi Arabia under study, Daggy relied on malaria morbidity data taken from company hospitals since 1941 and company research. The estimates from this data, Daggy suggested, would likely be a conservative evaluation since oasis

69. Richard Daggy, "Malaria in Oases of Eastern Saudi Arabia," *American Journal of Tropical Medicine and Hygiene* 8, no. 2 (March 1959): 223-291.

dwelling populations would be more frequently exposed to mosquitos than employees living in company built communities.⁷⁰

Daggy also conducted a “traditional malaria survey” that involved collecting data every November from 1947 to 1957 from villages near the oases. Although not providing Dakshinamurty with specific calculations of the economic benefits of eradication, the report did demonstrate a dramatic decrease in annual malaria morbidity rates in Aramco’s Saudi Arabian employees between 1941 and 1957.⁷¹ In 1941 Aramco calculated a morbidity rate of 2,144.5 per 10,000 employees, midyear employee strength at 1,722 workers, and a total of 380 cases of malaria. The same measurements taken in 1957 calculated a morbidity of 42.1 per 10,000, midyear employee strength at 12,837 and a total of 54 cases. When the Saudi Arabian government declined to participate in a 1950 spraying program, Aramco nonetheless continued spraying on an experimental basis in the villages of al-Ajam and Safwa. These two villages, where “75 percent wettable powder was used for the first time,” continued their general decline in parasite rates, while untreated Qatif villages experienced a 56.7 percent increase.⁷² Between 1948 and 1954 DDT-based malaria control projects were conducted in Qatif villages only in odd numbered years due to the Saudi government’s inconsistent participation and funding, which allowed for a resurgence of the disease in years when it was not applied. The villages of the al-Hasa oasis, on the other hand, received DDT every year until 1955, when they and the Qatif villages were sprayed with dieldrin. In 1956, “For the first year on record, no malaria deaths in

70. Ibid., 234.

71. Ibid., 270.

72. Ibid., 272.

any population group were reported from Aramco hospitals.”⁷³ Daggy did not speculate on how the spraying campaigns impacted company or national productivity, but the resurgence of malaria in the mid-1950s suggested that the potential future hurdle posed by DDT resistance and the possibility that spraying campaigns that fell short of eradication may only have temporally limited benefits. Regardless, the before and after data provided Dakshinamurty with evidence of potential improvements in morbidity. That such a project was initiated and maintained by a private company also provided support for his argument that malaria eradication had commercial implications and could attract private funding.

Correspondences from researchers and reports such as Daggy’s also demonstrated the extent to which many advocates of the MEP glossed over the shortcomings of a spraying dependent approach and the stark change from the pre-war consensus that was critical of eradication campaigns in general. While influential malariologists such as Ross, Macdonald and R.B. Watson favored large-scale campaigns, the Malaria Commission of the League of Nations, together with the so-called Dutch and Italian schools “advocated locally designed programs of progressive, albeit slow, development of case management facilities and environmental sanitation to stimulate health and economic development, and diminish malaria morbidity and mortality.”⁷⁴ The physician and researcher Mark Boyd summarized the prevailing public health platform that “malaria control should not be a campaign, it should be a policy, a long term program.”⁷⁵ Working in the decade before DDT and the first suggestions that spraying

73. Ibid., 275.

74. Najera, “Malaria and the Work of the WHO,” 1.

75. Mark F Boyd, “Malaria: Retrospect and Prospect,” *American Journal of Tropical Hygiene* 19, (1939): 1-6.

campaigns could, at a minimum, drastically diminish the threat of malaria in some regions, the pre-war enthusiasm of Ross and others lacked a deceptively straightforward and inexpensive approach such as DDT spraying. In the much-changed conditions of the post-war era, proponents of large-scale campaigns were more easily able to frame their approach as the only logical solution. According to the historian Randall Packard, post-war proponents did not succeed only through the strength of their arguments at the time of the 1955 conference, but from a “no other logical choice” approach to malaria.⁷⁶ The initial success of workers employing DDT, evidence from a handful of countries that eradication was both technically and economically possible, and evidence that vector resistance to DDT was increasing allowed proponents to assert their opinions more strongly.⁷⁷ As more evidence of vector resistance accumulated, Candau and others argued that DDT would soon be lost as an effective means of controlling malaria and there was no other option than to quickly pursue a global campaign before it was lost as a means of combatting the disease.⁷⁸

These debates, “shaped by a growing vision of postwar development which viewed the application of scientifically based technology as the key to human development,” and the more mundane task of producing a report to please health financiers, precluded Dakshinamurty's report from considering larger concerns regarding the attainability of eradication by large scale spraying campaigns.⁷⁹ Moreover, by collecting only the contributions of researchers who were against neither the campaign strategy or the attempt to analyze the benefits of eradication in

76. Packard, “Malaria Blocks Development,” 217.

77. Ibid.

78. Ibid., 218.

79. Ibid.

economic terms, he limited the number of researchers who would cooperate with his project. Those working for private enterprises, such as Daggy, were enthusiastic about the prospect of ridding themselves and their employees of the burden of malaria, but could not provide the macroeconomic data Dakshinamurty needed. Daggy was especially optimistic about the prospects of eradication, but he provided research and reached conclusions that were ultimately of limited use. “Both industry and agriculture suffer when the disease is uncontrolled,” concluded Daggy, “and if these activities are to continue to prosper, adequate provision for malaria control must be made.”⁸⁰ Looking to his eleven years of experience and the data he had accumulated, Daggy concluded that vector resistance was not an insurmountable challenge and “With our local evidence of increased efficiency of dieldrin over DDT, it appears possible to aim for malaria eradication in our oases rather than only for malaria control.”⁸¹ In the example of malaria in Saudi Arabian oases, the jointly held belief that “Oasis malaria is man-made and is directly connected with the local practice of agriculture,” together with a renewed faith in science in the form of dieldrin, resulted in reports that were supportive of the WHO's campaign, but not especially helpful to the economic measurements Dakshinamurty was trying to make.⁸²

More helpful responses to his requests came from public health administrators and researchers from across the world who had done their own research on the costs of malaria. Reports regarding malaria in India, while providing him with data more directly helpful to his report, pointed out the challenges of drawing any economic conclusions from the data he received. A letter from the Hirakud Dam Project Administration on July 29, 1958 described the

80. Daggy, “Malaria in Oases,” 286.

81. *Ibid.*, 284.

82. *Ibid.*, 285.

conditions surrounding a rural area in India and the results of irrigation construction projects, but did not relate any qualitative or quantitative studies of the impact of recent anti-malaria projects in the area.⁸³ Although workers employed on the construction projects were not altogether free from malaria, the area “could not be termed endemic or hyper-endemic.” Mentioning statistical surveys not included with the two-page report to Dakshinamurty, the letter stated that appreciable agricultural production losses were not experienced in the villages near the dam although malaria did exist prior to construction. “On the other hand,” the report then went on to say, “With active Anti-Malarial measures taken by the Project Anti-Malaria Unit in these villages, the incidence of Malaria has been considerably reduced.” Careful to clarify that malaria was not a hindrance to dam construction and a meticulous survey would be needed before any conclusions regarding the losses caused by malaria could be reached, the author of the letter told Dakshinamurty that continued malaria control would not be expensive since the “per capita cost of expenditure incurred in the year 1957-1958 by the Anti-Malaria Organization of the Project is Rs. 2.22 and it was even higher in previous years.”⁸⁴ The Damodar Valley Corporation offered similar per capita estimates of the amount spent on eradication and explained that an increase in malaria transmission had not occurred as had been observed in other parts of India “due to proper anti-Malarial measures.”⁸⁵ A letter from the WHO Regional Office for South East Asia also pointed out the problem of shifting state and national boundaries in India, noting data

83. N.P. Sinha to Sonti Dakshinamurty, 14 August 1958, Archives of the World Health Organization, Geneva, Switzerland.

84. K.S.S. Murthy to Sonti Dakshinamurty, 31 July 1958, file M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

85. Damodar Valley Corporation to Sonti Dakshinamurty, file M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

Dakshinamurty requested from Bombay would not be useful since portions of it had recently become part of the Mysore.⁸⁶

More important than the data Dakshinamurty was able to glean from such letters was the support from regional and national officials to calculate the monetary losses associated with malaria. By the summer of 1958 officials in Bolivia, Costa Rica and Indonesia were estimating and debating various economic aspects of malaria. Prepared by the WHO Regional Office for South East Asia, an estimate of the economic losses caused by malaria was included in a letter sent from the Indonesian Minister of Health to the Prime Minister. According to this report, losses were estimated to be between 117 to 167 million US Dollars whereas “the total eradication costs over a period of 11 years (1959-1969) amount to 100 million US\$, one half of which will be the cost of the imported commodities and the other half local operational costs.”⁸⁷ The letter sent to the Prime Minister remarked “It is generally recognized that malaria is also the single most important drain on the economy of the country, and that were it eliminated we should experience an immediate improvement in productivity, and corresponding improvement in our socio-economic conditions.”⁸⁸ Explaining how malaria resulted in laborers who were less economically productive both during and after a bout of malaria, the letter claimed that workers would only be 50% productive in the two-month period after returning to work, which resulted in additional 'indirect' losses that had to be added to the 'direct' loss of wages that were not earned while the laborers were ill. At 2,160,000,000 Rpa. the indirect losses far outweighed the direct

86. WHO Regional Office for South East Asia to Sonti Dakshinamurty, file M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

87. Ibid.

88. Ibid.

loss of wages of 360,000,00. An additional problem to be considered was: “the cost to the nation of 120,000 deaths annually from malaria, principally among infants and children, rob us of a further staggering amount of potentially productive days. If the minimum number of years lost through premature death is calculated at 20 per death, one may estimate the annual cost to our country, from this cause, at Rpa 1,152,000,00.”⁸⁹ This sum, when added to lost wages and the Rpa 10,000,000 estimated to be necessary to care for the sick, created a situation in urgent need of attention since resistance to dieldrin might result in the loss of one of the effective means of eradication available. The creation of a National Malaria Eradication Board continued close collaboration with international organizations. As a result, a new financial plan was prepared. Reminding the Prime Minister how much malaria costs Indonesia on a yearly basis, he pointed out that it was a problem that, “once eradicated, will tax us no more.”⁹⁰

In response to his inquiries, the governments of Bolivia and Costa Rica provided Dakshinamurty with estimates of the social and economic effects of malaria and speculated on the potential benefits of eradication. Bolivia reported that approximately 64,000 people had suffered from malaria between 1951 and 1954, an estimate provided from the Department of River Statistics. Assuming an average worker would be impaired for 100 days, a loss of 1.6 million man-hours and a daily salary of 3,000 Bs, the country was thought to suffer from a yearly loss of 4,800,000,000, “which is fairly high for a country with a small population and poor economy.”⁹¹ The report did not quantify the losses suspected to result from people abandoning malarious but otherwise fertile agricultural land, but noted especially troubled regions. Malaria

89. Ibid.

90. Letter to Sonti Dakshinamurty, file M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

91. Ibid.

was so problematic in those areas, especially among children, that those who managed to survive were so few that they were called “CHUCCHU PUCHUS” in the local language, Quechua, which translated to “that which malaria left or malaria residue.” With the eradication of malaria, the letter concluded, “there would be greater agricultural productivity, an increase in population in zones currently depopulated, roads will be constructed for the removal of products, and as a consequence of the greater production, a better standard of life that would prompt an increase in the demand of manufactured products, which would begin a new stage of industrial activity in Bolivia that will improve its economy.”⁹²

Costa Rican officials, first noting the various natural resources and agricultural production that could be effected by malaria, also estimated the total number of cases in the country each year, but estimated monetary values based on hospitalization costs. Reports received from a hospital in San Jose, which was outside of the malarious zones, stated that the average stay for a patient being treated for malaria was 12 days and the cost of a bed per day was 17 colones. Over the past ten years the hospital estimated a cost of over 700,000 colones. Additionally, malaria was thought to cause between 120,000 and 180,000 non-productive workdays, which resulted in a total loss of between 960,000 and 1,440,000 colones at an average salary of 8 colones per day. These and similar calculations were unfortunately of limited use to Dakshinamurty since they provided him with sparse amounts of raw data and were based on assumptions that much of the academic literature he consulted did not consider to be empirically or theoretically founded. The actuarial-focused research of Louis Dublin and Alfred Lotka,

92. Ministerio de Higiene y Salubridad, Servicio Cooperativo Interamericano de Salud Publica, Servicio National de Erradicaion de Malaria, “Perdidas Economicas,” unpublished report, file M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

which Dakshinamurty had consulted and was widely read by public health researchers, considered calculations of losses based on aggregating the man-hours lost by individual workers to be an inaccurate way of calculating national losses since at least a portion of that labor would be performed by capable unemployed persons or by the surplus labor retained by the employer for the very reason of replacing those incapacitated due to illness.

Correspondences continued to arrive as Dakshinamurty tried to devise a mathematical way of demonstrating that funds contributed for the MEP would outweigh the costs. The challenge to create a quantitative means of expressing the gain was compounded by a large number of responses that had little information to report. A WHO malaria advisor for Africa explained that he “was trying to collect this very sort of information from different parts of the Region but, as you know, statistics and particularly economic losses in Africa are not easy to interpret.”⁹³ Dakshinamurty explained his project as a relatively straightforward project of converting, “from deaths to dollars,” the damages caused by malaria and the economic benefits that would result. In a letter to Dr. JA Concha y Venegas, Minister for the Division of Malariology in Columbia, he more explicitly outlined the computations he was attempting to make. Dakshinamurty asked him to share, in addition to whatever data he might have on the topic, techniques to calculate social and economic losses into the common denominator of dollars:

Further to the data, it will also be helpful if the techniques for computation of any of the losses of malaria to dollars is also given, to help us devise various methods of compilation and evaluation. In short, I wish to reduce both economic and social losses to the common denominator in money value in dollars. In particular, I would very much appreciate it if the techniques on the following losses could be briefly noted:

93. Letter to Sonti Dakshinamurty, file M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

1. Converting losses due to malaria sickness and death into dollars.
2. Converting agricultural production-land utilization and crop yields to dollars.
3. Commerce and Trade: Effects on imports and exports before and after eradication to dollars.
4. Medical Charges: amount spent on quinine and other anti-malarials and hospitalization- both government and private clinics- in terms of money values.
5. Administration and Financial Problems: losses in Revenue and increased expenditure: total budget of the country, health budget and malaria budget details will be helpful.⁹⁴

Although statistics and the mathematical description of health problems were increasingly utilized by public health researchers involved in the MEP, economic modeling and formal cost-benefit analysis had not yet been well developed by economists interested in medical care or public health. Theodore Porter's research on the history of quantification in the sciences and the development of cost-benefit documents the increasing complexity of techniques available to mid-century researchers.⁹⁵ Much of this research, roughly contemporaneous to the MEP, was focused on engineering and public works projects. Dakshinamurty was either unaware, or found it unnecessary, to consult this body of scholarship.⁹⁶

94. Sonti Dakshinamurty to Dr. JA Concha y Venegas, file M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

95. Theodore Porter, *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life* (Princeton: Princeton University Press, 1996).

96. For examples of cost-benefit analysis in the 1950s, see: RJ Hammond, *Benefit-Cost Analysis and Water-Pollution Control* (Stanford: Food Research Institute Stanford University, 1959); and Roland McKean, *Efficiency in Government through Systems Analysis with Emphasis on Water Resources* (New York: John Wiley and Sons, 1958).

The Money Value of a Man (1930): Louis I. Dublin, Alfred Lotka and Actuarial Science

As a public health researcher familiar with demography and the demographic implications of malaria control, Dakshinamurty consulted the actuarial-based investigations of Metropolitan Life Insurance researchers Louis I. Dublin, Alfred Lotka and Mortimer Spiegelman.⁹⁷ The work of the three researchers, especially the book *The Money Value of a Man* (1930), sought to refine and standardize estimates of the income an individual laborer could expect to earn over the course of his lifetime. Conducted in the commercial context of a large life insurance corporation, this body of research provided a replicable model to malaria researchers and others interested in estimating the losses resulting from illness that was lacking from public health scholarship.

The first edition of the book reviewed historical attempts to calculate the value of a man, discussed the mathematical economics behind such estimates and cautioned researchers pursuing similar studies. While the authors wrote the book as part of their work for a profitable business and based it on data collected by Metropolitan Life, they were nonetheless careful to repeatedly emphasize the limitations of their calculations to those aspects that were more readily quantifiable as well as the ultimate importance of humanitarian considerations. “Realizing the supreme significance of intangibles such as sentimental or esthetic value in human affairs,” Dublin and Lotka explained, “we shall refrain from dealing with such by methods wholly unadapted for their valuation.”⁹⁸ Dublin and Lotka were similarly careful when analyzing in detail the possible applications of their work to public health and the benefits of better health.

97. Louis Dublin and Alfred Lotka, *The Money Value of a Man* (New York: Ronald Press, 1930).

98. *Ibid.*, 3.

Advocating increased funding for public health, they emphasized that economic returns on health investments would be large, but the important result of all such projects “flows from humanitarian efforts- the diminution of human suffering.”⁹⁹ Dublin and Lotka began their project of explaining how human life “may be equated to a sum of money” through a historical overview of important economists who preceded them and served as models for their own work. They also noted the enthusiastic response their earlier publications received from public health advocates who wanted to demonstrate the economic benefits of health projects: “health officers and other workers in social fields, who at all times welcomed evidence of the costliness of disease and premature death, so as to demonstrate to the hard-headed businessmen in control local, state and federal government, that money spent on public hygiene is well invested. The figures which we have developed here have been used extensively as a foundation for health campaigns under the slogan “Health Work Pays.”¹⁰⁰

The theme of “Health Work Pays” was expanded in the 1946 edition of the book, with additional analysis of the “remunerative force of money invested in public health work” and the theme of “Public Health Work as an Investment.”¹⁰¹ Dublin and Lotka cited two intellectual precursors to their project of estimating the economic value of a man. The English epidemiologist and statistician William Farr, who in the nineteenth century “laid down the fundamental principles of the proper valuation of a man, among modern lines,” was credited with the “method that has been followed by us, with due regard to the modifications required by

99. Ibid., 135.

100. Ibid., v-vi.

101. Louis Dublin and Alfred Lotka, *The Money Value of a Man* (New York: The Ronald Press Company, 1946), 138-139.

modern American conditions.”¹⁰² The economist Irving Fisher, publicly well known as a supporter of public health projects and the first President of the American Eugenics society, was also mentioned as an important influence.¹⁰³ “Based on a sound scientific standpoint,” Dublin and Lotka believed that “nothing fundamental remains to be added to the method of these two actors” and claimed no originality in their own work.¹⁰⁴

In the chapter dedicated to tracing the intellectual history of their research, which was slightly expanded in the second edition of the book, Dublin and Lotka credited the English philosopher and scientist William Petty with the first modern attempt to value populations and people. Four decades later, health economists would still point to Petty as the forerunner of their own research.¹⁰⁵ Citing a passage where he explained his assumptions regarding the monetary worth of individuals, labor, land and private property, Petty calculated a sum of “80 to be the value of each Head of Man, Woman and Child, and of adult Persons twice as much; from whence we may learn to compute the loss we have sustained by the Plague, by the Slaughter of Men in War, and by sending them abroad into the Service of Foreign Princes.”¹⁰⁶ Dublin and Lotka presented an overview and critique of the various attempts others had made and devoted a special section at the end of their history to listing academic resources that estimated the costs of war. These resources were particularly influential on their actuarial tasks and others interested in

102. Dublin and Lotka, *The Money Value of a Man*, 1930, vii.

103. Victor R. Fuchs, “Health, Government and Irving Fisher,” *American Journal of Economics and Sociology* 64, no. 1 (Jan., 2005): 413.

104. Dublin and Lotka, *The Money Value of a Man*, 1930, 6.

105. Sir William Petty, *Political Arithmetick, or a Discourse Concerning the Extent and Value of Lands, Peoples, Buildings, etc.* (London: Robert Clavel, 1699).

106. *Ibid.*, 192.

the topic.¹⁰⁷ In the second edition of their book Dublin and Lotka provided a more elaborate history of the topic and suggested readers consult a bibliography prepared by the Carnegie Endowment for International Peace of published resources on the cost of war. They also suggested readers consult a seventy-five-page publication of the German Actuarial Society they considered to be “the most detailed historical survey on the subject of the value of a man.”¹⁰⁸

More directly relevant to the conceptualization and production of Dakshinamurty’s WHO report was Dublin and Lotka’s chapter “Disease and the Depreciation of the Economic Value of the Individual.”¹⁰⁹ Dublin and Lotka described the different ways disease adversely affected the economic value of an individual. They considered the chapter the most important because they believed the “most common source of depreciation of value was disease.”¹¹⁰ Both the 1930 and 1946 editions focused on illness as an impairment to individual wage earnings. However, the 1946 edition added to the analysis of income impairment the cost of medical services incurred by the ill.

The 1946 edition of *The Money Value of a Man*, which included Mortimer Spiegelman as a contributor, directly influenced Dakshinamurty’s attempt to describe malaria in economic terms

107. For examples of war related literature on cost, see: AE Crammond, “The Cost of War,” *Journal of the Royal Statistical Society* 78, no. 3 (May 1915): 389-400; and E.L. Bogart, *Direct and Indirect Costs of the Great War* (Oxford: Oxford University Press, 1919); and John Maurice Clark, *The Costs of the World War to the American People* (New Haven: Yale University Press, 1931).

108. For a bibliography of resources on calculating the money value of a human life as it pertains to the insurance industry, see: Ida Meyer, “Der Geldwert des Menschenlebens und seine Beziehungen zur Versicherung,” *Veröffentlichungen des deutschen Vereins für Versicherungswissenschaft* (Berlin: E.S. Mittler & Sohn, 1930).

109. Dublin and Lotka, *The Monday Value of a Man*, 1946, 112-131, or *The Money Value of a Man*, 1930, 102-122.

110. Dublin and Lotka, *The Monday Value of a Man*, 1946, 112.

and he wrote Spiegelman for advice on how to apply similar principles to his own project.¹¹¹ Spiegelman, a Harvard MBA graduate and Supervisor of Mathematical Research at Metropolitan Life, worked closely with Dublin and Lotka and collaborated with them to produce the second edition of their book. Referencing the work of Hanlon and Winslow, Dakshinamurty described the assumptions others had made when making similar calculations and his desire to improve on their methods. To verify that his approach was reasonable, he contacted Spiegelman and explained his methodology. Dakshinamurty explained how previous researchers had calculated costs “from wages lost, number of workers and the number of days lost.”¹¹² Contrary to this approach, he hoped to avoid such assumptions by using the United Nations Yearbook's estimate of the number of economically active individuals and the International Labor Organization's calculation of the number of workers who were actually employed. Multiplying this number by prevailing wage rates in different countries he hoped a more accurate estimate of losses could be calculated. To calculate the value lost as a result of deaths he planned to use either Hanlon or Winslow's methods. Hanlon's method, Dakshinamurty admitted, was based on estimating malaria losses in the United States. He asked Spiegelman whether or not the “figures for the USA can be made applicable to an agricultural industrial economy with considerable under- and unemployment.”¹¹³ Although Dakshinamurty seemed to be following Dublin and Lotka's often repeated warning that different techniques are necessary to estimate losses in different fields. And yet, he still struggled to understand how he could make use of the results and methods used

111. Sonti Dakshinamurty to Mortimer Spiegelman, file M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

112. Ibid.

113. Ibid.

in the context of malaria in the American South for a global study. His analysis of loss calculation explicitly questioned the adequacy of his approach to calculate total losses by multiplying average wage rates to the estimated number of hours lost to sickness was adequate.

In a portion of the chapter entitled “Disease and Depreciation” Dublin and Lotka analyzed the issue of how to calculate losses directly.¹¹⁴ An approach such as Dakshinamurty's, Dublin and Lotka argued, “leaves out of account the reserve of unemployed persons ready at any time to step in and take the place of sick persons.”¹¹⁵ Assuming that employers know they must employ supplementary employees in the event their workers get sick, reducing the number of hours lost to sickness, they reasoned, would only result in more unemployed since employers would not need to keep extra workers in reserve. In this case, illness requires employers to have a larger payroll than would be necessary. Adding up the lost man-hours and multiplying it by prevailing wages would, however, not necessarily accurately capture the cost of this higher payroll to industry. Dublin and Lotka's conclusion that any estimation of the economic loss due to illness is at best incomplete and their clear criticism of attempts to estimate losses through lost hours of labor explain the relative lack of refinement of such methods in their own works between the first and second editions of *The Money Value of a Man*. This explicit reluctance, however, did not prevent Dakshinamurty or others from continuing to use such direct calculations for their own purposes.

Progress on the development of suitable methods to calculate losses and the collection of relevant data did not go smoothly. Dakshinamurty continued to correspond with other

114. Dublin and Lotka, *The Money Value of a Man*, 1930, 120-121.

115. Sonti Dakshinamurty to Mortimer Spiegelman, file M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

researchers to seek advice on the results he was generating, but did not receive responses that substantiated his research. Prescott Stevens wrote in response to a letter he received from Dakshinamurty to tell him his data did not demonstrate any savings from malaria eradication: “Unfortunately, using the same cost figures you gave in table 1 multiplied by 5 (for 5 years) gives higher costs than savings.”¹¹⁶

Conclusion

Submitted to Director General Candau in August of 1958, Dakshinamurty’s report largely achieved the goal of the project he had communicated in letters to public health officials around the world: an update to Sinton’s series of articles that employed quantitative methods. The unpublished report likewise fulfilled the WHO’s original goal of completing an ostensibly straightforward and simple report to provide UNICEF with information regarding the economic benefits of the MEP.

Despite accomplishing what it had set out to do, the report was considered a disappointment by Bruce-Chwatt who described it as “amateurish” in a letter to the economist Burton Weisbrod.¹¹⁷ Nonetheless, Bruce-Chwatt and the WHO remained committed to pursuing the project. Eager to have his report read and the project continued, Dakshinamurty requested that his research be sent to Russell for comment, which Bruce-Chwatt agreed to do.¹¹⁸ Bruce-

116. Bruce-Chwatt to Sonti Dakshinamurty, 24 September 1958, file Archive M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

117. Leonard Bruce-Chwatt to Burton Weisbrod, file M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

118. Leonard Bruce-Chwatt to Sonti Dakshinamurty, 24 September 1958, file M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

Chwatt's correspondences with Dakshinamurty following the report's submittal clearly communicated the WHO's intention of pursuing the project further and communicated the WHO's new insistence that a professionally trained economist take-over where the study had left off. "I am told by Dr. Weeks," Bruce-Chwatt wrote to Dakshinamurty, "that your paper has been much appreciated. The powers-that-be thought that a similar paper written by a professional economist might be a valuable parallel to yours. That paper is now being prepared."¹¹⁹ Although interested in continuing the project, the WHO was nonetheless unconvinced that research done by its staff and outside agencies was sufficient:

As you know, we have attempted to obtain a series of such papers from a number of sources and have actually received some of them. We have come to the conclusion that none of them gives us a definite measurement of the economic benefit of malaria eradication. We feel today that the subject is so vast and complicated that we shall have to ask the United Nations to appoint a special team for a long-term socioeconomic study not only from the available files but in the field.¹²⁰

To Dakshinamurty's dismay, the WHO was increasingly concerned with the complexity of malaria as an economic phenomenon and convinced that only an economist could produce a report that was both adequate in its analysis and considered authoritative by others. The original plans for the project, as initially described by Candau in 1958, considered malariologists and economists equally qualified to produce the type of report requested by UNICEF. However, now the simple task of producing data that would convince financiers to support the MEP further was recognized as becoming increasingly complex. Dakshinamurty, although trained in quantitative methods, was excluded from all further participation in the project.

119. Bruce-Chwatt to Sonti Dakshinamurty, 24 September 1958, file M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

120. *Ibid.*

Although resistance from researchers such as Macdonald against the idea that such a study could and should be pursued further suggested a reluctance among public health professionals to employ economic arguments in order to justify health programs, the WHO's persistence indicated the need to not only pursue economic justifications for its work, but the perceived necessity of doing so by professionally trained economists. Following Dakshinamurty's report, Candau and the WHO were still motivated by the same desire as public health researchers dating back to the early twentieth century: to advocate for additional funding for public health. But they were increasingly convinced that only a professional economist was both qualified and credible in the eyes of those providing the financing. Just as Herman Biggs had argued in the early twentieth century that public health was purchasable, Candau remained convinced that decreased morbidity and mortality from malaria could be purchased through greater investment in antimalarial programs. But it was now a purchase that was best justified by professional economists. The advancement of the economic study of health as a social science was not an intended goal of the WHO's estimate of the economic value of malaria eradication. However, the report's conclusion that a professional study should only be done by an economist demonstrated a changing relationship between economics and public health science. This conclusion also revealed the WHO's willingness to cede expertise on economic matters to a different group of specialists they believed could help them find support for their public health goals. Dakshinamurty, who authored the first textbook on social medicine in India, may not have produced a report that was satisfactory at proving the economic value of eradication. And yet, he was successful in convincing the WHO of two things: the importance of leaving such future work to economists and the paramount importance of economic values in health programs.

Chapter 2

The Beginnings of Health Economics and the End of the Malaria Eradication Program

The well-being of a nation depends on its achievements in agriculture, education, industry, and public administration, as well as in traditional health fields. It is in a nation's interest to solve all its major problems within the limits of its natural resources, since national well-being can be assessed only by the level of a nation to its physical and psychological environment.¹

WHO Expert Committee on Malaria
15th Report, 1971

Interest in the economics of malaria eradication did not diminish after Dakshinamurty finished his report and returned to India. As indicated by Bruce-Chwatt's letter to Dakshinamurty, the WHO wasted little time in pursuing the project further and by September of 1958 it had already found an economist to write a report on the economic effects of malaria eradication. A report by an economist, the WHO hoped, would provide "a definite measurement of the economic benefit of malaria eradication" and establish the economic legitimacy of the project more fully.²

The WHO did not retain or publish a copy of the report, yet between Dakshinamurty's departure and the end of 1958 the economist Michael C. Kaser conducted his own study titled

1. WHO Expert Committee on Malaria. *Fifteenth Report. Technical Report Series No. 467* (Geneva: World Health Organization, 1971), 28.

2. Bruce-Chwatt to Dakshinamurty, WHO Archive M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

“Observations on the Likely Economic Efficiency of the Malaria Eradication Program.”³ Kaser, a graduate of the Cambridge Economic Tripos under the tutorship of AC Pigou and Gerald Shove, did not complete a PhD in economics but was at the time of the project a lecturer at the prestigious business school INSEAD in Fontainebleau, France. Following his work at the WHO he would serve as a Visiting Professor at the Graduate Institute of International Studies at the University of Geneva.

Beginning with the renewed effort to study the economic implications of malaria eradication in 1958 and ending with the final withdrawal of funding in 1972, this chapter continues to analyze the history of health economic thought as it developed regarding malaria. Whereas the first chapter focused on the long-term tradition of public health analysis that posited eradication as a program that would yield economic benefits, this chapter examines the transition of academic expertise from public health to health economics and the consequences for both health policy and the academic study of the economic implications of disease.

With a focus on the continuity and divergence between public health and health economics, this chapter explores the beginnings of fundamental analytical changes introduced by health economists in the 1960s as well as the persistence of intellectual trends that dated back to the early twentieth century. Unlike the analyses offered by John Sinton and Sonti Dakshinamurty, health economists sought to undermine many of the most basic assumptions employed by the scholars who preceded them and were not pre-disposed to supporting the MEP or additional investment in health programs. Beginning with the assumption that health was in many ways like any other commodity, health economists presented a fundamentally new

3. Michael C Kaser, “Observations on the Likely Economic Effect of the Malaria Eradication Programme” in Robin Barlow, *The Economic Effects of Malaria Eradication. Public Health Series No. 15* (Ann Arbor: University of Michigan, 1968), 145-167.

dilemma regarding the economic problem posed by disease. According to health economists, the central question facing society was not how best to purchase better health, but whether or not better health was a commodity worth purchasing. Inverting the relationship between demographic change and economic development presented in the first chapter of this dissertation, economists also argued that population growth would ultimately make countries poorer and employed recent demographic research to support their arguments.

Despite the criticisms of public health, health economists did not entirely break with either the scholarship that preceded them or its shortcomings. Economists may have based their estimates of the likely economic impact of malaria eradication on more sophisticated research from academic demography, but empirical economic data was as lacking in 1972 as it was in 1958. Economists adroitly examined the assumptions employed by public health researchers supporting the MEP, but few if any of the critiques represented original economic thinking regarding the relationship between health and economy or even economic development and malaria. Despite their claims to having undermined the economic arguments in favor of malaria eradication, a strong continuity persisted between public health and economics as economists continued to rely on basic actuarial methods developed by Louis Dublin and Alfred Lotka in the 1930s. By 1972 the economic assessment of health programs had nonetheless become both routine and accepted as a topic best suited to professional economists.

The Economic Efficiency of Malaria Eradication

Included in the appendix of Robin Barlow's 1968 book *The Economic Effects of Malaria Eradication*, Kaser's seventeen-page study was a more thorough attempt to present the argument in favor of eradication. Unlike Dakshinamurty, Sinton or others who uncritically reviewed the

malaria economic literature, Kaser agreed in principal that economic analysis supported the need to pursue eradication, but was dismissive of the data and arguments employed by previous attempts that ultimately always yielded the same conclusion. “It would not be facetious to say,” Kaser claimed, “that much of the literature on the economic incidence of malaria somewhat resembles the vicious cycle of transmission of the disease itself- a few bad statistics circulating from paper to paper.”⁴ Public health researchers were not exclusively to blame however, since “Partly this reflects the neglect of public health by economists and of economics by health administrators.”⁵

Despite the harsh criticism, there was very little to distinguish Kaser’s paper from Dakshinamurty’s ‘amateurish’ attempt or the numerous early twentieth century studies produced by non-economists. While perhaps producing a report that was stylistically more refined and similar to what could be found in an academic journal, Kaser’s research was largely a conceptual repeat of Dakshinamurty and did not go much beyond a review of already published academic literature. Like much of the previous literature, Kaser analyzed malaria in terms of ‘opportunity cost’ and concluded “the opportunity cost favors malaria eradication.”⁶ Although the argument that implementation of the MEP would cost only a very small fraction of the economic output of the countries involved was supported by more informed academic research regarding the average health expenditures of developing countries, the form of speculative cost-benefit analysis employed by Kaser did not substantially differ from the arguments made by Dakshinamurty. Whatever the impact on future economic growth, the per person cost of eradication was

4. Ibid., 147.

5. Ibid.

6. Ibid., 150.

presented as unquestionably low, especially when compared to what the equivalent amount of money could buy in material goods:

Thus the estimated annual cost of eradicating malaria per person protected in no area of the world exceeds 50 cents (and is, of course, required for only six years or so until eradication is complete) and may fall as low as a quarter of this in some malarial zones. 50 cents would purchase no more than, say, two metres of cheap cotton cloth.⁷

Having criticized the tendency of researchers to rely on estimates provided by others, Kaser nonetheless did exactly the same and referenced work by Emilio Pampana and Paul Russell on the large increase in the pool of available labor that would result from decreased morbidity.⁸ The economic benefits of the MEP, according to Kaser and most of the research that came before him, would mostly come from a larger number of laborers who would survive through adulthood and thus increase the amount the country could produce: “The extension of the labor force both in numbers and in work intensity is by far the most important effect of the eradication of malaria. Pampana and Russell (1955) estimate that possibly 2.5 million and Russell (1956) ‘over two million’ deaths occur as a result of malaria.”⁹ Kaser also reviewed the same ancillary benefits cited by researchers over the course of the twentieth century as further reasons to support the MEP: reduced school absenteeism and the availability of newly cultivatable land that had previously been rendered too dangerous by malaria.¹⁰

7. Ibid., 146.

8. Works referenced by Kaser: EJ Pampana and Paul Russell, “Malaria: A World Problem,” *Chronicle of the World Health Organization*, 9, no. 2-3 (1955): 31-100; and Paul Russell, “World-Wide Malaria Distribution, Prevalence and Control,” *American Journal of Tropical Medicine and Hygiene* 5, no. 6 (1956): 937-965.

9. Kaser, “Observations,” 154.

10. Ibid., 158-159.

Kaser's report largely reiterated much of the research that had been conducted before him and demonstrated the difficulties encountered even by experienced economists in attempting a comprehensive and convincing study that supported the MEP. On the one hand, Kaser presented compelling data on the dramatic decrease in malaria deaths in Ceylon (1939: 170.2 deaths per 100,000; 1.6 per deaths 100,000 in 1956) and a reduction of morbidity in general (2105 deaths per 100,000 in 1938, 980.6 deaths per 100,000 in 1956).¹¹ On the other hand, neither Kaser nor other researchers presented empirical data on the economics of malaria eradication. Kaser recognized the dearth of empirical data, but suggested that "the examples are perhaps too recent for such research to have been fruitful."¹² An experimental study in Ethiopia or elsewhere, discussed earlier in the year before Dakshinamurty began his study, was never pursued. The preliminary data Richard Daggy sent to the WHO documenting his experimental spraying campaigns, conducted as part of his doctoral research and work with the Arabian American Oil Company in Saudi Arabia, was never cited.

The WHO was not alone in their preference that a professional economist lead any future study of the economic benefits of malaria eradication. The International Cooperation Administration (ICA) and others indicated that public health officials and researchers should take a decidedly supporting role in future studies. Nathan Sinai at the University of Michigan School of Public Health had suggested that the health agencies of individual countries could conduct their own research projects, but the ICA believed that the "results would be suspect since we are all confident that malaria eradication will have a profound impact upon the social and economic

11. Ibid., 162.

12. Barlow, "The Economics Effects of Malaria Eradication," 149.

development of any malarious country.”¹³ The ICA’s Expert Panel on Malaria and economists within the agency also reviewed Sinai's proposal for a malaria study, which agreed with this position and affirmed that “Any objective study must be in the hands of economists with some guidance from the social scientist and public health person.”¹⁴

By the early 1960s academic debate over malaria economics had become concerned not only with determining whether or not the disease had a significant impact on development, but also on how best to go about measuring it. Although the orientation of research began to shift away from economics as performed by public health officials in favor of quantitative methods as conducted by professional economists, many of the studies published after the 1958 WHO project were carried out by public health experts and funded by the original supporters of the MEP. The Pan American Health Organization (PAHO), which had established regional eradication as a goal prior to the 1955 World Health Assembly, continued to play a central role as a source of funding for research and as an organizer of international conferences. At the Twelfth Directing Council Meeting of the PAHO, held in Panama in 1960, the Council recommended a formal study be made of the social and economic consequences of malaria eradication.¹⁵ Supplementing a \$95,000 grant given by the National Institutes of Health, the PAHO gave the Bureau of Public Health Economics of the University of Michigan an additional \$9,500 to finance Sinai and the University of Michigan’s three-year study of the economic

13. International Co-operation Administration to Dr. Nathan Sinai, 22 March 1960, file M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

14. Ibid.

15. WHO Archive M2/180/4, Letter from Dr. Bruce-Chwatt to AMM Payne, 6 August 1962, file M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

implications of malaria eradication.¹⁶ The second person to receive a PhD in public health in the United States, Sinai's work with the Committee on the Costs of Medical Care between 1927 and 1932 and research on health insurance demonstrated the significant extent to which economic matters were long the purview of public health researchers. Sinai's course on medical organization at the University of Michigan in 1934, "The Social and Economic Aspects of Public Health and Medicine," was the first of its kind at an American university. This came at a time when medical care and industrial organization were not considered concerns of the public health profession.¹⁷

Other researchers in public health departments continued to investigate the economic aspects of malaria eradication, but did so in consultation with economists and aware of the complexities of national economies and the difficulty involved in estimating losses due to illness. More aware of the limitations of previous studies of the subject and their own inability to adequately address economic topics, public health researchers expressed disappointment with the research that had already been performed and consulted more directly with economists. In a letter to the economist Burton Weisbrod, Leonard Bruce-Chwatt lamented the state of malaria research. Referring to Dakshinamurty's work, he complained that "The results of these, some rather amateurish, attempts were not convincing for a number of reasons... the problem of

16. Inter Office Memorandum from Dr. Oswaldo J. Da Silva, March 1961, file M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

17. Department of Medical Care Organization, University of Michigan School of Public Health, "Celebrating 50 Years of Teaching Medical Care Organization, 10 Years On Job/On Campus Master's Program, 1984."

http://deepblue.lib.umich.edu/bitstream/handle/2027.42/89591/Dept_Medical_Care_Organization-50_Years.pdf?sequence=1

quantification of disease is almost insuperable.”¹⁸ Other researchers did not object to the standard of previous research as much as they doubted their suitability to study the subject. Convinced of the economic impact of malaria and the merits of demonstrating the impact disease had on national economies, AM Payne was nonetheless reluctant to breach the issue himself even though he considered it a means of counteracting what he considered the influence of international bankers and the tendency to place economic development before international health. Invited to address the opening session of the 90th Annual Meeting of the American Public Health Association on the topic of “Disease Eradication as an Economic Factor,” Payne explained to Candau:

I have accepted this invitation with some diffidence because I don't believe that I am the best choice. However, this will give me an opportunity for putting forward the views and experience of the World Health Organization on this vital subject.

The impression I have over here is that the economic views of the international bankers are tending to have undue influence on the proportion of economic resources which are being applied to international health programs. There seems to me a tendency to lean more and more to the idea that large scale eradication programs must wait on economic development, but there seems to be inadequate realization that in many instances economic development is not possible until some progress has been made toward controlling the major health programs. I would hope this could be used as an opportunity to restore the balance somewhat as far as this country is concerned.... I write direct to you rather than to individual directors or chief medical officers because I think it is clear that this subject has to be developed from a comprehensive, over-all viewpoint rather than oriented to any specific disease. That of course does not mean that malaria eradication should not take the prime place.¹⁹

18. Leonard Bruce-Chwatt to Burton Weisbrod, 28 June 1962, file M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

19. AM Payne to Marcolino Candau, 24 May 1962, file M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

Bruce-Chwatt, who had read the correspondences between Candau and Payne, wrote to Payne and explained how the WHO struggled with the economic topics and believed that none of the previous research they had conducted was satisfactory:

On several occasions we attempted to produce solid proof of this relationship and express it in £ s.d. or in Dollars. Again and again we have noticed that this is a much more difficult subject than we have anticipated and all our preliminary documents were considered by us to be unfit for publication.²⁰

Bruce-Chwatt further described the difficulties they faced, explaining “The difficulty of this study is due to the fact that no reliable methodology for computation of health factors and the value of human life in economic terms has been developed up till now.”²¹ Unless circumstances are exceptional, as in the malaria outbreak in Ceylon in 1934 and 1935, there is the additional difficulty “from the vast complex of other socio-economic factors related to it.”²²

The Development of Health Economics and Malaria as a Topic of Study

Payne, Sinai and the WHO struggled with the economic quantification of malaria and faced many of the same dilemmas as the 1958 study headed by Dakshinamurty, but they did so in consultation with economists, a growing body of health focused economic research and amidst a general trend in economics favoring sophisticated mathematical modeling. Highly regarded economists such as Simon Kuznets and Kenneth Arrow had published research on health issues prior to 1958, but by the early 1960s a larger and more accessible amount of health economics

20. Leonard Bruce-Chwatt to AM Payne, 6 August 1962, file M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

21. Ibid.

22. Ibid.

was available.²³ Of this scholarship, Burton Weisbrod's *Economics of Public Health, Measuring the Economic Impact of Diseases* was perhaps the most widely consulted.²⁴ Unlike Dakshinamurty, Sinton or Winslow, Weisbrod approached the economic costs of disease as a trained economist intending to “set forth a procedure to aid in making rational choices among alternative public health programs-that is, to establish a framework for estimating the social benefits of improved health.”²⁵ Of this growing body of literature Weisbrod's early work focused on three diseases: cancer, tuberculosis, and poliomyelitis- and their impact in the United States. Much like Sinton believed the analysis of malaria eradication in the southern United States was applicable to India, the WHO did not hesitate to consider Weisbrod's broad treatment of American public health and economics as relevant to the MEP.²⁶ Weisbrod's definition of ‘avoidance cost,’ for example, did not provide a particularly insightful or novel approach to the basic problem of how to quantify a disease in economic terms. Avoidance cost was, however, easily amenable to previous analyses of loss as conducted by public health researchers.²⁷ As defined by Weisbrod, avoidance costs were those that occurred as a result of people trying to avoid a disease. The additional cost of filter-tip cigarettes, however misguided, represented an

23. Milton Friedman and Simon Kuznets, *Income from Independent Professional Practice* (New York: National Bureau of Economic Research, 1945).

24. Burton Weisbrod, *Economics of Public Health, Measuring the Economic Impact of Diseases* (Philadelphia : University of Pennsylvania Press, 1961).

25. *Ibid.*, viii-ix.

26. AM Payne from Leonard Bruce-Chwatt to AM Payne, 6 August 1962, file M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

27. Weisbrod, *Economics of Public Health*, 45-47.

attempt to avoid the health problems associated with smoking.²⁸ While difficult to quantify, such a concept more or less matched the suggestion that malaria caused indirect losses and it was not difficult to incorporate this added category of loss into the broad outline constructed by Sinton and the researchers he cited. Prior to the eradication of malaria in Sardinia, Weisbrod explained, farmers adjusted to the threat of malaria by living as much as an hour's walk from their farms.²⁹ The remediation of the mosquito problem, requiring environmental sanitation far too costly for an individual, led to upwards of two hours of lost productive time.³⁰

Bruce-Chwatt's suggestion that avoidance cost represented a concept useful in the analysis malaria also demonstrated the extent to which the implications of economic arguments were not fully explored, or understood, by the WHO and its supporters as they selectively employed terminology according to their needs. Largely ignored by researchers who were intent on demonstrating the economic damage caused by malaria, Weisbrod also analyzed in greater detail the different costs involved in implementing health programs. He did not, however, conflate economic loss with cost as did many public health researchers. As an academic economist, Weisbrod was less devoted to shoring up support for particular health programs or demonstrating the savings to be had from investing in health, despite his belief that "society is not now making the fullest possible use of existing medical knowledge."³¹ Weisbrod, unlike Dakshinamurty, did not assume that health programs were always the best use of resources. He did assume, however, that health was in many ways like any other commodity and the dilemma

28. *Ibid.*, 31.

29. *Ibid.*, 45.

30. *Ibid.*, 45.

31. *Ibid.*, vii.

facing individuals and society was whether or not to purchase that commodity. The more epochal shift represented in Weisbrod's work, and health economics in general, was not the refinement of the analytical tools needed to more accurately calculate the losses caused by malaria. Instead, it was the shift in focus to the more professional cost-benefit debate he helped introduce to the study of disease.

The economic dilemma at the heart of Weisbrod's work was a slightly qualified version of Hermann Bigg's analysis of the relationship between health and investment: "Public health is purchasable. Within natural limitations, a community can determine its own death rate."³² "Better health is purchasable," agreed Weisbrod, but "at a price!"³³ The decision facing individuals and society was whether or not to pay the price required to attain better health. Better health was desirable and, with recent developments in medical science, attainable with current knowledge. To demonstrate the scale of the problem Weisbrod cited a Federal Security Agency report that estimated that "Every year 325,000 people die whom we have the knowledge and skills to save."³⁴ Nonetheless, he left open to debate which of these deaths should be prevented and which diseases to address first. Although he was familiar with the work of Henry Sigerist and other figures in pre-war social medicine, Weisbrod did not support the public advocacy and fundraising goals of the MEP, but instead presented the problems of cost and loss as more technical issues. For Weisbrod, it was ultimately up to society to economize and decide whether or not the price of better health was worth paying and not the economist.

32. CEA Winslow, *The Life of Hermann M. Biggs, M.D., D.Sc., LL.D, Physician and Statesman of the Public Health* (Philadelphia: Lea & Febiger, 1929).

33. Weisbrod, *Economic of Public Health*, 1.

34. Ibid.

The WHO's project to estimate the value of the malaria was impacted by three major developments in the 1960s: increasing skepticism that eradication was an achievable goal, concern that the attainment of the goal could contribute to dangerous population growth, and a proliferation of research focused on the costs of different diseases. Many of the foundational works in health care economics in the 1960s, such as Weisbrod's *Economics of Public Health*, were not important in terms of the novelty of their techniques, but as studies that introduced general economic concepts to the study of health. The re-introduction of older formulas to current health problems was a common occurrence. Weisbrod's methodological approach, for example, used fundamentally the same formula as Dublin and Lotka to calculate the present value of net future earnings, which was employed as a means to analyze the economics of public health. Like Weisbrod, much of the academic literature from the 1960s was based on early twentieth century actuarial science and the pervasive influence of Dublin and Lotka was widely cited. These researchers may not have been original in terms of the development of new concepts in the field of economics, but the scope of their studies continually expanded. Much of this early research was produced in the United States and was initially focused on the economic aspects of different chronic illnesses. Rashi Fein, for example, published *The Economics of Mental Illness* in 1958. Like Weisbrod, Fein largely employed the same methodology as Dublin and Lotka to explore the issue of how much mental illness cost the United States. Fein questioned whether or not the country could better afford “the cost in human misery caused by mental illness or the cost in dollars to provide the best care we can give” and if increased expenditures could be justified from an economic as well as humanitarian viewpoint.³⁵

35. Rashi Fein, *The Economics of Mental Illness* (New York: Basic Books, 1958), IX.

With the expansion of federal healthcare and social benefits in the 1960s, economics was increasingly seen as a way to manage health expenditures that were far outpacing inflation and economic growth. Of the techniques offered by economists to better analyze and manage health, cost-benefit analysis emerged by the late 1960s as the most widely applied method. Like early twentieth century researchers in actuarial science, many economists in the 1960s were careful to highlight the limitations of their methods as well as the non-monetary values of health not included in their studies. Herbert Klarman explained that cost-benefit analysis suffered from two principal weaknesses: certain consequences were difficult to predict while others were more difficult to measure. Klarman emphasized that “Among the most difficult to measure are the intangible aspects of human life and experience, including the sheer value of human life or of good health.”³⁶ Expounding on the value of human life beyond economic terms, Klarman vehemently critiqued reductive economic approaches to health:

It is a distortion, moreover, as well as an oversimplification, of the task of economics to view additions to national income as the sole or principal economic benefit of a health services program. The goal of production is consumer satisfaction, including the enjoyment of leisure. The limitations of a truncated view of economics are most obvious in dealing with health services for children. In our society a child is scarcely to be viewed as an object of investment.³⁷

The new generation of health economists shared with the WHO and affiliated researchers a concern with the cost of disease as expressed in economic losses. However, their added analysis of benefits in addition to costs expanded and changed the terms of the debate. Savings in the use of health resources, gains in economic output and the satisfaction of better health were three

36. Herbert Klarman, “Present Status of Cost-Benefit Analysis in the Health Field,” *American Journal of Public Health* 57, no. 11 (November 1967): 1948.

37. *Ibid.*, 1950.

categories of benefit identified by Klarman.³⁸ Where malariologists and others investigating the economic aspects of malaria eradication traced their origins to public health scholarship and social medicine, cost-benefit analysis and new economic research on health was viewed as “an offspring of welfare economics and public finance, the former an abstruse branch of economic theory and the latter the applied study of government expenditures and taxation, has been developed as a tool of quantitative analysis.”³⁹

Klarman's identification of cost-benefit analysis as a core part of welfare economics was correct in the sense that it accurately described the scholarship produced by his contemporaries and its differences with actuarial based research focused on costs and losses. On the other hand, Klarman was incorrect in believing cost-benefit analysis had come to healthcare via traditional branches of economics. Writing in 1958 on the topic of water resource management, R.J. Hammond traced the lineage of early twentieth century cost-benefit analysis, asserted its non-economic origins, and fiercely critiqued those who promoted it as a universally applicable formula:

There have hence been obscured two salient and related features of the subject: first, that its characteristic formulation is purely American, and secondly, that it was in origin an administrative device owing nothing to economic theory and adapted to a strictly limited type of Federal activity-the improvement of navigation. These facts constitute at once an explanation and a warning to the inquirer. The explanation, which is by no means self-evident, why discussion of a large area of public investment should crystallize around a particular formula of evaluation- the benefit-cost ratio- that other countries, to say nothing of private investors, have never employed. They suggest that attempts to make this formula universal in application may be prima facie misguided-

38. Ibid., 1949.

39. Ibid.

from being so causal in origin- and that a pragmatic rather than a dogmatic approach to such a problem is desirable.⁴⁰

Hammond's outspoken criticism of cost-benefit analysis did not acknowledge the contributions of the engineer-economists described by Theodore Porter. Hammond nonetheless correctly identified the technique's proximate origins and its intellectual spillover to an increasing number of federal bureaucracies.⁴¹ Hammond complained:

Recreation, fish and wildlife provide benefits of such intangible character as not be susceptible to appraisal in monetary terms. Efforts at such appraisal can only be, in the nature of the case, unrealistic and arbitrary. Recreation is like education in this respect, and recognition of this essential difference between it and other functions of multipurpose water projects is fundamental to a sound policy and an equitable distribution of costs.⁴²

Cost-benefit analysis as a topic of academic economics, as described by Klarman, was not new to the post-war era, but “the atmosphere was entirely different” as large-scale economic projects requiring high federal expenditures resumed after World War Two and it became a topic of debate for professional economists.⁴³

The Economic Effects of Malaria Eradication-Economists and the Critique of Public Health Economics

By the mid-1960s malaria eradication as a public health campaign and as a method of economic development was increasingly challenged. Not only had neo-Malthusian population

40. RJ Hammond, *Benefit-Cost Analysis and Water-Pollution Control* (Stanford: Stanford University Press, 1960): 3.

41. Theodore Porter, *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life* (Princeton: Princeton University Press, 1996).

42. Hammond, *Benefit-Cost Analysis*, 7.

43. Ibid.

control arguments managed to create doubt as to the humanitarian benefits of eradication, but economists were increasingly challenging the idea that eradication would yield economic benefits in any scenario. Much of the economic critique was founded on the basis of demographic projections which purported to show that even if malaria eradication and the consequent economic growth were achievable goals, the unintended consequences of population growth eroded many, if not all, of the subsequent economic benefits.

Robin Barlow's *The Economic Effects of Malaria Eradication* was the most widely read and influential of the studies presented by economists that undermined the assumption that eradication would produce better economies.⁴⁴ Published in 1967 as an article in the *American Economic Review*, one of the premier academic journals in the world for economics, it was expanded and released in 1968 as part of the Bureau of Public Health Research Series⁴⁵ Barlow, whose academic training consisted of an undergraduate degree from Oxford as well as an MBA (1958) and PhD (1961) from the University of Michigan, was an associate professor of economics at Michigan at the time his research was published as well as faculty associate in the Center for Middle Eastern and North African studies.⁴⁶ Barlow's book was published as part of a larger project at the University of Michigan and as the second part of a two book series. The first part, Peter Newman's 1965 *Malaria Eradication and Population Growth*, provided the

44. Barlow, *Economic Effects of Malaria Eradication* (Ann Arbor: University of Michigan Press, 1968).

45. Robin Barlow, "The Economic Effects of Malaria Eradication," *American Economic Review* 58, no. 4-5 (May 1968) 130–148.

46. University of Michigan, "Faculty History Project. Robin Barlow," accessed 5 January 2016, <http://um2017.org/faculty-history/faculty/robin-barlow/memoir>.

demographic data used to justify much of Barlow's argument.⁴⁷ S.J. Axelrod, the Director of the Bureau of Public Health Economics, explained: "Professor Robin Barlow has employed Newman's demographic results for Ceylon in an attempt to measure the long-run effects of malaria eradication on per capita income in that country."⁴⁸ The fact that Barlow's book was selected as the second part of the two-volumes on malaria demonstrated the close relationship between the demographic and economic analysis of the results of malaria eradication. It also suggested the extent to which the economic value of eradication presupposed demographic projections and dramatic population growth.

Barlow's work, published nearly a decade after the start of the MEP, was read in a context lacking the initial enthusiasm surrounding eradication in the late-1950s among those interested in public health and development. "Malaria eradication," Barlow was careful to point out a decade later, "is a half-finished task."⁴⁹ To add to the problem of whether or not the money invested to achieve eradication would ultimately result in the economic benefits desired, a larger number of public health researchers and economists were now doubting whether or not eradication could even be achieved. Unlike the late 1950s and the political-academic culture surrounding Dakshinamurty's report, economic debates as to the merit of malaria eradication and other health programs were no longer novel as both economists and public health researchers were increasingly familiar, and critical, of each other's work. According to Barlow, "In the public health literature there is a consensus that malaria eradication is economically

47. Peter Newman, *Malaria Eradication and Population Growth* (Ann Arbor: University of Michigan, 1965).

48. Barlow, *The Economic Effects of Malaria Eradication*, "Forward."

49. *Ibid.*, 132.

beneficial.”⁵⁰ However, there was also a consensus in the public health literature that economic analysis should be treated with suspicion. According to Barlow, public health researchers seemed to think that “when the economist points to the possible economic losses resulting from eradication—such as those implied by a population explosion he is callously arguing that people should be denied the benefits of modern medicine.”⁵¹

Barlow, like many health economists in the 1960s, was acutely aware of the criticism that health programs should not be reduced to only the economic benefits they could yield; there was an inherent value in the reduction of human suffering and other intangible benefits not easily incorporated into economic analysis. Defending economics, Barlow argued that “At the outset it should be stressed that in drawing attention to the economic consequences of disease eradication, the economist does not mean to belittle the noneconomic consequences.”⁵² Moreover, Barlow defended economic studies against the claim of economic reductionism by arguing that even if his research demonstrated that eradication would result in negative economic consequences as a result of population growth “It may of course be rational to adopt an eradication program even when it is known that per capita income will probably fall as a result.”⁵³

Even though Barlow, like other economists, recognized that eradication may further other legitimate goals, such as the diminution of human suffering, such a project nonetheless had something in common with public projects in general, namely economic consequences, which economists were uniquely suited to assess. Barlow explained, “The fact is that an eradication

50. Ibid.

51. Ibid., 130.

52. Ibid.

53. Ibid.

program, like all other government programs, ought to be judged by the contribution which it makes toward several national goals.”⁵⁴ As an economist, Barlow was most committed to analyzing the contribution of eradication to economic goals. Unlike public health researchers, Barlow was not concerned with justifying existing programs or attracting money to health projects. Although the economic analysis of health projects did not preclude the possibility of advocating greater investment in health, Barlow’s article and book focused on employing basic economic concepts to health phenomena. Moreover, Barlow and other researchers sought to undermine the most basic assumptions and oversights of cost-benefit analysis as done by public health researchers that purported to demonstrate the economic savings that would come from reducing or eliminating a disease.

Newman’s demographic data and projections, which served as the basis of Barlow’s economic analysis, represented a definitive improvement in the empirical study of the likely economic impact of eradication. Yet, Barlow’s analysis did not represent a significant conceptual break with the public health economics tradition. Using per capita income as the measure of whether or not an eradication program had beneficial effects, Barlow concluded that “The main economic disadvantages of eradication are seen to lie in the rapid increase in the population of children resulting from the marked changes in infant mortality and birth rates.”⁵⁵ Despite an increase in the labor supply and the possibility of improved labor productivity, Barlow believed that even with improved national productivity and total income, the larger size of the economy would not ultimately make up for the even larger increase in population, which would pull the

54. Ibid.

55. Ibid., 143.

average income down. While more nuanced and rigorous than the study Kaser produced for the WHO, Barlow's explanation of why the increased availability of laborers did not necessarily mean improved economic performance did not deviate from Rashi Fein's analysis or the much earlier and foundational work of Dublin and Lotka.

Fein, like Barlow, explained that estimates of the productive value of more people surviving to become productive laborers "is tied to full-employment considerations."⁵⁶ Having fewer sick workers, according to Fein and others, would only increase a nation's productive capacity in the event they were employed and participated in the national economy. In the event of high unemployment, the additional surviving laborers would likely be unemployed, thus not contributing to national income. Fein, however, was reluctant to make this assumption, preferring to assume that "national economies will organize themselves towards full employment."⁵⁷ Barlow, on the other hand, not only assumed that affected countries would not be able to incorporate malaria survivors into productive society, but he also asserted that the economic impact of such a program "depends also on what segments of the labor force are benefited by eradication."⁵⁸ Moreover, a "disease whose greatest impact is upon the low-income, low-productivity segment of the labor force," such as malaria, would not represent as large a burden as some may think since the impaired were thought to be unskilled and would contribute less.⁵⁹

56. Fein, *Economics of Mental Illness*, 13.

57. Ibid.

58. Barlow, "Economic Effects of Malaria Eradication," 133.

59. Barlow, "Economic Effects of Malaria Eradication," 134.

In the economic analysis of malaria Barlow and other critics of the economic case for malaria eradication may not have employed significantly improved techniques, but the scope and intention of the project was qualitatively distinct from the early and mid-century researchers who cited and employed the work of Dublin and Lotka. Actuarial methodology, as originally developed in *The Money Value of a Man*, was clearly defined and of limited scope: estimating the monetary value of a wage earner to his family in the event of death or incapacitation. Fein was careful to cite Dublin and Lotka's warnings about the limitation of such a technique, but he and Barlow both worked towards a radically different goal: the economic value of an individual or group of individuals to society. As Fein noted:

It is conceptually rather easy to measure the money value of a man to his family. This problem has been assayed in the courts which deal with indemnity cases and in the statistical bureaus of life insurance companies.⁶⁰

Aggregating such calculations to make a national estimate of a group's productive value to society, in this case those who have malaria or would have died from malaria, was a different matter altogether. According to Fein, "The concept of economic value to society is, on the other hand, rather complex."⁶¹ Fein was careful to note that Dublin and Lotka "state explicitly that their concern is not with the value of the individual's productive services to society."⁶² Quoting Dublin and Lotka, he warned "All estimates of losses to the community obtained by some elementary process of totaling losses to wage earners, immediate families, or the like, must be

60. Fein, *Economics of Mental Illness*, 14.

61. *Ibid.*, 15.

62. *Ibid.*

viewed with extreme reserve.”⁶³ Barlow and other economists who criticized the economic case for malaria eradication were nonetheless uninhibited in their application of actuarial principles. Dakshinamurty and other supporters of the MEP were equally bold in their application of such methods. However, they with their explicit intention of searching for any evidence that would appear to support their health programs, were less dedicated to the conviction that economics could determine whether or not a specific health program should be funded or not. For public health researchers, economics could be a useful tool to attract funding, but never a decision making tool apart. Health, for Barlow, was as an economic phenomenon that did not have a value completely separate from the economic realm. The preference for improved health, or the saving of lives, was not a given.

The End of Malaria Eradication and the Beginning of Control

After two years of debate and analysis of the funding and efficacy of the Malaria Eradication Program, the World Health Assembly adopted resolution WHA 22.39 and formally ended the MEP campaign.⁶⁴ The 1969 resolution, unlike the MEP that grew out of WHA 8.30, referred to the role of basic health in the treatment and control of malaria as “crucial” and the necessity for “the increased attention to their development.”⁶⁵ The resolution reaffirmed that complete eradication of malaria remained the ultimate goal, but “the control of malaria with the means available should be encouraged and may be regarded as a necessary and valid step

63. Ibid.

64. World Health Organization, *The Third Ten Years of the World Health Organization, 1968-1977* (Geneva: WHO, 2008), 181.

65. Ibid.

towards the ultimate goal of eradication.”⁶⁶ The resolution also referred to disappointing progress the MEP had made “in the regions where eradication does not yet seem feasible.”⁶⁷ And yet, it made abundantly clear “the part played by socio-economic, financial, administrative and operational factors, as also by the inadequacy of the basic health services, in the failures recorded during the implementation of the global malaria eradication program.”⁶⁸

The end of eradication as the primary project for both the WHO and the international community grew most immediately, but not exclusively, out of a funding crisis. WHA 8.30 not only formalized the goal of eradication, but it also established the Malaria Eradication Special Account to finance the long and expensive campaign. The scrutiny of MEP finances began as a result of a dramatic decrease to the Special Account, which required the WHO to allocate funds from its regular budget to meet the standard operating costs of the MEP.⁶⁹ While the resolution formally ended eradication as the ultimate goal, the WHO was nonetheless requested “to continue to provide assistance in studying the socioeconomic impact of malaria and of its eradication and to find a method for socioeconomic evaluation of the program under way.”⁷⁰ According to the official history of the WHO, “The review carried out during the previous two years had attempted to evaluate the impact but had been thwarted by lack of reliable data.”⁷¹

66. Ibid.

67. Ibid.

68. Ibid.

69. Ibid.

70. Ibid.

71. Ibid.

Despite the inability of economic studies to adequately investigate the economic impact of malaria in a way that would improve the MEP's funding emergency, the resolution suggested that the WHO remain committed to studying malaria economics and the potential of such studies to contribute to the ultimate goal of eradication:

Recognizing, moreover, that, in order to confront the financial difficulties which are a major hindrance to the implementation of malaria eradication programmes and to secure adequate priority for these programmes in the allocation of funds, it is necessary to justify them on economic as well as health grounds by demonstrating the reality of the rapid and lasting advantages accruing from the pursuit of eradication, which now seems to be possible.⁷²

The resolution would go on to recommend:

(c) that the Organization continue to provide assistance for the study of the socio-economic impact of malaria and of its eradication and develop a methodology for the socio-economic evaluation of the programmes under way.⁷³

The WHO's reluctant shift to control, coupled with its stated belief that economic analysis could still play a part in resolving the funding challenges perceived to be central to the struggles of the MEP, demonstrated the WHO's continued persistence. While critiques such as Barlow's and others more trained in health economics may have undermined the details of their analysis, the WHO did not waiver in its belief that a more definitive study would ultimately vindicate its case for a sustained eradication campaign. The blame for the failure of the MEP was not to be located in the founders of the program or their overall strategies, but in the administration and funding of

72. World Health Organization, *Twenty-Second World Health Assembly. Official Records of the World Health Organization No. 176*, (Geneva: World Health Organization, 1969), 18.

73. Ibid.

the program. Still, the resolution effectively ended the MEP and immediately had the effect of further reducing the financial support available to antimalarial programs.⁷⁴

The 1969 resolution and the shift towards malaria control occurred at a time of transition in the leadership of two major institutions. The death of George Macdonald in 1967 and Bruce-Chwatt's appointment as director of the Ross Institute at the London School of Hygiene & Tropical Medicine (LSHTM) facilitated the transition towards malaria control. At the time of his death, Macdonald had still been part of a tense feud with P.C.C. Garnham, who regarded Macdonald's focus on eradication as misguided. Garnham criticized:

The blunderbuss ideal of Ronald Ross and George Macdonald, with their single objective of malaria eradication at all costs, ignores the side effects. With adequate education and food supply, the dangers of malaria and other tropical diseases can be much reduced. Therefore education and agriculture should at least receive the same degree of priority as medical care.⁷⁵

Bruce-Chwatt would only serve in his role at the LSHTM for five years, but his LSHTM obituary celebrated him as the person “who probably did more than any other individual to steer the world's malaria experts back from the failures of eradication to a more reasonable and rational program to control malaria.”⁷⁶ Bruce-Chwatt's former colleagues suggested that such an appraisal of his work was an exaggeration meant to eulogize a legitimately key figure in the history of malaria that.⁷⁷ If anything, he may have been one of the malariologists who most supported the MEP before reversing his stance and advocating for control.

74. PI Trigg and AV Kondrachine, “Malaria Control in the 1990s,” *Bulletin of the World Health Organization* 76, no. 1 (1998): 12.

75. World Health Organization, *Third Ten years of the WHO*, 242.

76. R. Bray, “Obituary Leonard Bruce Chwatt,” *International Journal for Parasitology* 20, no. 8 (1990): 977-78.

77. *Ibid.*

While the MEP may not have been the abject failure described by Garnham, the transition from eradication to control was certainly not motivated by a feeling of success or a consensus that permanent progress had been made towards easing the burden of malaria, or that gains then established could be defended or consolidated further with control. Advocates of eradication had to contend with the realities of mass DDT spraying campaigns and growing resistance to DDT resistance, which resulted in the loss of their main weapon and a deceptively simple strategy of combatting the disease.

Rival international health campaigns also began to attract more attention and openly attacked eradication for the negative impact it would have on their own causes.

As described above in Barlow's analysis of the economic impact of malaria eradication, advocates of family planning initiatives and efforts to control global population growth stated, in no uncertain neo-Malthusian terms, the prospectively catastrophic consequences of an increase in birth rates and larger numbers of poor, rural laborers surviving to adulthood. The Smallpox Eradication Program, inaugurated at the Nineteenth World Health Assembly in 1966, also attracted attention and funding away from the struggling MEP. The 22nd WHA in 1969, the same that had voted to shift strategy to malaria control, also voted to further support smallpox eradication in 'WHA 22.34 Smallpox Eradication.' The Resolution noted that "very significant progress is being made in the eradication effort" and "reiterates the need for all and active participation by all endemic countries, for the maximum of co-ordination, and for more complete and prompt reporting and improved surveillance techniques."⁷⁸

More important than the concerns regarding population control or the economic benefits of eradication, according to the WHO's own account of the period, "was the call to integrate the

malaria program into basic health services, especially in countries where eradication was not foreseeable in the near or medium-term future.”⁷⁹ Even at the height of funding, cooperation and support for the MEP in the early 1960s, the WHO and its partners found eradication to be a difficult goal in regions lacking substantial health infrastructure. With DDT resistance growing and opposition mounting on all sides to both the feasibility and desirability of eradication, the WHO began advocating for the necessity of improved basic health services and the availability of primary care to those susceptible to malaria. A substantial departure from the WHO’s previous role in combatting specific diseases and acting as a technical coordinator, the frustrated attempt to eradicate and control malaria prompted greater interest in the organization of health services and, subsequently, the financing and economics of health and disease.

The Economics of Malaria After the Malaria Eradication Program

The MEP officially came to an end in 1969 and malaria control was adopted as the official international strategy. Still, the economics of malaria eradication continued to attract the attention of economists who doubted that eliminating malaria would necessarily result in economic benefits. Continued interest remained among those within the WHO still convinced of the relationship between development, economy, well-being and the elimination of malaria. Of the studies published after 1969 analyzing the economics of malaria, Edwin Cohn’s 1972 article “Assessment of Malaria Eradication Costs and Benefits” presented a direct and ostensibly straightforward dismissal of the cost-benefit analyses he claimed had previously been used to

78. World Health Organization, *Twenty-Second World Health Assembly*, 16.

79. WHO, *Third Ten Years of the WHO*, 181.

justify eradication.⁸⁰ An economist at the US Agency for International Development, a branch of the US State Department, Cohn drew on his “participation in the In Depth Evaluation of the Indian National Malaria Eradication program last year (my only association with malaria studies and the experience on which I therefore draw heavily in this presentation).”⁸¹ In contrast to the malariologist Sonti Dakshinamurty who led the WHO’s first attempt to study the economic effects of eradication, Cohn possessed no expertise in malaria but was an experienced economist.

To undermine the argument that malaria eradication would yield economic benefits that outweighed the costs, Cohn employed the standard accounting principle of the ‘discount rate’ and questioned previously applied methods of assessing and comparing the values, costs and savings across time. According to Cohn, his focus was on “the fallacious practice of assuming that costs (and benefits) today and at different points in the future are of equal value.”⁸² The fundamental problem of comparing benefits and costs over time, and which discounting methods claimed to solve, is the difficulty of comparing monetary amounts in different time periods since a given numerical amount of money on one given day would not be worth the same in the future. Cohn clearly explained his analysis of why the failure to properly apply discounting posed a serious problem for accurately analyzing the economic consequences of different malaria programs:

One of the arguments which has been advanced in favor of eradications, along with the technical ones, is that although eradication is initially more costly it is cheaper in the long run because it is completed in a finite period of time (seven to ten years) whereas control goes on forever. It is, however, inadmissible to compare these two sets of outlays

80. Edwin J. Cohn, “Assessment of Malaria Eradication Costs and Benefits,” *The American Journal of Tropical Medicine and Hygiene* 21, no. 4 (1972): 663.

81. Ibid.

82. Ibid.

by simply adding up the projected annual costs of the two programs over their expected lives; it is essential that the two expenditure flows be reduced to a common base to take into view the fact that, viewed from today, money next year is of lower value than money today, and that money five or ten years hence is of still lower value. This principle, known as discounting for present value, is conceptually the reverse of compound interest. Discounting makes it possible to compare expenditure (or income flows) with different time phasing; without discounting no such comparison is possible.⁸³

Discounting, Cohn and others pointed out, allows researchers today to fully compute savings and expenditures that accrue in the future and provide their present value in current dollars. A project with long-term consequences and long-term funding needs, such as malaria, would require current economists to estimate how much would be saved and spent in each future year, which would then be discounted to a smaller contemporary value. By putting all sums into their present value, the true economic costs and benefits could be more accurately estimated.

With this relatively straightforward accounting concept Cohn sought to undermine the magnitude of the savings that would result from eradication. However, Cohn's application of discounting to solve the question of whether or not malaria was beneficial economically was far from original. Discounting was a concept Dublin and Lotka were expertly familiar with as actuaries and researchers for an insurance company and they employed the idea in *The Money of a Man*. Widely cited economists such as Rashi Fein and Burton Weisbrod were likewise aware of the concept and its application to whether or not particular health programs should be financed. Cohn's analysis, certainly not new in methodology or even in its application of the method to the topic of malaria, was nonetheless significant. The article's publication three years after the end of the MEP demonstrated how embedded the economic analysis of malaria had become in discussions of whether or not to fund international health programs.

83. Ibid.

Cohn's paper was not published as the official position of the US State Department, but it still carried significant weight as a result of his position with USAID. Using India to illustrate how the concept of discounting could disprove the economic case for eradication, Cohn cited the Government of India's estimates from 1957 that eradication would cost a total of about 800 million rupees over ten years as compared to the approximately 60-70 million rupees then being spent yearly on control.⁸⁴ "Discounting," Cohn claimed, "places the comparison in a quite different light."⁸⁵ Providing a table that compared the costs of 30 years of malaria control to eradication, Cohn claimed that "at a 14% discount rate there is no difference in cost between eradication and control; at any higher discount rate, control would be cheaper."⁸⁶ Cohn asserted that such calculations "should not be interpreted as an argument for or against control as compared to eradication" and "The point is that discounting permits a realistic comparison of the costs (or benefits) of alternative courses of action with different expenditure phasings," the implications were clear.⁸⁷ Cohn analyzed the three direct consequences of eradication in much the same way as those who published before him: reduced morbidity, reduced mortality, increased fertility. He also surveyed the familiar consequences of avoidance costs: the cultivation of land that had previously been too dangerous to work and the adverse impact of population growth. From this, Cohn concluded "the economic case for malaria eradication may not be very strong."⁸⁸

84. Ibid., 664.

85. Ibid.

86. Ibid.

87. Ibid., 664-665.

88. Ibid., 666.

Although American funding for anti-malaria programs in general and the MEP in particular had peaked in the early 1960s, a reduced amount of funding for malaria eradication from the US State Department continued even after the 1969 WHA resolution that ended the WHO's global eradication program. Following Cohn's publication, however, the State Department withdrew the remainder of its financial support, putting to an official end to any significant international support for eradication. Cohn's 1972 article lacked empirical data on the accuracy of India's 1957 estimates of what eradication would cost or an analysis of India's economic performance over the period when eradication was pursued with vigor. Cohn's 1972 article did not present a strong empirical case for either the value of eradication or control. Cohn's comparison of eradication and control across different discount rates also offered no justification of how likely the different rates he employed in his analysis were likely to reflect actual, empirical trends.

Despite the article's title, Cohn's analysis was only a cost analysis; the economic benefits of control as compared to eradication were not presented, let alone compared to the different discount rates he hypothesized were possible. The use of Cohn's article to withdraw any remaining funding to malaria eradication despite these important omissions demonstrated both the continued lack of empirical data in the economic debate over the economics of malaria, but also how entrenched and potentially influential such studies came to be. Just as George Macdonald had warned Dakshinamurty, despite his own work and belief in the economic impact of malaria, if any flaws in the estimate of the economic losses could be found "this may be taken

as good reason for being inactive over a disease which in fact deserves attention on its own account.”⁸⁹

Conclusion

The WHA’s 1969 resolution and the final withdrawal of US support in 1972 may have ended malaria eradication as an administrative program and global health goal, but malaria as a topic of economic study continued unabated. Publications from the 1970s onwards seem to suggest that Bruce-Chwatt was accurate in his observation that “Of all the human diseases malaria is the one that gave rise to the greatest number of attempts to quantify its direct and indirect adverse effects on socio-economic conditions.”⁹⁰ ⁹¹ Bruce-Chwatt would add to this growing body of literature, publishing his own overview in the *Official Bulletin of the Pan American Health Organization* in 1978.⁹² Recalling the WHO’s own 1961 estimate that global eradication would cost a projected \$1.691 billion, a sum that had already been surpassed by 1963, he concluded a consensus existed that any widespread epidemic disease, malaria in particular, would have a profound socioeconomic impact, but there were “enormous difficulties

89. George Macdonald to Sonti Dakshinamurty, file M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

90. Leonard J. Bruce-Chwatt, “The Challenge of Malaria: Crossroads or Impasse?” in *Tropical Medicine from Romance to Reality, Proceedings of a Conference 12-14 December 1977*, ed. Clive Wood (London: Academic Press, 1978), 39.

91. For additional articles and sources on the economics of malaria, see: CM Stevens, “Health and economic development: longer-run view,” *Social Science and Medicine* 11, (1977): 809–817; and <http://www.healthpolicyjrnl.com/article/S0168-8510%2802%2900036-2/references>

92. Leonard Bruce-Chwatt, “El Costo de la malaria y su control en relacion con la realidad economica,” *Bol. Ofic. Sanit. Panamer* 85, no. 5 (1978): 392-406.

evaluating the effect in economic terms.”⁹³ Obtaining the data necessary to investigate the interdependence between malaria and a nation’s economy was an extremely difficult task, above all in developing regions.⁹⁴

The number of studies dedicated to the economics of malaria and the difficulty of obtaining even the most basic data regarding the economic effects of anti-malaria programs presents a series of fundamental questions regarding the economic analysis of disease and of malaria in particular. Why, given the extreme difficulty of researching the economics of malaria, did the WHO and its supporters continue to pursue a study that grew out of a 1958 meeting with the Executive Board of UNICEF? Why did the original study, which the WHO believed “should click the issue and convince financiers,” continue even after it was recognized the project was not the simple, short-term project they envisioned?⁹⁵ Why did even the resolution marking the end of eradication reiterate the need to continue to study the economic effects of malaria programs even though such studies had failed to attract funding or even delay the official end of the MEP? Why did both the supporters of eradication as well as detractors, such as Cohn, who recognized the lack of reliable data and criticized the absence of sound economic methodology, continue to publish studies employing many of the same analytical tools they found deficient? Lastly, what was the role of health economics and the professionalization, by economists, of what had previously been the purview of public health?

93. Ibid.

94. Ibid.

95. Memorandum, file WHO Archive M2/180/4, Archives of the World Health Organization, Geneva, Switzerland.

As presented in this chapter, few economists who questioned the legitimacy of the economic arguments supporting eradication employed novel techniques or presented data significantly different from the earlier tradition of public health economics. What Weisbrod termed ‘avoidance cost,’ Sinton referred to as ‘indirect’ losses or costs, and others referred to by the general economic term ‘opportunity cost’ were ultimately very similar. Additionally, at both the start of the MEP in 1958 and the US State Department’s withdrawal of funding in 1972 researchers agreed that malaria economics ultimately hinged on the issue of demographic change and the economic benefits, or drawbacks, of an increase in the population of developing countries. Where Dakshinamurty and Kaser cited the increase in labor supply as the primary reason why eradication could be justified economically, Barlow and Cohn pointed to very similar population growth estimates to explain why the effected countries would ultimately suffer.

Although economists likely had more accurate demographic data at their disposal, neither supporters nor critics of the MEP based their arguments on economic data or analysis. Cohn’s use of discounting, based on government projections from 1957, did not account for the evidence that by 1963, nine years before his study was published, the WHO had already spent more in a few years than it had anticipated for the entire length of the program. The supporters of the WHO eradication program were likewise not restrained by their inability to demonstrate definitively the likely economic benefits of eradication or even the ability of their studies to defend the potential of their program. Even the resolution that officially ended the MEP in 1969 highlighted the importance of further study to ensure the success of anti-malaria programs even though eleven years of such studies had failed to secure additional funding.

The WHO was not dissuaded from pursuing further studies even though much of the research lacked empirical support and questioned the economic legitimacy of the MEP. This

seems to suggest, as Gladys Conly observed, “humanitarian arguments now require support from economic arguments.”⁹⁶ “Thwarted by lack of reliable data,” both the WHO and its critics continued to press the case of the economic consequences of eradication because both, despite their opposing view points on this particular issue, had reached a consensus regarding the economic nature of health programs.⁹⁷ Despite disagreements, a new intellectual unanimity had developed since the inception of the program in 1958, with its Cold War origins, that health was an economic phenomenon that could and should be studied alongside humanitarian and political justifications. That both sides lacked empirical evidence or novel theoretical justifications were secondary to a new found status for economic arguments in the analysis of health programs.

Despite this consensus, important differences remained in 1972 between the public health advocates of eradication and their critics. However much researchers such as Dakshinamurty, Kaser and Bruce-Chwatt may have appealed to the economics of malaria as a justification for eradication, they never intended, as Weisbrod explained, to “set forth a procedure to aid in making rational choices among alternative public health programs, to establish a framework for estimating the social benefits of improved health.”⁹⁸ When Kaser estimated the annual cost of eradicating malaria per person to no more than fifty cents, which “would purchase no more than, say two metres of cheap cotton cloth,” he was not envisioning Weisbrod’s more expansive, decision-making tool. On the contrary, the observation that fifty cents could only buy two meters of cheap cotton cloth when it would otherwise potentially save a life was used to underscore the near absurdity of comparing the alternate uses of money when one of the alternatives was health.

96. Gladys Conly, “The Impact of Malaria on Economic Development. A Case Study,” *The American Journal of Tropical Medicine and Hygiene* 21, no. 5 (1972): 668.

97. WHO, *Third Ten years of the WHO*, 181.

Despite the differences between these two conceptions of how economics could or should be used in relation to the analysis of health programs and the steadfast advocacy centered program pursued by public health researchers and administrators, by 1972 health economics and the professionalization of what previously had been the purview of public health had succeeded in the institutionalization and routinization of economic analysis. The analytical tools may not have been novel and the data lacking, but by the early 1970s the professionalization of the economic analysis of health had established the necessity of conducting such studies. Moreover, a consensus had developed that such a health program, “like all other government programs, ought to be judged by the contribution it makes towards several national goals.”⁹⁹

That eradication, or any other health program for the matter, could save lives was insufficient; all potential effects had to be calculated and appropriately weighed. Whatever the purposes of the particular analysis, whether to advocate for increases in public health funding or the creation of rational decision making tools, by the end of the malaria eradication program health had become fully economic and comparable to other commodities. Professional economists, who had originally shared competency with public health researchers, were now uniquely qualified to assess the economic value of proposed programs.

98. Weisbrod, *Economics of Public Health*, viii-ix.

99. Barlow, *Economics of Malaria Eradication*, 18.

Chapter 3

Disease, Development and the Dismal Science: The Professionalization of Health Economics in the 1960s

In 1962 the US Public Health Service published *Medical Care Financing and Utilization*, the first installment in the *Health Economics Series*, and outlined the magnitude of healthcare spending in the United States.¹ A compendium of data focused on the marked uptick in health spending over the previous several decades, the first volume noted “our knowledge of this single item of expenditure is incomplete, scattered, and fragmented.”² “It could be assumed,” the authors also added, “with reasonable accuracy that improved and increased medical services are reaching more people.”³ The volume was itself fragmented and incomplete, but was nonetheless more far reaching than many prior attempts. Among the topics analyzed were the relatively well-studied area of hospital economics and the less examined area of pharmaceuticals, as well as the seriousness of medical spending reaching 5.4 percent of GNP and the doubling of health care expenditures over the previous thirty years.

While the first volume of the series sought to better understand and document general trends in health spending in the twentieth century, later editions focused more closely on single issues and how to understand health and disease under the lens of economics as well as their role in the national economy. Volume 5, written by Dorothy Rice, focused exclusively on the economics of cardiovascular disease and cancer and clarified the mounting costs of healthcare in

1. U.S. Public Health Service, *Medical Care Financing and Utilization. Source Book of Data through 1961. Health Economics Series No. 1* (Washington, DC: US Government Printing Office, 1961).

2. *Ibid.*, V.

3. *Ibid.*

general. More importantly, however, it revealed an intellectual and economic shift in the nation's disease profile: chronic disease far outweighed infectious disease as the primary medical and economic problem facing modern societies.⁴ Examining heart disease, Rice concluded that this one chronic disease accounted for approximately half of all deaths. The economic implications of this change, however, were more difficult to numerate so precisely but the financial toll was no less severe: “Cardiovascular disease (including stroke) and cancer impose a multibillion dollar burden on the nation's economy each year.”⁵

In this chapter I focus on the professionalization of health economics in the United States during the 1960s and continue the previous chapters’ analysis of the intellectual evolution of disease and health as economic phenomena. The focus on chronic disease as an economic phenomenon occurred at a time not only when it had surpassed infectious disease as an economic and humanitarian burden in the United States, but also at an intellectually critical juncture when health spending began to be understood as an economic problem. During this period, the public health tradition of economics was also increasingly marginalized at a time when welfare states began to expand in the United States and Europe. In this chapter I will continue to analyze how health economics diverged from the tradition of social medicine and departed from the intellectual foundations developed to understand malaria and infectious disease. Unlike public health economics, the discipline of health economics did not have a long-term tradition of analysis or a frequently cited group of core authors such as CEA Winslow and John Hanlon. Health economists, unlike Sonti Dakshinamurty and Michael Kaser, pursued research intended to critique the assumptions of public health researchers in order to re-orient the economic study of

4. Dorothy Rice, *Economic Costs of Cardiovascular Disease and Cancer, 1962. Health Economics Series No. 5* (Washington, DC: US Government Printing Office, 1965).

5. *Ibid.*, 450.

health according to traditional forms of academic economic analysis.

By the early 1960s economists and public health researchers had reached a consensus that chronic illness, especially heart disease, was the most economically and medically urgent problem facing the American healthcare system. While recognizing the economic importance of chronic illness, the early history of health economics as a professional discipline is noteworthy for the relative absence of scholarship focusing on the economic impact of different diseases when compared to the public health research that preceded it. The critical function of research related to the Malaria Eradication Program, which sought to highlight the scale of the loss of human life by putting a dollar value on the economic losses, was replaced by a less critical intention of redefining the concept of cost “from the traditional accounting entry to one with greater economic content.”⁶

By analyzing important moments in the professionalization of health economics in the 1960s this chapter aims to further explore the similarities and differences between public health and economics during that critical decade. Whereas the first chapters of the dissertation examined the history of an international health program organized under the auspices of an international organization, health economics and the economic study of chronic disease was largely a domestic, American research program conducted as part of trends in American government, healthcare and academic economics. According to a working paper written by Luis Pina Rebelo, the only known attempt to write a brief history of the field, “It is universally recognized that Health Economics had its origins in the USA.”⁷

6. Rashi Fein, *Learning Lessons, Medicine, Economics and Public Policy* (New Brunswick: Transaction Publishers, 2010), 18.

7. Luis Pina Rebelo, “The Origins and Evolution of Health Economics: A Discipline By Itself? Led by Economists, Practitioners or Politics?” (Working Papers 16, Economics, Universidade Catolica Portuguesa, Porto, 2004), 2.

Despite these relevant institutional and political differences, both malaria and chronic disease economics shared a central conceptual goal: a thorough questioning of the role of health in modern societies and contemporary practices used to compare the benefits of health programs. This research agenda ultimately aimed at developing a rational, decision-making tool regarding how to economize and best achieve better health. While explicitly analyzing the impact of chronic disease in the United States and the economic organization of American institutions, researchers such as Rice were working under the assumption that they were studying trends that were happening “in most other countries of the world.”⁸ This orientation was telling of their project: a more scientific understanding of disease as an economic phenomenon and a more universally applicable research program.

Defining Health as an Economic Phenomenon and the Critique of Public Health Economics

Rice’s observation that cardiovascular disease constituted a significant percent of health spending in the United States represented not only a recognition of the vast resources that were coming to be spent on healthcare, but also a change in which diseases were most affecting individuals and developed nations. As the previous chapters of this dissertation argued, the economic analysis of health was an influential discourse that, despite a lack of empirical data or analytical rigor, was increasingly a required addendum to claims about the efficacy of a particular health program. The rhetorical strength of health economics was not only a matter of economics imperialism; the term used by Kenneth E. Boulding to denote the tendency of academic economics to encroach on the academic terrain of topics not previously considered as

www.porto.ucp.pt/feg/repec/WP/162007%20-%20Rebelo%20-%20The%20Origins%20and%20the%20Evolution%20of%20Health%20Economics.pdf

8. U.S. Public Health Service, *Medical Care Financing and Utilization*, V.

within the economic sphere.⁹ On the contrary, the influence of health economics was founded on significant increase in health spending analyzed by researchers such as Rice and epidemiological transition to chronic disease as the primary health problem facing industrialized societies.

Unlike malaria, whose large impact on laborers and national productivity was taken for granted, the discourse surrounding the economics of chronic illness co-developed with the professionalization of health economics and the discipline's desire to study health phenomena scientifically. Foundational to much of the work that would be pursued over the course of the 1960s and 1970s was scholarship published during the late 1950s and early 1960s that sought to explain why and how economists had just begun to study health. These early health economists sought to delineate how health was like any other economic phenomenon and how its unique attributes defied conventional economic analysis. The most widely cited work of the early 1960s, Burton Weisbrod's *The Economics of Public Health* presented an analytical framework for the economic understanding of health and how it could be understood as similar, yet distinct, from other commodities.¹⁰ Like much of the public health research that believed morbidity from disease in general could be significantly decreased with existing technology and knowledge, Weisbrod believed that "Better health is within our grasp if only we choose to pay the price."¹¹ In a departure from public health researchers and others who sought to demonstrate the economic

9. Boulding was also one of 70 participants in the 1962 conference "The Economics of Health and Medical Care" described in the introduction and discussed as one of the founding moments of health economics. For Boulding's discussions of economics imperialism, see: Kenneth Boulding, "Economics as a Moral Science. Presidential address delivered at the eighty-first meeting of the American Economics Association, Chicago, Illinois, December 29, 1968," *The American Economic Review* 59, no. 1 (1969): 1-12.

10. Burton Weisbrod, *The Economics of Public Health. Measuring the Economic Impact of Diseases* (Philadelphia: University of Pennsylvania Press, 1961).

11. *Ibid.*, vii.

benefits of malaria eradication, Weisbrod also aimed to establish that “what is true about the commodity, health, is equally true of virtually any other commodity one might mention.”¹²

The challenge for academic economists in the early 1960s was to reconcile how to analyze health like any other commodity while also accounting for the unique attributes that made it unlike other economic phenomena and therefore difficult to analyze with conventional economic knowledge or previous public health research. According to Selma Mushkin, the relatively little attention health and the medical marketplace received and the first attempt to formally define health economics, “can be traced to the special characteristics of medicine that mark it as an exception to economic propositions that explain the mechanism of the market generally.”¹³ Weisbrod identified one of these characteristics that distinguished health from other commodities as the external economies that create its ‘collective-good’ nature.¹⁴ Unlike other commodities, individual health was much more limited by the extent to which individuals could economically control their own health apart from other members of society. The price of developing a vaccine, for example, would be prohibitive for even the wealthiest, but potentially very economical if developed for use by society as a whole. Even where vaccines exist economic benefits are distributed in unique ways. Even the unvaccinated can potentially benefit if a sufficient number of those around them are vaccinated because it would decrease the likelihood of contracting an infectious disease. Over time, the social dimensions of disease as well as the benefits accruing from newly developed treatments created complexities that made health especially challenging to analyze using already existing economic theories.

12. Ibid.

13. Selma Mushkin, “Toward a Definition of Health Economics,” *Public Health Reports* 73, no. 9 (September 1958): 786.

14. Weisbrod, *The Economics of Public Health*, 17-18.

Health also differed from other commodities since it was often provided outside the market. As a commodity frequently provided by philanthropic organizations and the government, the standard measures -profit and the profit motive- were not adequate explanations for economic activity within the health marketplace.¹⁵ Likewise, the measuring of profits could not be used as a market-based test to determine the efficiency of resource allocation. Since providers did not always seek to find prices for their products and services that would lead to profit, “price was not the sole means by which demand and supply of health services” were equated.¹⁶ Unlike other commodities, the amount of health services patients demanded and the amount providers were willing to supply were not determined by price and were therefore outside the market mechanism; a term used by economists to refer to the manner in which the price of a commodity affects both the supply and demand for an item.

As Weisbrod explained, “Since this commodity is, in general, not for sale in the manner of most goods and services which we consume, one cannot express his demand for the commodity through the market mechanism of dollar votes.”¹⁷ Since patients cannot simply figure out what the price for health is and then decide whether or not to pay, as they could for other commodities, economists lacked price as a traditional economic guide. In the absence of a simple way to calculate the supply and demand for health, traditional macro and microeconomic supply and demand models did not suffice. According to Weisbrod, the absence of these basic characteristics contributed to the disagreement over health programs and the struggle of legislatures to devote adequate resources. Weisbrod pointed out that if legislators could just

15. Mushkin, “Toward a Definition of Health Economics,” 786.

16. Ibid., 787.

17. Weisbrod, *The Economics of Public Health*, 5.

better assess the public's unexpressed demand for better health, "how much easier it would be to obtain agreement as to a desirable amount and distribution of expenditures."¹⁸

For Weisbrod, the growth of health economics was closely linked to greater government involvement in the economy as well as the unique relationship between government and health as a commodity provided outside of the market:

As the role of government in the economy has grown, the problem of efficient resource allocation in the public sector has received increasing attention from economists. Progress has been made in the analysis and estimation of costs and benefits of public programs, especially in the water resources area but cost-benefit analysis in the public health area has lagged. The objective of the present study is to reduce the extent of this lag.¹⁹

Weisbrod and other economists did not question whether the peculiar commodity of health was desirable or attainable. They also largely agreed with the public health tradition of economics that better health was attainable. However, they did not envision their discipline as a refinement of an accounting principle as presented in *The Money Value of Man* and later employed by public health economists interested in tabulating the value of health. Although later economists would pursue a more theoretically informed research program, early health economics was initially grounded in policy. Rather than theoretically explore health as a form of human capital, early scholarship was more concerned with the management of public health spending according to rational analysis as guided by economic experts. Quoting a 1920 article in the *American Journal of Public Health*, Weisbrod explained "Public health administration is a business," and as such is amenable to economic analysis.²⁰

18. Ibid.

19. Ibid., xiii.

20. Henry Bixby Hemenway, "Economics of Health Administration," *American Journal of Public Health* 10, no. 2 (February 1920): 106. Cited in Weisbrod, *The Economics of Public Health*, 5.

Since early health economists believed that health in general and disease in particular could be analyzed like any other economic phenomena, one of their primary tasks was to define how it could be done, which they approached with a critical and positivist orientation. Despite a limited amount of data, Weisbrod hoped to show how “some of the most important economic losses due to a disease can be measured, and how these data can be useful in making a priority listing of health projects according to anticipated benefits.”²¹ Like the Malaria Eradication Program (MEP) and other such efforts to estimate the economic impact of a given disease, simplifying assumptions were employed to compensate for a lack of data. Both Rashi Fein and Burton Weisbrod assumed, as did the supporters of the MEP, that the economy would be at full employment and have an unemployment rate of 5%.²²

A fundamental problem presented in Weisbrod’s analysis of the economics of public health was the choice of an appropriate discount rate and the extent to which it impacted economic calculations. In the absence of previous empirical studies on the impact of money spent on the health of individuals and their subsequent ability to work and earn wages, Weisbrod considered the case for two different discount rates: 10% and 4%.²³ The choice of these percentages demonstrated the extent to which calculations ultimately rested on the choice of discount rates and the often-tenuous connections made between the value of health and the broader economy. Comparing the results obtained with a high rate and a low rate demonstrated “the relative dependence upon the discount rate of our conclusions regarding the comparative

21. Weisbrod, *The Economics of Public Health*, 12.

22. *Ibid.*, 30.

23. *Ibid.*, 57.

losses from different diseases.”²⁴ The choice of these two particular percentages was made to illustrate the dependence of the calculations not only on the discount rate employed, but also on economic phenomena elsewhere in the American economy. Since money invested in health would be money not invested elsewhere, Weisbrod believed it would be appropriate to consider a rate that represented “the rate of return obtainable on the best alternative use of the resources which might be devoted to improving health,” which economists referred to as marginal productivity of capital. According to Weisbrod:

In recent years common stocks of large American corporations have been yielding 5 per cent or more; when account is taken of the 52 per cent tax to which corporate profits have been subject, the average rate of return on investment is seen to be on the order of 10 per cent.²⁵

The lower discount rate was likewise chosen for its connection to recent economic phenomena: “The 4 per cent rate was chosen as the cost to the federal government of borrowing long term funds.”²⁶ For an investment in health to be worthwhile for the government, the analysis implied, the resulting benefit would at least need to exceed the cost for the government to borrow the money.

Analysts of the MEP recognized and often repeated the cautionary maxim that estimates did not include non-monetary costs or the value of human suffering avoided. Weisbrod too reviewed the limitations of the analytical framework he constructed in his book. As all economists had warned in the 1950s and 1960s, the “monetary limitation to monetary considerations may be noteworthy, for the non-monetary, psychological-sentimental costs of

24. Ibid.

25. Ibid.

26. Ibid., 58.

sickness and death may be far more important.”²⁷ More importantly for the calculation was the choice of discount rate. Weisbrod recognized that ultimately the choice of one percentage over another was insuperable since it involved a process of valuation that made accurate quantification difficult if not impossible. The choice of any discount rate, Weisbrod conceded, was not an empirical or scientific matter:

It seems clear that there exists no unique discount rate which is “correct” to use. For one thing, the relative well-being of the present generation and future generations is influenced by the choice of discount rate because of the effect on investment; and so the rate chosen implies a value judgment regarding the importance of various generations. Such “importance” cannot be achieved scientifically.²⁸

Such admissions, however, did not stop Weisbrod and economists that followed from making liberal use of the discount rate that best supported their argument. They also used simplifying assumptions, such as a fully employed economy, which were conditions true only under unique historical circumstances.

Weisbrod illustrated the difficulty of proving that controlling infectious disease, even with extremely effective measures, could be demonstrated to be economically beneficial. Such a viewpoint demonstrated economists’ general pessimism and critique of such attempts. Even widely celebrated and successful mid-century treatments, such as the Salk vaccine, were subject to criticism and doubt. Compared to the high cost of cancer, the vaccine was not believed to represent the best use of funds: “The price we may be paying for the Salk Polio vaccine is the continuation of the far greater rates of sickness and premature death and greater economic losses from cancer, tuberculosis, and other diseases.”²⁹ Although criticizing a public health success

27. *Ibid.*, 29.

28. *Ibid.*, 58-59.

29. *Ibid.*, 87.

such as the Salk vaccine may have been controversial, Weisbrod's rarely challenged conventional public health wisdom regarding the relative importance of different diseases. Weisbrod concluded his book with an overview of the three case studies he presented (cancer, tuberculosis and polio) and their relative importance, admitting they "indicate that the order of their importance coincides with that which a thoughtful worker in the public health area would have expected."³⁰ However, he did not find this a challenge to the usefulness of the methodology he developed. On the contrary, to him, it provided an affirmation of its soundness. "This fact," Weisbrod claimed, "rather than implying that little has been learned from our quantification efforts, should tend to increase our faith in the usefulness of the procedure, for it does not give results which are in striking contrast to the judgments of experts in public health work."³¹ Weisbrod did not doubt the expertise of public health researchers and officials in regards to identifying the most significant and challenging medical problems. However, Weisbrod and others undermined the legitimacy of their economic analysis and the accuracy of their economic studies. Rather than dismiss outright the possibility that disease prevention or treatment could be economically beneficial, Weisbrod introduced doubt as to whether even the most successful attempts to control infectious disease through public health campaigns could be good investments relative to the growing burden of chronic illness.

Unlike the Malaria Eradication Program and the public health economics tradition dating back to Sinton, which focused on a more expansive calculation of both direct and indirect losses, economists from the late 1950s onwards sought a more narrowly defined concept of cost that marginalized public health. Whereas Weisbrod largely limited his analysis to the benefits of

30. Ibid., 85.

31. Ibid., 86.

health programs, other early health economists such as Rashi Fein focused more exclusively on cost and the refinement of the concept to make it more applicable to health. Like much of early health economics, Fein sought to improve the study of health as an economic phenomenon, and health costs in particular, through two basic goals: the application of traditional economic terms to health and a more thorough and rigorous set of definitions for basic concepts. According to Fein, “Almost any elementary economics text contains definitions for various types of costs... The better the text (or should we say, the longer the text?), the more refinements appear and the more different definitions are presented.”³² Aware of the concept of ‘indirect costs’ and its broader social significance, Fein explained:

The concept of indirect costs is a somewhat vague one. By indirect costs of mental illness, we mean the economic loss in dollars (or in work years) that society incurs because a part of society is suffering from mental illness. Thus, we are concerned with a “what would have been” approach –e.g., what would the individuals suffering from mental illness have added and contributed to our economy if they had not been ill?³³

Fein and other economists were fully familiar with the less defined use of ‘loss’ and ‘cost’ employed for decades in public health research, but were both critical of its potential for use in policy and economics. The concept of cost Fein sought to define was not only less vague, but significantly narrower in scope. Whereas ‘Cost’ and “Loss” used in malaria research sought to underscore the loss society suffered as a whole, health economists narrowed the concept of cost to make it more economically useful.

Also distinct from the malaria eradication campaign, Fein was quick to depart from the theoretical framework outlined by Louis Dublin and Alfred Lotka in *The Money Value of a Man*. Instead, Fein employed basic economic concepts and a fundamentally different economic

32. Rashi Fein, *The Economics of Mental Illness* (New York: Basic Books, 1959), 9.

33. *Ibid.*, 11.

paradigm that he felt more accurately estimated the costs of disease. In line with Dakshinamurty and the many other public health researchers who cited and employed Dublin and Lotka's research, Fein promptly eschewed the warning that "All estimates of losses to a community obtained by some elementary process of totaling losses to wage earners, immediate families, or the like, must be viewed with extreme reserve."³⁴ Unlike Dakshinamurty and supporters of the MEP, however, Fein did not abandon caution for the sake of producing more favorable results for a funding proposal. Rather, Fein sought to add the concept of marginal cost to Dublin and Lotka's framework. Fein was aware that *The Money Value of a Man* provided an analytical framework only in the context of the actuarial work of an insurance company, which was primarily concerned with how to replace the earnings workers used to support their families. Fein's refinement of the concept of cost went beyond a more rigorous accounting principle and introduced the general economic concept of the 'margin' and the more specific analysis of 'marginal cost.' This conceptual refinement represented a critique of the crude accounting calculations promoted by malaria researchers, which often simply multiplied the number of sick workers by the average cost to treat a patient to arrive at an estimate of the amount spent treating malaria. "Dividing total costs by total patient years," Fein explained, "tells us nothing about the costs incurred if an extra patient is admitted to the hospital or about the savings derived if an extra patient is discharged."³⁵ Fein's analysis sought to point out that cost estimates should begin from a different theoretical standpoint since the cost of treating a patient or the cost of comprehensively addressing a given disease never occurred in isolation from other patients or diseases. Since at least some of the health infrastructure used to treat patients exists regardless,

34. Louis Dublin and Alfred Lotka, *The Money Value of a Man* (New York: The Ronald Press Company, 1946), 86-87.

35. Fein, *The Economics of Mental Illness*, 10.

the cost of treating an additional patient is often less than a straightforward calculation might suggest. Using a simple example, Fein asked: “Does an extra guest cost anything or does the hostess add more water to the soup?”³⁶

In addition to orienting the study of the cost of illness towards the economic concept of marginal cost, Fein’s analysis of mental illness as a chronic condition also critiqued the base calculation of what exactly was lost when an individual was lost to disease either due to infirmity or death. As the previous chapters analyzed in greater detail, early attempts to calculate the social and economic losses that resulted from malaria focused on the diminished productivity of laborers and, ultimately, national economic production. Beginning with the base question, “What would society lose if the individual we are discussing should die?”, Fein added that society loses not only a wage earner and producer, but also a consumer.³⁷ For Dublin and Lotka’s purposes it might have been sufficient to consider only the wage earner’s productive capacity as a male head of a household and his lost income that would need to be replaced. But, for the rest of society his death would also represent a lost consumer. While Dublin and Lotka explicitly stated they were only attempting to estimate the value of a man to his family and not his broader community, Fein and health economists in general attempted to do the exact opposite: the economic implications of health for society as a whole and the costs of treating it or not. Unlike earlier public health investigations, health economists accepted the possibility that medical decisions and the funding of public health campaigns could ultimately hinge on the outcome of economic calculations.

Such analyses were far from revolutionary in the discipline of economics, but they

36. Ibid.

37. Ibid., 19.

underscored the simplistic assumptions of many estimates used to advocate for increased health spending in support of a particular health program. Fein and other analysts began with a relative conceptual blank slate, unlike public health researchers analyzing the economics of malaria who were faced with the political-economic necessity of justifying an expensive international health program as well as a defined conceptual framework dating back to the early twentieth century. Disease economics had been pursued within public health departments, but the new generation of health economists was relatively unencumbered by either the politics of a particular health campaign or disciplinary convention. In his memoirs, *Learning Lessons: Medicine, Economics and Public Policy*, Fein described how he came to health economics almost by “accident.”³⁸ Asked by the Joint Commission on Medical Illness and Health, a private organization partly funded by the federal government, if he would be interested in writing a book about the economics of mental health, Fein described the project as a unique opportunity. According to Fein, “The fact that there were no ‘specifications’ and that I would be given complete freedom to define the inquiry as I saw fit was intriguing and I agreed to undertake the project.”³⁹ As an economist not trained in public health, Fein decided to accept the commission and intended “to make a contribution by redefining the term ‘cost’ as in the ‘cost of mental illness’ from the traditional accounting entry to one with greater economic content.”⁴⁰ Fein’s insights as to how best to calculate economic cost may have been more nuanced and accorded greater weight to economic concepts, but originality did not extend to his empirical analysis. The detailed economic data presented in *The Economics of Mental Illness* offered little more than a

38. Fein, *Learning Lessons, Medicine, Economics and Public Policy*, 17-18.

39. Ibid., 18.

40. Ibid.

republishing of data collected by others on the topic and lacked original economic analysis.

Although his discussion of economic concepts demonstrated a strong background in economic methodology and theory, the tables of data and calculations he used for quantitative analysis did not go beyond percentages and the application of different discount rates, concepts well covered by Dublin and Lotka.

Dorothy Rice and the Empirical Study of Health in the Early 1960s

What the research of other economists and public health researchers lacked, and which Rice's publication could partially lay claim to, was a collection of reliable statistics and economic data that revealed distinct economic trends, the transition from infectious to chronic disease, and the increasing amount of public funds used to research and treat the problem. Comparing data on "Expenditures for Cancer Research Grants by Source of Funds," Rice documented the vastly larger amount of money going to research for this one area in 1963 compared to 1946.⁴¹ From \$617,918 in 1946, cancer research expenditures had increased to \$98,822,738 in 1963. The percentage of this funding coming from public sources also increased, rising from 58% to 88%. Despite the lack of innovative methodology or, as was claimed, a framework that could be used to understand other diseases or programs, the comprehensive data Rice provided was itself a note-worthy accomplishment.

Compared to the data employed in the debate surrounding the MEP and malaria over the course of the twentieth century, Rice's work gave readers a detailed, empirical estimate of expenditures on cardiovascular disease and cancer in the United States that was accompanied by concrete estimates of how much was also being spent on research. As both health economists and public researchers studying the economic value of malaria had repeatedly lamented, there was a

41. Dorothy Rice, *The Economic Costs of Cardiovascular Disease and Cancer*, 516.

general lack of relevant data related to the economics of disease and medical care. Rice did not resolve the problem definitively, but significant strides were made.⁴² In contrast to supporters of the Malaria Eradication Program, Rice and the other authors of the volumes in the Public Health Series did not devote their efforts to a cost-benefit analysis of the diseases or health programs they were investigating with the intent on building a case for more health spending. Rather, one of their goals was meticulously document the increasingly vast sums of money spent on health in general and chronic diseases in particular.

Rice's 1962 publication on the economics of cardiovascular disease and cancer, as the fifth volume in the series, was closely connected to an evolving discourse on the transition to chronic disease and the importance of understanding costs in the management of illness. Completed in 1964 and based on data from 1962, the study was conducted by Rice as an economist at the United States Public Health Service, but had its origins in the Heart Disease Control Branch of the Division of Chronic Diseases.⁴³ Believing that data on the annual direct expenditures on cardiovascular research and disease treatment "were needed for program planning in heart disease control," the Heart Disease Control Branch asked the USPHS Health Economics Branch in the fall of 1963 to conduct a study.⁴⁴ The Commission on Heart Disease Cancer and Stroke, established in March 1964 by the President of the United States, also asked a short while later for a broader study of "expenditures for cardiovascular diseases by including the indirect costs of illness, disability, and premature death arising from these diseases and to

42. Weisbrod, *The Economics of Public Health*, ix.

43. Rice, *The Economic Costs of Cardiovascular Disease and Cancer*, 441.

44. *Ibid.*

make a parallel study of the economic costs of cancer.”⁴⁵ Based on these requests, the report focused on the economic costs of heart disease, stroke and cancer. And yet it claimed, like Fein and Weisbrod, to offer much more:

It offers a sound approach for the study of the economic costs of other diseases. It can be effectively utilized in developing policies in health manpower and health facilities. It can also serve as a basis for the rational assessment of requirements and allocation of resources in the health field.⁴⁶

While the study did represent a concentrated case study, Rice made explicitly clear that methodologies used to analyze one group of chronic diseases provided a replicable framework to understand the economics of disease and healthcare in general. Whereas research related to the MEP focused on assessment of the economic impact of this one disease, research in the 1960s increasingly used the economic study of individual health problems as templates for a more thorough scientific understanding of the economics of health and disease in general creation of a new discipline.

While purporting to offer a framework that could be used to analyze other diseases, Rice’s analysis in the *Economic Costs of Cardiovascular Disease and Cancer* focused on the empirical collection of data and the estimation, much like Fein, of the ‘direct’ costs of this group of diseases. Contrary to much of the analysis presented by economists and public health researchers who debated the value of malaria eradication, Rice and other health economists were more reluctant to speculate as to the indirect costs of chronic disease. Additionally, Rice’s study focused on the costs of medical treatments and largely left out a more speculative analysis of the economic benefits of treating disease.

Rice’s study and *The Health Economics Series* in general demonstrated that the

45. Ibid.

46. Ibid.

professionalization of health economics was not an exclusively academic trend driven by economics imperialism. Rice's position within the USPHS and the funding accorded to health economic research by both the USPHS and the amendments to the Hill-Burton Act in 1955 demonstrated the extent to which health economics had become not only more professionalized as it moved away from public health and towards the economic profession, but also more public. Health economic research was increasingly funded and published by the US federal government, which indicated a change in the status of health economics a policy relevant social science. It also marked a perceived and real fundamental change in both the role of healthcare in the modern American economy and the government's role in the management of health resources. The Food and Drug Administration had long since played a large role in the safety of the nation's medical supplies and the Hill-Burton Act provided a substantial amount of funding for hospital construction. However, neither represented a fundamental shift in the perceived ability to manage national health resources or a comprehensive attempt to organize health services along rational economic lines.

The interest of the USPHS in the economics of American medicine demonstrated that the significance of the professionalization of health economics extended beyond academic research and a novel attempt to rationalize the organization of healthcare. It also indicated that new intellectual trends had shifted economic analysis away from private organizations and towards public analysis and public administration. Although an impressive collection of data, much of the information analyzed and cited in the volumes of the *Health Economics Series* was originally collected by private groups and trade organizations such as the American Heart Association, American Hospital Association, and the American Medical Association. The analysis provided by Rice and other authors in the series may not have been analytically innovative, but the

organization of the previously fragmented data on health phenomena across numerous philanthropies and medical industries under the auspices of a government research project indicated something significant: it signaled the extent to which health economics had become legitimized as an established field of analysis and a topic of public concern.

Kenneth Arrow and Uncertainty as a Topic of Economic Analysis

Although research by economists such as Weisbrod, Mushkin and Fein received wide readership within both public health and economic circles, health economics was still a largely undefined field. As discussed in the introduction, Mushkin had provided the first known comprehensive definition of health economics in her 1958 article “Toward a Definition of Health Economics” published in *Public Health Reports*, but the scholars interested in the field had yet to establish a yearly conference or even settle on the name ‘health economics’ as the title of their field.

If the 1962 conference provided health economics with a meeting to develop their research community independently of public health and identify all economists beginning to work in the still undefined field, an article published in December 1963 by one of the conference participants more clearly defined the field and expressed in mathematical language what made health an economic phenomenon. Identified by economists in the 1960s as the founding moment of the new discipline, Kenneth Arrow’s article “Uncertainty and the Welfare Economics of Medical Care” was the first work contemporaries believed connected health economics to academic economics.⁴⁷ Arrow was a member of the Council of Economic Advisors under the Kennedy Administration at the time of the health economics conference and a professor of

47. Kenneth Arrow, “Uncertainty and the Welfare Economics of Medical Care,” *American Economic Review* 53, no. 5 (December 1963): 941-973.

economics at Stanford University at the time the paper was published. He also conducted research for the paper as part of a series of papers on the economics of health, education and welfare sponsored by the Ford Foundation.⁴⁸

Arrow's 1963 article came to be seen as the founding moment of the new discipline due to the paper's clear definition of its object of study as different from public health economics as well as a theoretical orientation that described how analysis of this object applied to economic phenomena generally. Like many of the foundational works by early health economists, Arrow sought to analyze on a theoretical level what he considered distinctive about the economics of healthcare. Whereas previous attempts by Mushkin, Weisbrod and Fein focused on demonstrating how health and healthcare could be analyzed with basic economic concepts, Arrow's paper represented a significantly more theoretical investigation. Arrow's theoretical analysis also suggested a critical approach to role of markets in healthcare and a subtle but forceful attempt to undermine normative and positive claims that healthcare would be best organized by the market. Rich in theoretical implications and advanced mathematics, Arrow identified uncertainty as the fundamental characteristic that distinguished healthcare as a commodity and complicated the market's normal and assumed ability to allocate resources efficiently:

It is contended here, on the basis of comparison of obvious characteristics of the medical-care industry with the norms of welfare economics, that the special economic problems of medical care can be explained as adaptations to the existence of uncertainty in the incidence of disease and in the efficacy of treatment.⁴⁹

Based on an ostensibly simple and fundamental characteristic of disease, the inability to know

48. Ibid., 941.

49. Ibid.

with absolute certainty when it will strike and how to best pursue treatment, Arrow developed with mathematical proofs a discourse more informed by the theories of welfare economics than previous researchers then associated with health economics. Despite basing his analysis on a fundamental feature of illness and health, Arrow's work distinguished itself from public health economics through its focus: "It should be noted that the subject is the medical-care industry, not health."⁵⁰ Arrow's work approached the problem the problem of health as an economic topic with unprecedented mathematical rigor, but it was the article's clear focus on "the complex of services that center about the physician, private and group practice, hospitals and public health" that also made it a standard setting text.⁵¹ Compared to public health economics, health economics focused on the economics of the goods and services designed to treat illness and not disease itself. Although chronic illness was the source of the uncertainty that drove Arrow's explanation of what made healthcare unique economically and difficult to organize according to market principles, the academic focus of Arrow's paper and health economics in general was on the growing myriad of services and institutions created to address this problem. Compared to public health, disease took a decidedly secondary role.

Although the paper focused on an assessment of the competitiveness of the medical-care market and "the presence or absence of the preconditions for the equivalence of competitive equilibria and optimal states,"⁵² Arrow's paper was seen to be "generally applicable to all commodities involving such uncertainty."⁵³ As researchers trained in economics who

50. Ibid.

51. Ibid.

52. Ibid., 944.

53. Dennis S. Lees and Robert G Rice, "Uncertainty and the Welfare Economics of Medical Care: Comment," *American Economic Review* 55, no. 1-2 (March 1965): 140.

subsequently studied healthcare, many health economists were not exclusively interested in disease or medical attempts to treat it, but rather what insights the study of medical care could offer to academic economics and recent developments in the American economy. Recalling what attracted him to the study of health economics, Victor Fuchs explained:

My involvement in health economics grew out of my research on the services industries. It was motivated in part by a desire to gain a better understanding of the postindustrial society that was emerging in the United States and other developed countries.⁵⁴

Although a detailed analysis of the concept is beyond the scope of this chapter, Arrow's 1963 essay was likewise motivated in part by the desire to improve the understanding of the phenomenon economists called information asymmetry and the branch of microeconomics called information economics. While those more interested in the economics of the healthcare industry or the conceptual foundations of health economics cited Arrow's contribution to the understanding of how markets functioned in regards to healthcare and the topic of health as a commodity, the article was also a reflection on information as a difficult to define commodity relevant to all economic activity. For Arrow, the uncertainty at the center of the economics of healthcare illustrated the general role of information in economic phenomena:

When there is uncertainty, information or knowledge becomes a commodity. Like other commodities, it has a cost of production and a cost of transmission, so it is naturally not spread out over the entire population but concentrated among those who can profit most from it. (These costs may be measured in time or disutility as well as money.) But the demand for information is difficult to discuss in the rational terms normally employed. The value of information is frequently not known in any meaningful sense to the buyer; if, indeed, he knew enough to measure the value of information, he would know the information itself. But the information, in the form of skilled care, is precisely what is being bought from most physicians, and, indeed, from most professionals. The

54. Victor R Fuchs, "Economics, Values, and Health Care Reform. Presidential Address delivered at the 108th meeting of the American Economic Association, January 6, 1996, San Francisco," *American Economic Review* 86 (March 1996), (86) 1-25. Republished in Victor Fuchs, *Who Shall Live? Health, Economics and Social Choice 2nd Edition*. New Jersey: World Scientific, 2011, page 195.

elusive character of information as a commodity suggests that it departs considerably from the usual marketability assumptions about commodities.⁵⁵

In examining healthcare Arrow not only defined health economics apart from public health economics through a focus on industry instead of health phenomena such as disease, but also cemented the discipline's place in academic economics. Arrow used what he believed to be the defining characteristic of health, uncertainty, to illustrate the role of information in economic phenomena. Arrow drew on healthcare's elusive character as a commodity to illustrate the central role of an even more elusive commodity in transactions in general: information. Arrow's use of the unique dynamics of the patient-doctor relationship at the center of healthcare as a means of illustrating abstract and fundamental economic principles helped define health economics as an academic subfield whose findings were as applicable to academic economics as they were to public policy and public health.

Arrow was not without his critics. While Arrow's paper was widely seen as the conceptual foundation of health economics and few doubted the relevance of key concepts such as uncertainty, politics and normative claims were not entirely removed from theoretical debates. Dennis Lees, one of the few non-American economists active in academic health economics in the 1960s, published a criticism of Arrow's work that he co-authored with Robert G. Rice while at the University of Chicago as a visiting professor.⁵⁶ A British researcher whose work was supported by a conservative economic think tank, the Institute of Economic Affairs, Lees' assessment of Arrow's work stemmed from his opposition to government involvement in the provision of health care and health insurance. Lees identified this as one of the principal policy

55. Arrow, "Uncertainty and the Welfare Economics of Medical Care," 946.

56. Dennis S. Lees and Robert G. Rice, "Uncertainty and the Welfare Economics of Medical Care: Comment," 140-155.

implications of Arrow's description of the problem of uncertainty and the failure of the market to provide health insurance for the entire population.⁵⁷

Much of Lees' criticism of Arrow's article had been previously described in his 1961 and 1962 publications, which targeted the creation and continued existence of the National Health Service. Similar to the analysis he would present against Arrow, his 1962 article "The Logic of the National Health Service" attempted to prove that national health coverage could be provided without the direct involvement of a national government. In a denunciation of the logic used to support the NHS, Lees described its establishment as "revolutionary change."⁵⁸ He concluded that "Of all the post-1945 acts of nationalization, only in the case of the NHS was every semblance of spontaneously adjusting market destroyed and displaced by total socialist planning and administration."⁵⁹ In contrast to Arrow, Lees denied that medical care was any "different from other things that are normally bought and sold in markets."⁶⁰ Consequently, Lees considered that in the establishment of the NHS "The decisive step was the removal of prices for the users of health services," which he believed was also a policy prescription implied by Arrow's research that pointed to the non-marketability of risk.⁶¹ Lees' was unabashedly in favor of a system of healthcare that was organized according to free market principles and opposed any

57. For additional papers by Lees focused on the criticism of public health insurance, see: Dennis S. Lees, "The Economics of Health Services," *Lloyds Bank Review* 56, (April 1960): 26-40; and *Health Through Choice: An Economic Study of the British National Health Service*, (London: Institute for Economic Affairs, 1961).

58. Dennis S. Lees, "The Logic of the British National Health Service," *Journal of Law and Economics* 5, (October 1962): 111.

59. *Ibid.*

60. *Ibid.*, 114.

61. *Ibid.*, 111.

theoretical or normative position that suggested otherwise. Citing an increase in voluntary insurance coverage in the United States to “around 70 percent” by 1962, Lees believed the market-based system of providing healthcare was beyond reproach.⁶² Within a generation, Lees and his co-author argued, voluntary insurance would cover almost the entire American population and “Whatever role government is to play in this transition, it would at least seem inappropriate to create permanent institutions to deal with what is essentially a temporary problem.”⁶³

Arrow’s response to their criticism, published in the same edition of the *American Economic Review*, recognized that Lees’ opposition to his theoretical analysis on policy grounds was not unfounded. Arrow conceded “It is clear that their proposition is broadly true, and will be accepted for the purposes of this discussion; as they make clear, it is certainly consistent with and to some extent implied by my paper.”⁶⁴ Although he responded to Lees’ criticism with a technical, economic analysis, Arrow identified the source of conflict as outside the theoretical grounding of his research or empirical analysis: “The issue between us concerns the normative implications of this proposition.”⁶⁵ Published in March 1965, the same month Medicare was introduced as a bill to the U.S. Congress, the Arrow-Lees debate demonstrated that health economics had moved away from disease analysis and the advocacy of eradication programs. Yet, the re-orientation of the field towards academic economics and away from public health had not stripped the new field of politics or loosened the connection between normative statements and economic analysis.

62. Lees, “Uncertainty and the Welfare Economics of Medical Care: Comment,” 152.

63. *Ibid.*, 153.

64. Arrow, “Uncertainty and the Welfare Economics of Medical Care,” 155.

65. *Ibid.*

The debate underlying the exchange between Arrow and Lees ultimately centered not on how to analyze health according to economic science or whether or not government possessed the capacity to provide healthcare effectively. Rather, it narrowed into a normative assessment of what role it should play in society. Responding to Lees' criticism as a normative argument, Arrow concluded that “the relevant criticism of government health insurance would seem to be not that it would not accomplish its purposes, but that its success is incompatible with the attainment of some other objective.”⁶⁶ Health economists in the 1960s would more frequently question the aptitude of their methodologies or resort to the language of advanced mathematics and mathematical proofs to resolve theoretical debates. Nonetheless, the establishment of health economics as an economic science seemed to suggest the discipline remained closely connected to normative debates. Instead of advocating for disease eradication programs and extolling the value of health like the public health discipline it had sought to displace, health economists frequently debated normative issues regarding the economic organization of healthcare systems and the ultimate value of the market.

Conclusion

Reflecting on developments in health economics over the previous two decades, A.J. Culyer addressed the World Congress on Health Economics in 1980 and recalled the origins of the field in the early 1960s. Culyer spoke before an international audience of 350 researchers from 15 countries, far bigger than the largely American audience of 70 economists who traveled to the University of Michigan in 1962:

If one takes 1963 as the year of the real watershed in health, (it was, of course, the year of Arrow's classic article in the *American Economic Review*) it is striking that nearly all the published work on health by economists up to and including that point year was

66. Ibid.

concerned with questions of welfare economics.⁶⁷

Like other economists who pointed to key publications in the early 1960s as foundational to the development of the discipline, Culyer was right to point out the extent to which researchers had coalesced around the theoretical orientation of welfare economics and of Arrow's work in particular. Culyer's brief internal history of the discipline omitted, as did many others, the early relationship between health economics and public health through the mid-1960s.

Despite the real and perceived break with public health in the 1960s in favor of welfare economics, and eventually econometrics, the first steps towards professionalization occurred as part of the longer-term tradition of public health economics and the analysis of disease. As analyzed in the early sections of this chapter, the foundational publications of economists such as Rashi Fein and Burton Weisbrod drew freely on the twentieth century tradition of public health and the often-cited public health maxim "better health is purchasable." As researchers who were interested in developing the field as an economic discipline, they each focused on the costs and benefits that would result from reducing the burden of chronic diseases, not unlike the contemporaneous supporters of the Malaria Eradication Program. Unlike those supporters, however, both economists sought to intellectually refine the concepts applied to the analysis of disease. In doing so, Fein and Weisbrod undermined the assumptions earlier public health researchers had relied upon to produce their estimates. The conceptual refinement of 'cost' and 'benefit' did not rely on intellectual or methodological innovation as much as the application of well-established ideas in academic economics. The overarching goal of the earliest work by economists focused on providing a general economic perspective and proving that economic

67. A.J. Culyer, "Health, Economics and Health Economics," in *Proceedings of the World Congress on Health Economics, Leiden, The Netherlands, September 1980*, ed. J. van der Gaag and Mark Perlman (New York: North-Holland Publishing Company, 1981), 5.

tools used to analyze markets were suited to the study of health.

By the time of the 1962 conference at the University of Michigan, economists interested in health and medicine sought to abandon not only the calculations and concepts of public health economics, but also its focus on disease. Compared to the publications of public health researchers and the supporters of the Malaria Eradication Program, disease was conspicuously absent from the research agenda pursued by health economists over the course of the 1960s despite the recognition that increases in health expenditures and the resulting burden of disease on society resulted from the mounting challenge of how to manage chronic illness. A small number of publications attempted to calculate the costs of chronic diseases and how best to conduct cost-benefit calculations. However, health economists defined their field theoretically, methodologically, and topically separate from the study of disease and public health.

This movement away from public health was physically manifested in the changing of the location of the health economics' yearly meeting and intellectually in the changing of research topics. Weisbrod, Fein, Mushkin and Rice were all concerned with proving economic analysis could be applied to health. And yet by the 1962 conference at the University of Michigan the principal theoretical objective changed to defining the limitations of analyzing healthcare as a commodity and the failure of markets. Rather than building on Weisbrod's general economic perspective of disease and public health, researchers largely abandoned older topics in favor of medical industries and insurance. The mixing of normative and positive questions on the eve of Medicare left the discipline with its own political debates and limitations even as researchers in the field hoped to establish a more scientific and quantitative discipline.

Unlike public health economics, health economics was conceptually freed from the requirement to advocate for increased health funding and the benefits of specific public health

campaigns. The rapid growth of health spending in the 1960s meant that health economists no longer needed to pursue research under the “Good Health is Good Business” paradigm discussed in the introductory chapter. With investment in health growing at such a rapid pace, health economics no longer supported a critical orientation that sought to highlight the magnitude of human death and suffering through economic calculations. By the early 1960s corporations, the government and the public largely supported devoting more spending to health giving progressive economists the ability to expand their research programs.

Liberated from the need to justify funding or prove the negative impact of disease, health economists successfully established their discipline as policy relevant and as a branch of economic analysis. Professionalization nonetheless presented its own set of limitations. More often than not, the expanding American healthcare economy from the 1960s onwards found health economists arguing the opposite of what their predecessors had: increased spending on healthcare would not necessarily improve health as resources were limited and could be better invested elsewhere in the economy. As Victor Fuchs would later argue in his essay “The Economics of Health in a Post-Industrial Society:”

The most important, and perhaps the most surprising, finding of health economics is this: Holding constant the state of medical technology and other health-determining variables, the marginal contribution of medical care to health is very small in modern nations. Those who advocate ever more physicians, nurses, hospitals, and the like are either mistaken or have in mind objectives other than the improvement of the health of the population.⁶⁸

Unlike the tradition of public health economics and the Malaria Eradication Program that sought to highlight the economic benefits of ridding developing economies of infectious disease, health economics increasingly became a ‘dismal’ science when compared to the public health tradition that preceded it. Coined by the Victorian historian Thomas Carlyle as a derogatory name for

68. Victor Fuchs, “The Economics of Health in a Post-Industrial Society,” *Milbank Memorial Fund Quarterly* 57, no. 2 (Spring 1979): 3.

economics, the term dismal science sought to highlight the often cynical and pessimistic policy prescriptions and predictions offered by economists when faced with social problems. Compared to earlier researchers, health economics had lost public health economics' critical function: to highlight the negative impact of disease on human well being and advocate on behalf of programs known to improve it.

With a new policy focus on the 'direct' costs of health programs and healthcare financing, the economic study of health lost part of its critical role highlighting the magnitude of 'indirect' costs. Estimates of indirect costs may have been speculative, but the reluctance of health economics to address the calculation theoretically and empirically resulted in a discipline that was focused more on discouraging spending that was not deemed efficient and less focused on reform. The discipline may have initially been free of such a focus on calculation and the need to attract funding to health programs, but by the mid-1960s American health economics was increasingly embroiled in political debates surrounding Medicare. No longer debating the economic benefits of health programs, health economics faced new limitations as an established social science tasked with researching the appropriate role of the state in the new healthcare economy and whether or not medical care was any "different from other things that are normally bought and sold in markets."⁶⁹

69. Lees, "The Logic of the British National Health Service," 114.

Chapter 4

The Gift Exchange: Blood, Economy and Health in the 1970s

In 1971 Richard Titmuss published *The Gift Relationship-From Human Blood to Social Policy* and provided critics of private enterprise an empirical and philosophical case against commercialism in medicine.¹ Comparing the blood donation systems of the United Kingdom and the United States, *The Gift Relationship* used blood as a case study of the relationship between economics and health and exemplary of the differences between socialist and capitalist social policy. Titmuss sought to empirically demonstrate, contrary to the arguments of professional economists, that market-based blood collection and distribution systems were less efficient than non-remunerated blood donor systems. Not only did Titmuss provide evidence that they were wasteful since large amounts of blood were discarded and never transfused, but he also proved that paying donors to give blood endangered patients as it resulted in significantly higher rates of hepatitis transmission. Using comparative case studies and anthropological theory to bolster his claim, Titmuss described how the American system of paying donors to give blood attracted the poor who more frequently suffered from infectious diseases that could be transfused to patients. For Richard Titmuss blood was “a social indicator; perhaps the most basic and sensitive indicator of social values and human relationships that could be found for a comparative study.”²

The implications of Titmuss' study and its general critique of capitalism were not lost on American reviewers. Published in the US in 1971, there were soon no fewer than five columns

1. Richard Titmuss, *The Gift Relationship- From Human Blood to Social Policy* (New York: Pantheon Books, 1971).

2. *Ibid.*, 198.

dedicated to the book in the *New York Times* and the *Washington Post* alone.³ The topic of blood donation also quickly caught the attention of the Nixon Administration, which declared blood a “unique national resource.”⁴ Although not formally trained in economics or quantitative methods, Titmuss nonetheless presented an economic and statistical critique of capitalist health institutions that also elicited responses from noted economists Robert Solow and Kenneth Arrow.⁵

The significance of *The Gift Relationship* and blood donation extended beyond academic discourse and debates among economists. Following its publication numerous exposés were published in American newspapers, which set in motion a series of investigations by the US Congress and American regulatory agencies. While Titmuss focused his critique on the ethics of remuneration and whole blood collection, media coverage throughout the 1970s unveiled the burgeoning and unregulated market of for-profit blood plasma collected from ‘skid rows’ across the country. The Centers for Disease Control and Prevention, attempting to quantify the magnitude of the problem, estimated 3,700 deaths per year from transmission related hepatitis while others suggested a dollar figure of \$251.1 million in medical costs and lost productivity.⁶ However significant the economic impact of hepatitis, the disease and its relationship to the

3. Clark C. Havighurst, “Trafficking in Human Blood: Titmuss and Products Liability,” *Law and Contemporary Problems* 72, no. 3 (2009): 1.

4. Richard Nixon, “Special Message to the Congress on Health Care. March 2, 1972.” Online by Gerhard Peters and John T. Woolley, *The American Presidency Project*. <http://www.presidency.ucsb.edu/ws/?pid=3757>.

5. Philippe Fontaine, “Blood, Politics and Social Science: Richard Titmuss and the Institute of Economic Affairs, 1957-1973,” *Isis* 93, no. 3 (September 2002): 429-433.

6. United States General Accounting Office, *Hepatitis from Blood Transfusions: Evaluation of Methods to Reduce the Problem* (Washington, DC: US General Accounting Office, 1976), 2. <http://babel.hathitrust.org/cgi/pt?id=pur1.32754063380558;view=1up;seq=14>

economic organization of healthcare systems and the American economy attracted national attention in 1970s. Titmuss' analysis, despite several oversimplifications and inaccuracies, helped expose the shortcomings of a fragmented system of competing healthcare providers that had previously prompted academic study and litigation, but not significant reform.

In the 1960s and early 1970s hepatitis and infectious disease received the most attention from public health departments and researchers concerned with the relationship between remuneration and post-transfusion health problems, but the emergence of blood as a public health issue was predicated on the emergence of chronic disease as the primary medical problem facing economically developed societies. The dramatic increase in the need for donated blood and the expansion of blood service infrastructure in the 1960s originated from the advent and accessibility of new procedures to treat heart disease and cancer that required massive blood transfusions. As rates of chronic disease increased and procedures such as open-heart surgery became available to a larger portion of the global population, the economically efficient and medically safe delivery of blood to patients became a greater health concern. New procedures, such as open-heart surgery, required massive amount of blood, initially around 200 units per patient. Increasing cancer rates and new surgical procedures, which more often resulted in increased blood loss, likewise increased demand for blood and its derivatives.

In this chapter I will examine the blood transfusion and hepatitis controversy of the 1970s as an important episode in the history of health economics. The beginning of this chapter will provide a brief overview of the political, economic and scientific origins of blood products and blood donation during the Second World War and the post-war era. Whereas the previous chapters examined the evolution of the economic study of health away from its origins in public health and towards a professionalized discipline under the influence of quantitatively trained

economists, the final chapter of the dissertation will examine the lasting influence of non-economists such as the physician J. Garrott Allen and Richard Titmuss. Contrary to the trends analyzed in previous chapters, this chapter will point to the limitations of economic analysis in public policy and politics as well as the marginalization of economic analysis in the blood donation debates of the 1970s.

Blood Transfusion and the Second World War

The social, economic and ethical consequences of blood banking in the second half of the twentieth century were set in motion by scientific and technical developments in the field of blood transfusion in the 1930s and 1940s.⁷ The organization of blood banking in the second half of the twentieth century resulted most directly from technological and organizational efforts related to the Second World War. The development of an acid-citrate and dextrose mixture by John Loutit and Patrick Mollison during the war allowed blood to be stored for twenty-one days and most directly contributed to the use of banked blood.⁸ Edwin J. Cohn's fractionation of plasma into its constituent parts in 1940 most directly contributed to the expanded use of blood as a specialized, therapeutic product. Plasma, the pale-yellow liquid that carries white and red blood cells, had previously been separated-out through centrifugation but was not further refined into its constituent parts. Although researchers had previously suggested that blood could be more effectively used if its parts could be isolated and used for specific needs, it was Cohn's fractionation method that allowed for plasma to be processed into products such as albumin at industrial quantities.

7. Titmuss, *The Gift Relationship*, 19.

8. Louis K. Diamond, "History of Blood Banking in the United States," *Journal of the American Medical Association* 193, no. 1 (July 1965): 128.

Cohn's development of fractionation occurred at an especially crucial time: the Second World War had already begun in Europe but American participation was still more than a year away. The Plasma for Britain blood drive demonstrated the possibility of producing and shipping large quantities of blood products internationally. Unlike whole blood, plasma could be easily stored and shipped across the Atlantic and did not present the problem of blood groups. Plasma for Britain began operations on August 15, 1940, at the Presbyterian Hospital in New York City and continued until the British Red Cross was able to procure sufficient quantities on its own.⁹ By the time the program ended on January 17, 1941, 14,556 donations had been collected by the Blood Transfusion Association of New York to be shipped to the British Army through the British Red Cross. The American Red Cross (ARC) participated in the joint effort principally by providing most of the funding, approximately \$30,000, and authorizing its New York and Brooklyn chapters to recruit voluntary donors and to provide volunteers in hospitals where the blood was collected.¹⁰

Overshadowed by the mass mobilization campaigns of the war and Lend-Lease, Plasma for Britain nonetheless established several important precedents. Not only was it the first mass blood drive in the United States, but it was also the first effort to collect large quantities of American blood from civilian donors to be used for military purposes.¹¹ When the US entered the war a little less than a year after the end of the program, the American Red Cross and its chapters had a model ready when the US Army and Navy requested they cooperate in a

9. G. Canby Robinson, *American Red Cross Blood Donor Service During World War II. Its Organization and Operation* (Washington, DC: The American Red Cross, 1946).

10. DeWitt Stetten, "The Blood Plasma for Great Britain Project," *Bulletin of the New York Academy of Medicine*, 17, no. 1 (January 1941): 28.

11. Robinson, *American Red Cross*, 7.

similar program to supply the American military. Formally approved on May 12, 1941, the agreement served as the basis for the founding of the Red Cross Blood Donor Service and left the organization with the responsibility of procuring volunteer donors and acquiring the necessary funding to operate on a national scale.¹² This joint effort of the American Red Cross and the National Research Council stipulated that blood would be provided to the Army who would then negotiate contracts with pharmaceutical companies and provide blood to the other branches of the military.¹³

Plasma for Britain also marked the first large scale, international shipment of blood products. At the start of the war the use of plasma was still in an experimental stage, but the organizers of Plasma for Britain believed that enough knowledge regarding its efficiency was available to justify the effort.¹⁴ British volunteer units in the Spanish Civil War (1936-1939) had pioneered the use of blood for the treatment of battlefield injuries, but blood and plasma were collected from local civilian populations on both sides of the conflict. Following the procedures used by the German Army, Franco's units provided blood to the wounded at medical centers in the rear whereas Republican Army Medical Corps deployed to frontline areas.¹⁵

As noted by Douglas Kendrick, director of the American military's blood program, "World War II was a global war, and the blood and plasma program was an essentially global

12. *Ibid.*, 13.

13. *Ibid.*, 12-13.

14. *Ibid.*, 74.

15. *Ibid.*, 22.

program.”¹⁶ Many of the products and institutional arrangements of the post-war era originated in the infrastructure designed to supply the US military and to treat blood loss suffered as a result of traumatic battlefield injuries.¹⁷ Blood products made possible by Cohn's fractionation of plasma, such as albumin, sped the introduction of specialized treatments. Albumin first entered industrial production in 1941 when Cutter Laboratories in Berkeley began producing it from blood collected from local prisons.¹⁸ Laying the foundations of the blood processing industry, Cutter began delivering albumin to the American military by the end of 1942 and was soon followed by Lilly, Lederle, Squibb, and Sharpe & Dohme.¹⁹ Cutter, however, was the only company to continue making blood products after the war ended.²⁰

World War Two also spurred the mobilization of the American Red Cross (ARC) and the accelerated the use of banked blood. The term 'blood banking' had been in use since 1937 when Bernard Fantus at the Cook County Hospital in Chicago organized the first storage facility in the US and coined the term.²¹ It was not until the early 1940s, however, that the American Red Cross collected and distributed large quantities of whole blood as part of the war effort.²² According to

16. Douglas B. Kendrick, *Blood Program in World War II* (Washington DC: Office of the Surgeon General Department of the Army, 1964), XIX.

17. *Ibid.*, xvi.

18. *Ibid.*

19. Piet Hagan, *Blood: Gift or Merchandise?* (New York: Alan R. Liss Inc., 1982), 113.

20. Paul A. Offit, *The Cutter Incident. How America's First Polio Vaccine Led to the Growing Vaccine Crisis* (New Haven: Yale University Press, 2005), 74.

21. Bernard Fantus, “Therapy of Cook County Hospital: Blood Preservation,” *JAMA* 109 (July 1937): 128-131

22. Diamond, *History of Blood Banking*, 128.

historian and legal scholar Kara Swanson, Fantus' choice of the word 'bank' was a deliberate attempt to get physicians to think about blood in a new way.²³ The term soon stuck as hospitals across the country quickly established their own blood banks. The Red Cross national blood program ended along with the war a few years later, but local chapters continued to help hospitals recruit donors.²⁴ Physicians and surgeons, who had gained experience with blood products during the war, returned to a therapeutic environment where donors were more willing to give blood and civilian medical practice required more, and better organized, blood services.²⁵ However, the ARC's exit from blood collection was short-lived. By 1947 the ARC had re-entered the organization of blood collection and formulated a plan to establish regional blood centers to help better supply both civilian and military populations with whole blood and blood fractionations.²⁶

The importance of wartime precedents was not limited to administrative developments in the non-profit sector. Political and economic arrangements, such as government contracting with pharmaceutical companies, established a mixed system of blood as well as increased government involvement. Cohn's fractionation method, in addition to producing a new group of therapeutic products, also brought the National Institutes of Health (NIH) into the regulation of biologics. Before 1941 the NIH had not been directly involved in whole blood and blood products. As a product of blood, however, albumin and other blood derivatives were designated as biologicals,

23. Kara W. Swanson, *Banking on the Body. The Market in Blood, Milk and Sperm in Modern America* (Cambridge: Harvard University Press, 2014), 5.

24. Diamond, *History of Blood Banking*, 129.

25. Ibid.

26. Ibid.

which fell under the authority of the NIH. The production or sale of plasma, albumin and other products was illegal without a license from NIH.²⁷

The issue of who should profit from the processing of blood donated by volunteers also originated in wartime developments. The military's partnership with pharmaceutical companies expanded and, by 1943, was producing more blood products than the war effort required. Before the question of who should acquire ownership of the byproducts of plasma production became a debate, the Office of the Surgeon General had permitted commercial producers to donate red blood cells or other unneeded products to local hospitals. According to this temporary and informal agreement, laboratories were instructed not to charge the hospitals and the hospitals were not to charge patients who, preferably, would be those unable to pay.²⁸

The Origins of the Blood Industry in the Post-War Era, 1945-1970

Although some blood products made their way into civilian use during the Second World War, most plasma and its derivatives were sent internationally for use by the US military. The end of the war and the structures that had been in place to meet military demand resulted in several societal, professional and institutional developments that would impact the structure of all industries related to blood for decades to come. The widespread use of blood transfusion and blood products in all theaters of the war greatly expanded the number of physicians trained in what had been a nearly non-existent treatment only a few years earlier. When Cohn arranged for the rush shipment of albumin to Pearl Harbor in December 1941 to treat burn and shock victims,

27. Kendrick, *Blood Program*, 81.

28. *Ibid.*

the 50 canisters he sent represented the world's entire supply.²⁹ Between 1941 and 1945 the Red Cross had collected more than 13 million pints of blood for the military alone, much of which was processed into plasma and blood products.³⁰ When physicians returned to private practice they brought with them expertise and therapies that had not previously been used by civilian populations. By 1949 the US civilian blood system consisted of approximately 1,500 hospital blood banks, 46 community blood centers, and 31 American Red Cross regional blood centers.³¹

Despite the considerable manufacturing capacity that had been developed by American pharmaceutical companies and the ARC over the previous four years, the end of the war resulted in the 'demobilization' of the nation's blood resources. In 1945 the ARC stopped its program altogether. The exit of the ARC from blood collection together with the end of government organized production agreements quickly shifted blood collection towards a more decentralized and private model of procurement and distribution. In the absence of the ARC, hundreds of community blood banks opened across the country in the years following the war. Banks such as the Irwin Memorial Blood Bank in San Francisco, the first to be run on the community model, devoted its entire operation to supplying blood to local patients.

The system of local, physician controlled blood banks that appeared to be establishing itself as the post-war standard was soon challenged by the re-entry of the ARC to blood collection and its attempt to reassert itself as the organizer of a single national blood network. Concerned that the ARC would disrupt the organizations they had built after the war, community

29. Douglass Starr, *Blood: An Epic History of Medicine and Commerce* (New York: Alfred A. Knopf, 1998), 105.

30. American Red Cross, "History of Blood Transfusion," accessed January 5, 2015, www.redcrossblood.org/learn-about-blood/history-blood-transfusion#1900

31. Ibid.

blood banks across the US banded together in 1947 and formed the American Association of Blood Banks (AABB). Led by the Irwin Memorial Blood Bank and Bernice Hemphill, the AABB was formed with the explicit purpose of countering the influence of the ARC and its resurgent attempt to form a national network.³² From the very moment of the founding of the AABB, the ARC and AABB were in an antagonistic relationship which ranged from occasional cooperation to litigation. Although the ARC would have 31 regional blood centers by 1949, its reach never approached the national scope of its Second World War blood collection program even when it remobilized on a large-scale to provide the US military with blood during the Korean War.

Relations between the ARC and the AABB were strained throughout the 1950s and 1960s as the two often competed to be the dominant blood collector in key urban areas. The two organizations also represented different 'non-profit' models that disavowed paying donors or directly charging recipients. The ARC, along with the International Red Cross, had affirmed the primary necessity of non-remuneration in the years following the war and covered the costs of running its blood collection operations by charging hospitals a fee for the blood they provided. The AABB's collection methods, reflecting the organizational diversity of its hundreds of constituent members, were more complex and often critiqued by the ARC as a method of charging for blood. Although the AABB did not pay donors for their blood, they did require recipients to either replace the blood they had received through matching donations or pay a per unit fee. In this case, AABB member blood banks did not necessarily sell blood, but did require

32. Bernice Hemphill, *The Mother of Blood Banking: Irwin Memorial Blood Bank and the American Association of Blood Banks, 1944-1994, an oral history conducted by Germaine LaBerge in 1995 and 1996*, Regional Oral History Office, The Bancroft Library, the University of California, Berkeley, 1998, 111.

the patient to find friends and family to donate an equivalent amount of blood, which could be substantial in the case of open-heart surgeries or organ transplants.

In part to counter the substantial political and cultural capital the ARC was able to employ through its association with humanitarianism and non-remuneration, in 1957 the AABB formed the Committee on Inspection and Accreditation to improve and regulate standards among blood banks. While the ARC would only take a marginal role in the setting of safety standards related to blood, the AABB's lead role in acting as a scientific arbiter from the 1950s onwards increased its legitimacy as a steward of public interest. In 1958 the AABB published the first edition of its technical standards as *Standards for a Blood Transfusion Service* and founded *Transfusion*, the first American journal devoted exclusively to blood banking and its technologies, in 1961.³³

Under the stewardship of Bernice Hemphill, the director of the Irwin Memorial Blood Bank, the AABB established a blood clearinghouse modeled after the U.S. Federal Reserve System.³⁴ Although many AABB blood banks operated their own credit systems, no protocol indicated how they should distribute blood to other banks. The Pacific District Clearinghouse was established in 1951 to coordinate a debit and credit system for banks throughout the state. The goal of the clearinghouse was to better distribute blood and prevent one bank from having insufficient blood to meet its needs while another had excessive amounts that could potentially be discarded.³⁵ Housed at the Irwin Memorial Blood Bank, it was nonetheless meant to act

33. American Association of Blood Banks and the Joint Blood Council, *Standards for a Blood Transfusion Service* (Washington, DC: Joint Blood Council 1958); and American Association of Blood Banks, *Transfusion* 1, no. 1 (Jan.-Feb. 1961): 1-70.

34. Hemphill, *The Mother of Blood Banking*, 101-102.

35. *Ibid.*, 104.

independently of its host and coordinate the transfer of blood throughout the state. The clearinghouse was funded by a 25-cent transaction fee charged whenever blood was sent to elsewhere in the system.³⁶ Blood banks in Florida, Chicago, New York and Texas soon formed regional clearinghouses based on the Californian model.³⁷ In 1953 the National Clearinghouse was created under the aegis of the AABB with Hemphill acting as director of the National Clearinghouse Committee.³⁸

The contested politics of non-remuneration were further complicated during the 1950s and 1960s. Technological developments expanded the ability to collect larger amounts of blood, which was found to be an increasingly necessary therapeutic tool in the treatment of chronic disease. The increased use of blood as both a source of medicinal products and as necessary part of new surgical procedures also increased demand for blood and its potential as a source of profit. Accompanying the increased use of blood was a for-profit blood collection industry as well as legal and regulatory conflict. Unlike pharmaceuticals, federal regulation over blood collection and the production of blood products was limited and conducted under the Division of Biologics Standards at NIH, not the FDA. Moreover, the Division of Biologics Standards only had the legal authority to enforce standards on whole blood that was shipped between states, which constituted a small fraction of the blood collected by blood banks.³⁹

The authority to regulate blood that was shipped between states was a direct consequence of the Interstate Commerce Clause, which provided the US Federal Government with the power

36. *Ibid.*, 105.

37. *Ibid.*, 104.

38. *Ibid.*, 108.

39. Diamond, "The History of Blood," 132.

to regulate trade among the fifty states. Regulatory oversight and the status of blood as a medical commodity was lax due to blood donation's ambiguous legal status. The New York Court of Appeals ruled in 1954 that blood transfusion represented a service and not the sale of a product, but the issue of what sort of legal standards should be applied to blood remained contested.⁴⁰

The legal status of blood and debate over commercialization piqued public interest in 1962 as a result of a legal dispute between community blood banks and two commercial collectors in Kansas City. In the late 1950s two commercial blood banks in Kansas City began pursuing legal action against the local community blood bank for refusing to use blood that had been collected from paid donors. Formed in 1955 and licensed by the NIH, the Midwest Blood Bank and Plasma Center collected blood from "Skid-row derelicts" in exchange for payment and was joined by a second commercial operation, the World Blood Bank, in 1958.⁴¹ After complaints from the two commercial collectors that the community blood bank operated as a monopoly and pursued other anti-competitive behavior, the Federal Trade Commission (FTC) began a multiyear investigation. In 1962 the FTC ruled against the community blood bank and concluded that local hospitals had entered into contracts with the community blood bank and refused to accept paid donations from the commercial collectors because their clients were skid-row donors. According to the FTC, the community blood bank had entered "into an agreement or planned a course of action to hamper and restrain the sale and distribution of blood in interstate commerce."⁴² The FTC found the community blood bank and its partners in violation of Section 5 of the Federal Trade Commission Act of 1952, which stated that "uniform methods in

40. Havighurst, "Trafficking in Human Blood," 3.

41. Titmuss, *The Gift Relationship*, 160.

42. *Ibid.*, 161.

competition in commerce, and unfair or deceptive acts or practices in commerce, are declared unlawful.”⁴³ The boycott of a blood bank and the sale or distribution of blood, according to the ruling, was thought to represent an injury to the public that restricted and restrained interstate commerce in violation of law.⁴⁴

The FTC case quickly caught the attention of blood bank administrators throughout the US and the medical community more broadly. The American Medical Association issued a warning to doctors and hospitals suggested they change their billing practices as to not state the cost of blood.⁴⁵ In 1964 and 1967 Senator Edward V. Long of Missouri attempted to introduce bills in the US Senate that would exempt non-profit blood banks from anti-trust law.⁴⁶ For the AMA, the case represented a dangerous precedent that limited physicians’ professional sovereignty. The AMA warned physicians “It was illegal to take part in a collective decision not to buy commercial blood despite the general weight of evidence that such blood carried a much greater hepatitis risk.”⁴⁷ The president of the AABB, Dr. E.A. Dreskin declared that a society that applies the laws of the marketplace over medicine “is enforcing business practice over medical opinion.”⁴⁸ However, the Kansas City case demonstrated the often-ambiguous definitions of profit and non-profit activity as well as the flexible commercial priorities of many of the participants. Although the community blood banks in Kansas City criticized the

43. Ibid.

44. Ibid., 171-172.

45. Ibid., 163.

46. Ibid., 161.

47. Ibid., 163.

48. Ibid., 162.

commercial operations for using paid donors, FTC lawyers revealed that they also collected a portion of their blood from paid donors, which at times rose to 40% of their stock.⁴⁹ The community blood bank criticized the commercial collectors' use of prison blood, but the FTC was able to demonstrate that Community Blood Bank had established a donors program in Leavenworth Prison.⁵⁰ The AMA protested FTC intrusion into medical matters and the belief that blood was subject to competition law, but had supported the existence of commercial blood banks in 1964.⁵¹ Clinical laboratories operated by physicians and pathologists argued against the profit motive. Titmuss was later to carefully point out that in 1967 ninety-five percent of such clinical laboratories certified to participate in Medicare were under commercial proprietary control.⁵² The AABB also operated a replacement-based system that required recipients of blood to solicit donations from friends and family members or pay a fee.

Controversy surrounding the FTC decision was eventually settled in January of 1969 when the Eighth US Circuit Court of Appeals in St. Louis overturned the ruling.⁵³ The community blood bank was not successful at convincing the appeals court that they were exempt from federal trade law as a tax-exempt institution, but did succeed in convincing the court that nonprofit organizations were beyond the FTC's regulatory reach. By deciding the matter on jurisdictional grounds, the court did not rule on whether or not blood transfusion constituted a

49. Starr, *Blood*, 194.

50. *Ibid.*, 195.

51. Titmuss, *The Gift Relationship*, 163-164.

52. *Ibid.*, 164.

53. *Community Blood Bank of the Kansas City Area, Inc V. FTC*, 405 F. 2d 1011 (1969)

service or a commodity.⁵⁴ The litigation and public controversy did not mention the status of the growing number of products derived from blood, which were nearly entirely collected from paid donors.

Publication of *The Gift Relationship* and Reform in the early 1970s

The publication of *The Gift Relationship* in 1971, based on research Titmuss conducted over the previous decade, quickly caught the attention of both academic economists and a wider public concerned with the availability of blood and its original source. As Havighurst noted in his analysis of blood and product liability, numerous reviews appeared in major American newspapers in the months following its publication and in December it was chosen by the *New York Times* Book Review as one of the “seven books of special significance published in 1971.”⁵⁵ ⁵⁶ Following the publication of Titmuss’ book, investigative journalists throughout the United States began publishing exposés on the shocking practices of for-profit clinics in ‘skid row’ areas and the source of such blood among alcoholics and deviant populations.

The Chicago Tribune’s 1971 investigative series on hepatitis and locally paid donors was especially influential and was cited by congressmen seeking to regulate the 7,000 blood banks in the United States more carefully.⁵⁷ Beginning the four-part series of articles with the story of a donor known to have hepatitis, the article described how “the blood of the 25-year-old Robert

54. Starr, *Blood*, 205.

55. Havighurst, “Trafficking in Human Blood,” 423.

56. “Seven Books of Special Significance Published in 1971,” *New York Times Review of Books*, 5 December 1971, pages 2-3.

57. “Bill for Licensing Blood Banks is Introduced in the U.S. House,” *Chicago Tribune*, November 18, 1971, page 18. <http://archives.chicagotribune.com/1971/11/18/page/74/article/bill-for-licensing-blood-banks-is-introduced-in-u-s-house>

Irby is a potential killer.” “Considered a professional donor under the rules of the blood peddling business,” the article described how was nonetheless able to circumvent one hospital’s ban by going to another whose hepatitis test failed to detect the virus. In this way he was able to continue his “blood donor career.”⁵⁸ The intention of the *Tribune*’s series and others like it was not simply to produce tabloid-style scandal. Reports frequently took on an explicitly activist orientation to support alternatives to paid donation on the local and national levels.⁵⁹ Appearing alongside the news of Nikita Khrushchev’s death as the front-page article, the *Tribune*’s articles were representative of a journalistic trend that would continue throughout the 1970s that sought to uncover the unseemly sources of paid blood among indigents throughout the United States.⁶⁰

Appearing contemporaneously to the proliferation of such journalistic studies and attempts to legislate better regulation, *The Gift Relationship* nonetheless originated in debates with economists and other researchers in the early and mid-1960s. Unlike Allen, who had corresponded with legislators and lobbied regulators, Titmuss did not actively engage in attempts to reform either the American or British blood collection systems. As the historian and economist Philippe Fontaine explains in greater detail in his article exploring the origins and reception of *The Gift Relationship*, Titmuss’ interest in blood grew out of acerbic exchanges with the Institute of Economic Affairs (IEA) following the publication of the essay “Ethics and

58. “‘Lifesaver’ is Potential Killer. Find Blood of Paid Donors Polluted with Hepatitis,” *Chicago Tribune*, September 12, 1971.,Pages 1 and 8.
<http://archives.chicagotribune.com/1971/09/12/page/1/article/find-blood-of-paid-donors-polluted-with-hepatitis>

59. “Blood Brothers,” *Chicago Tribune*, September 22, 1971, page 20.

60. “The Blood Business. Booming \$5.5 Million Industry Getting Close Look After Two Deaths,” *The Miami Herald*, Sunday November 11, 1973, Page 1.

Economics of Medical Care” in the recently established journal *Medical Care*.⁶¹ Conceived in 1955 and inspired by the conservative economist Friedrich von Hayek, the IEA was founded by the British businessman and philanthropist Antony Fisher who followed Hayek’s advice to stay clear of politics and instead steer intellectual thought in the direction of economic liberalism.⁶² Titmuss’ antipathy towards the attempt to apply market analysis to what he believed were non-economic topics motivated much of his research.⁶³ Sensing that economic analysis was gaining popularity even in Labor Party circles and declining support for the principle of free social services, Titmuss began to articulate an intellectual framework that pointed to the qualitative and quantitative failings of economic analysis.⁶⁴ According to Fontaine, “It was in large measure his conviction that the extension of rational pricing to social services represented a threat to social cohesion that prompted Titmuss to start working on blood and, eventually, to write *The Gift Relationship: From Human Blood to Social Policy*.”⁶⁵

Titmuss’ focus on blood transfusion was not motivated by special interest in topic of blood donation, but by a desire to develop a critique of capitalist institutions as well as a thorough analysis of the role of altruism in modern societies. Titmuss’ views on healthcare and the welfare state differed markedly from those of enthusiasts of “economic man” who were more inclined to cost-benefit analysis.”⁶⁶ Although Titmuss analyzed a problem general to health

61. Fontaine, “Blood, Politics and Social Science,” 402.

62. Ibid.

63. Ibid.

64. Ibid., 403.

65. Ibid.

66. Ibid., 401.

economics, how medical care is a consumption good similar to others goods and services in the market, his general project was much broader in scope:

As the questions grow so does the book. It moves from the particular and microscopic - human blood- to the general and fundamental issues posed by philosophers for centuries. Essentially then, the study is about the role of altruism in modern society- hence its title. It attempts to fuse the politics of welfare and the morality of individual wills.⁶⁷

Whereas health economists pursued an attempt to apply modern economic thinking to a previously understudied economic phenomenon, Titmuss' project sought to elaborate a broader critique of capitalism and how it organized social relationships between individuals. One of the principal empirical aspects of Titmuss' book was a classic economic study of market failure: the inability of a market to allocate a resource (blood) efficiently. Nonetheless, the underlying focus remained the social value of altruism and the ability of socialist systems to promote altruistic relationships between individuals. Blood, and healthcare more broadly, were seen as especially sensitive indicators of these broader topics and thus perfect for a case study of difficult to study relationships such as capitalism and social values. In contrast to the tradition of health economics that had developed from the 1960s onwards analyzed in previous chapters, Titmuss vehemently argued "no money values can be attached to the presence or absence of a spirit of altruism in a society."⁶⁸

Although economists debated the quality of the analysis presented in the book, the reception of *The Gift Relationship* did indicate an immediate impact among academic economists. Titmuss' eclectic approach attracted a wide readership at a time when the boundaries

67. Titmuss, *The Gift Relationship*,

68. Fontaine, "Blood, Politics and Social Science," 422.

between academic disciplines were fluid.⁶⁹ However, the study simultaneously attracted criticism from those defensive or uncomfortable with an outsider encroaching on their fields.⁷⁰ The anthropologists Edmund Leach and Mary Douglas both believed Titmuss' use of anthropological theory was more ornamental than substantive. In his review of the *The Gift Relationship* Leach asked, "What could the prophet of the welfare state be up to, trespassing so flagrantly on the territory of Marcel Mauss and Claude Levi-Strauss?"⁷¹ Leach and Douglas both believed it inappropriate to apply anthropological theory developed to understand the rights and obligations of close-knit groups to the impersonal relationships of the modern state.⁷² Noted economists such as Kenneth Arrow and Robert Solow found the book to present compelling questions, but also found it to be lacking. Solow, whose review was solicited by the *Yale Law Review*, sympathized with Titmuss' critique of the excessive extension of economic analysis to areas. With issues such as blood donation where economic motives did not always predominate, unsustainable political conclusions sometimes resulted from the use of economic analysis.⁷³ While conceding that "Some of Titmuss' complaints about the enthusiasts are valid," Solow found Titmuss' grudge with economics in general to be misplaced, and explained the problem stemmed from "the invalid overextensions of economic reasoning, not about economic reasoning itself."⁷⁴ Arrow's analysis was likewise ambivalent:

69. Ibid., 424.

70. Ibid.

71. Ibid.

72. Ibid.

73. Ibid., 430.

74. Ibid.

This is not a systematic, abstract work on the foundations of ethics. It is not a meticulous descriptive and causal analysis of the functioning of social systems. But by suggestively combining a passionately informed commitment to an ideal social order and an illustration of problems with the context of a concrete situation, it has greatly enriched the quality of social-philosophical debate.⁷⁵

Solow and Arrow, both moderate-left of center economists, did not oppose Titmuss on ideological grounds as did the IEA. They likewise did not oppose the broader ethical project of promoting altruism, but found his methodology to be lacking in the intellectual rigor they believed standard among economists. Solow's and Arrow's reviews, however, were most focused on a theoretical critique based on the book's dissimilarity from their own work and, by extension, that of mainstream economics. Arrow remained doubtful "that the creation of a market for blood would decrease the altruism embodied in giving blood," but was willing to concede "a world of giving may actually increase efficiency in the operation of the economic system."⁷⁶ Although he believed the study was lacking in rigor, Arrow saw this suggestion as a potential "dramatic challenge to the tenets of the mainstream of economic thought."⁷⁷

Many of the academic reviews published in the 1970s focused on the shortcomings of Titmuss' methods and theoretical weaknesses compared to other social scientists. However, the credibility of the analysis was perhaps most undermined by empirical oversights that were either able to pass unnoticed or considered less significant by contemporaries. Titmuss' use of American blood services as exemplary of capitalist social policy and focus on remuneration in the collection of whole blood belied the fact that two non-profit organizations, the AABB and the

75. *Ibid.*, 432.

76. *Ibid.*, 431-432.

77. *Ibid.*

ARC, accounted for over half of the blood collected in the United States. Despite lacking the centralized, state-organized system of the UK, volunteer donations in the US steadily increased over the course of the 1960s. Contrary to Titmuss' claim that court decisions in the US were transforming health services into commodity relationships, a pronounced trend was already beginning to take shape that favored non-remuneration in the collection of whole blood.⁷⁸ According to estimates published in 1983, only 11% of whole blood collected in the United States in 1971, the year *The Gift Relationship* was published, came from paid donors.⁷⁹ Additionally, 1972 study sponsored by the National Heart and Lung Institute found paid blood was collected at only 63 commercial collection centers across the US, which represented just 1.2% of the total number of American blood collection facilities.⁸⁰ Moreover, the ARC's criticism of the AABB for operating a credit system demonstrated the extent to which non-remuneration and non-monetary systems of blood distribution were already central aspects of the American blood debate. Additionally, while the US did not operate a state-organized system of blood collection, Titmuss' conflation of remuneration with capitalist social policy in the United States did not hold up well to his own data and international comparisons. According to a table Titmuss constructed to compare the proportion of paid donors in various countries, 85% of the blood collected in socialist countries such as the German Democratic Republic came from paid

78 Titmuss, *The Gift Relationship*, 165.

79. D.M. Surgenor and S.S. Schnitzer and the American Blood Commission, *The Nation's Blood Resource 1979 and 1980: A Summary Report*, unpublished, 1983. Cited in: U.S. Congress Office of Technology Assessment, *Blood Policy and Technology*. OTA-H-260. Washington, DC, 1985, page 5.

80. National Blood Resource Program and Booze, Allen & Hamilton, *NHLI's Blood Resources Study. Volume I: Supply and Use of the Nation's Blood Resource* (Bethesda: Government Printing Office, 1972), 55.

donors.⁸¹ In a striking comparison of data originally collected by the IRC, Titmuss recognized that the US and USSR both collected approximately 50% of their whole blood from paid donors.⁸² The straightforward comparison of donor rates belied the vast differences between the amounts remunerated donors were paid. In 1965, donors in the Soviet Union were paid 60 rubles (\$66) per liter, which resulted in an average payment of 15-25 rubles. “This remarkably high price for blood” was especially noteworthy considering the average wage of a newly qualified physician was only 100 rubles a month and the minimum wage for all workers was only raised to 60 rubles a month in 1967.⁸³ “Only in Britain, Eire and two or three other countries in the world,” Titmuss would concede, “can we state with certainty that the system is almost entirely voluntary.”⁸⁴

Regulatory Change in the Early 1970s

Despite its shortcomings, *The Gift Relationship* played a central role in early 1970s blood reform. Within a year of its publication institutional and regulatory changes began to address many of weaknesses of the American blood system critiqued by Titmuss. Although academic economists and anthropologists found Titmuss’ work methodologically and theoretically lacking, the substance of the book and its general critique of trends in American methods of recruiting and monitoring whole blood donors were broadly accepted by policy makers and the general public.

81. Titmuss, *The Gift Relationship*, 174-175.

82. Ibid.

83. Ibid., 177-178.

84. Ibid., 176.

The problem of hepatitis and the national blood supply quickly caught the attention of the Nixon Administration, which supported significant changes to how blood was regulated. On March 2, 1972 the Nixon Administration outlined the central importance of health and the unique status of blood as part of the “Special Message to the Congress on Health Care.”⁸⁵ “In the ultimate sense,” the document explained, “the general good health of our people is the foundation of our national strength, as well as being the truest wealth that individuals can possess.”⁸⁶ Although recognizing the failings of the blood system, Nixon described the problems and potential solutions as ultimately issues of science, technology and modern management practice. The Nixon Administration discussed blood in a section of the document titled “Applying Science and Technology”:

Blood: Blood is a unique national resource. An adequate system for collecting and delivering blood at its time and place of need can save many lives. Yet we do not have a nationwide system to meet this need and we need to draw upon the skills of modern management and technology to develop one. I have therefore directed the Department of Health, Education, and Welfare to make an intensive study and to recommend to me as soon as possible a plan for developing a safe, fast and efficient nationwide blood collection and distribution system.⁸⁷

Refraining from directly addressing the issue of remuneration and its relationship to hepatitis, the document echoed Titmuss’ concern that existing systems were neither efficient nor producing enough total blood to meet national medical needs. Nixon’s public statements on the importance of blood were not the first by a sitting American president. Harry Truman also called blood a “critical national resource vital to the country’s well-being and security,” but stopped short of

85. Richard Nixon: "Special Message to the Congress on Health Care.," March 2, 1972. Online by Gerhard Peters and John T. Woolley, *The American Presidency Project*. www.presidency.ucsb.edu/ws/?pid=3757.

86. Ibid.

87. Ibid.

pushing for comprehensive reform.⁸⁸ In stark contrast to the analysis offered by Arrow and Solow, policymakers believed Titmuss' critique of the efficiency of the blood system to be compelling. Unlike economists they did not resort to the orthodox economic argument that resources that were managed outside of the price mechanism tended not to be used appropriately.

While vague public statements by the Nixon Administration seemed to suggest a reluctance to directly intervene and shape the future of the American blood supply, fundamental regulatory reform in the early 1970s demonstrated that political support existed for curtailing remunerated whole blood donation as well as for-profit firms. In 1972 the regulation of blood, blood products and all 7,000 blood firms in the United States was transferred from the Division of Biologicals at NIH to the FDA, a regulatory agency with both more resources available to monitor blood industries and significantly greater scientific reputation and political power.⁸⁹ Unlike the NIH, the FDA was willing and able to regulate all blood and was not restricted to interstate commerce. Neither the US Congress nor the Nixon Administration acted to nationalize blood collection in a manner reminiscent of the UK, but the transfer of regulatory authority did turn blood into something more resembling a national resource. In the absence of comprehensive regulation and mandatory reporting, relatively little data had previously been collected on the amounts of blood donated. Prior attempts to analyze blood collection in the US were limited to estimates provided by the ARC and the AABB of the magnitude of their own operations. Regulatory change also spurred non-governmental organizations, which had long since advocated for change, to press further for national reform and new, rationalized policy. In 1972

88. U.S. Congress Office of Technology Assessment, *Blood Policy and Technology* (Washington, DC: Government Printing Office, 1985), 33.

89. Daniel Carpenter, *Reputation and Power: Organizational Image and Pharmaceutical Regulation and the FDA* (Princeton: Princeton University Press, 2010).

the Red Cross formally called for a national blood policy, which the Nixon Administration would later announce in 1974.

Although the FDA and the Nixon Administration did not directly advocate for the end of remuneration in the collection of whole blood, for-profit blood collection became unprofitable in the 1970s as a result of increased regulation and safety requirements instituted by the FDA. Shortly after gaining regulatory authority in 1972, the FDA required that all blood collection facilities screen donations for Hepatitis B using a test that had first become available in 1969. The first generation Hepatitis B test, only 15% effective at screening for hepatitis, likely improved the safety of the national blood supply more by dissuading new commercial operators from opening and convincing established banks to close than by detecting infected donors. The added cost of paying for the tests was especially burdensome for small, commercial operations. Unlike hospital-based blood banks, commercial collectors could not easily raise the fees they charged for collected blood or offset losses by increasing fees for other medical services. The requirement to test all blood for hepatitis also discouraged new market entrants, signaling that regulation would likely continue to increase as more effective testing methods became available. Although the FDA did not have the regulatory authority to establish a national commercial policy, its well established authority in the area of product safety and efficacy gave it wide latitude to require labeling and testing practices that would quickly have a negative impact on the profitability of small operations.

The years following the publication of *The Gift Relationship* witnessed an unprecedented increase in the number of legislative proposals concerning blood donation and blood products. According to the 1985 congressional report *Blood Policy and Technology*, over 40 proposals

were introduced to the 92nd Congress alone, including H.R. 11828.⁹⁰ Introduced by Representative Victor V. Veysey, H.R. 11828 would have established a National Blood Bank Program within the Department of Health, Education and Welfare (DHEW). Although Congress ultimately did not legislate this particular reform or any of the others, the economic organization of the donor system and strict safety regulation became established topics of public discourse. In the years following *The Gift Relationship* the economics of blood and blood donor systems attracted attention from economic research, medical scientists and blood bank administrators who increasingly felt obliged to defend their economic and medical models. As one study observed, “An important consequence of the recent upsurge in public concern over blood services in the United States is that blood center managers can no longer assume that their pricing policies are a private matter.”⁹¹

Public concern precipitated not only a surge in legislative proposals, but also a surge in economic and operational data by economists interested in improving the efficiency of blood systems and blood bank administrators defending the safety and efficiency of their organizations. Bernice Hemphill, still the director of the Irwin Memorial Blood Bank, published a detailed analysis and data on the operations of AABB in 1971.⁹² Hemphill had previously published survey data on the details of the AABB’s collection efforts, but from 1971 onwards such

90. U.S. Congress, *Blood Policy*, 33.

91. Paul D. Cumming, Edward L. Wallace, Douglass Surgenor, Barbara D. Mierzwa and Francis A. Smith, “Public Interest Pricing of Blood Services,” *Medical Care* 12, no. 9 (Sep., 1974): 743.

92. Bernice Hemphill, “Dedication and Voluntarism in Blood Banking.” *Occupational Health Nursing* 19, no. 5 (May 1971): 22-23; Bernice Hemphill, “Fees and Replacement Policies of Institutional Members of the American Association of Blood Banks.” *Transfusion* 12, (1972): 126-134.

publications became a yearly occurrence as blood banks had to defend not only the safety of their blood, but also the economic details of their practices.

In the wake of the call for a national policy and a DHEW Task Force Report that largely validated Titmuss' empirical findings, the National Blood Policy was published in 1973.⁹³ Echoing Titmuss, the report reached five primary conclusions: the total supply of blood was inadequate, the quality of blood was variable, dependence on commercial blood contributed to higher rates of hepatitis, the system made inefficient use of collected blood, and the cost of blood presented a significant burden to many patients.⁹⁴ These five principal areas the report found needing of significant improvement (supply, quality, commercialization, accessibility and efficiency) were further divided into ten specific policies and six additional issues that needed to be examined more critically.⁹⁵ Among the proposed policies, the adoption of a non-remuneration, increased coordination of the charges and costs for blood services, and regionalization of blood collection and distribution were considered most central.⁹⁶ The NIH corroborated the magnitude of the waste alleged in *The Gift Relationship* and found that of the 9.3 million pints of blood collected annually, 29% spoiled before it could be put to use and was discarded.⁹⁷

93. U.S. Congress, *Blood Policy*, 33.

94. Ibid.

95. Ibid., 34.

96. Ibid.

97. Starr, *Blood*, 229.

The implementation of the National Blood Policy was not actively pursued or organized by the U.S. government, but by a loose organization of for-profit and non-profit organizations. The DHEW accepted in 1974 the establishment of the American Blood Commission (ABC), a private sector plan that was to implement “the lion’s share” of the National Blood Policy.⁹⁸ Partially funded by the National Heart, Lung, and Blood Institute, the ABC included the ARC, AABB and the largest pharmaceutical firms involved in processing blood. The ABC did reflect a legitimate desire to make progress on the policy goals outlined by the National Blood Policy. It also represented, however, an effort by members of both the non-profit and for-profit sectors to forestall further federal regulation and stave-off the creation of a national collection organization as existed in the United Kingdom. The ability of the ABC to effect change and implement the National Blood Policy was limited since it had no enforcement powers, was financially dependent on its constituent members, and had no role in the development of new technologies that could improve the efficiency of the blood collection system or the safety of the blood transfused.⁹⁹

The reluctance to directly end paid donation through legislation or government involvement in the organization of a national blood system persisted throughout the 1970s. Building on its 1972 requirement that all blood be tested for hepatitis, the FDA required in 1975 that all donations be screened with a new generation of tests that was 40% effective. The FDA had long resisted the suggestion that all blood be labeled as either paid or voluntary, a suggestion

98. U.S. Congress, *Blood Policy*, 34.

99. *Ibid.*, 1.

that had been made by Allen in 1966.¹⁰⁰ However, in 1978 the FDA finally relented and issued detailed criteria that acknowledged the risk associated with using blood from paid donors.¹⁰¹ Defining a paid donor as “a person who receives monetary payment for a blood donation,” it also clarified what benefits did not constitute payment. Leaving the AABB’s system of fees intact, the regulation stated that “Benefits, such as time off from work, membership in blood assurance programs, and cancellation of non-replacement fees that are not readily convertible to cash, do not constitute monetary payment within the meaning of this paragraph.”¹⁰² Despite a reluctance to directly prohibit paid blood donation or establish a public donor system, by the end of the 1970s the paid donation of whole blood had largely ceased and a non-governmental, voluntary system firmly was established. Estimates regarding how much whole blood in the early 1970s was collected from paid donors varied significantly due to a lack of data and ranged from approximately 50-75%, by 1980 only 2.2% of blood collected in the United States was thought to originate from paid donors.¹⁰³

Blood as a Global Issue

The commercial collection of blood in developing countries began in Central and South America in the mid-1960s, but it was not until the early 1970s that international organizations such as the Red Cross began warning that commercializing blood represented “a dangerous,

100. J. Garrott Allen, “Post-Transfusion Hepatitis-A Serious Clinical Problem,” *California Medicine* 104, no. 4 (Apr 1966): 293–299.”

101. Federal Registrar, January 13, 1978 (43 FR 2142)

102. Ibid.

103. US Congress, *Blood Policy*, 5.

scandalous and unfitting traffic” and a “new modality of exploitation of the most needy.”¹⁰⁴ At the 28th World Health Assembly in 1975 the WHO urged all member states “to promote the development of national blood services based on voluntary non-remunerated donation of blood” and “take other actions necessary to protect and promote the health of blood donors and of recipients of blood products.”¹⁰⁵ Increasing demand for products derived from blood, much of which was produced in the United States and shipped internationally, created a new political-economic context for critics of paid blood donation. Largely ignored by Titmuss, these issues and the issue of national self-sufficiency of blood products became the central concern of the global blood debate.

Spurred in part by the disappointing end of the global Malaria Eradication Program in 1969 and the struggle to systematically reduce infectious disease in countries that lacked robust health systems, the WHO and public health researchers began to consider the necessity of addressing health infrastructure and the organization of medical services. For the WHO, the particular form of a national health or blood donation system was not only a matter of public health and the prevention of hepatitis transmission. Criticism of remuneration in blood donation, a policy closely associated with the United States, was also a vital part of a political platform that promoted the post-war European tradition of health as a universal human right as opposed to an economic good. By the early 1970s the governments of both industrialized and developing states

104. World Health Assembly, “Resolution WHA 28.72 Utilization and Supply of Blood Products,” Twenty-Eighth World Health Assembly, Geneva, May 1975. <http://www.who.int/bloodsafety/en/WHA28.72.pdf>

105. Ibid.

agreed that, at a minimum, reform was needed to an increasingly globalized system of blood collection and distribution in which the United States had become an “OPEC of blood.”¹⁰⁶

The link between remuneration in blood donation and hepatitis was well established before Titmuss published his critique of the American blood system, but it was not until the 1970s that blood made the transition from domestic to global health issue. The League of Red Cross Societies had already begun to emphasize the importance of volunteer sources of blood in 1948. By 1952 French law explicitly forbade the paid collection of whole blood.¹⁰⁷ The link between hepatitis and paid blood was likewise well established by J. Garrott Allen who had published throughout the 1960s on the origins of transfusion hepatitis and the risk posed by collecting blood from paid donors or high-risk groups such as prisoners. Despite such precedents, the regulation of blood was largely considered a national affair and most analysis was limited to the relatively small group of wealthy, industrialized countries.

The organization of blood banking and the production of blood products in the second half of the twentieth century resulted most directly from technological and organizational efforts related to the Second World War, but the impact of these developments was largely limited to the US, Europe and other industrialized economies. While the distribution of blood may have been geographically global, it was not demographically globalized and did not extend much beyond providing services to Americans and Europeans. As the historian William Schneider details in his book *The History of Blood Transfusion in Sub-Saharan Africa*, the technologies and

106. The phrase “OPEC of blood” was coined by TC Drees in “National Blood System,” unpublished dissertation, 1979. Cited in Hagen, *Blood*, 66.

107. Loi 52-854 du 21 juillet 1952 sur l’utilisation thérapeutique du sang humain, de son plasma et de leurs dérivés.
<http://legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000512411>

institutions supporting blood transfusion first became accessible in French colonial Africa towards the end of the Second World War, but it was not until the post-war period that many of these services were made available for civilian use.¹⁰⁸ The development of blood transfusion in Africa, as in much of the world, was not only related to demand for the new service or the spread of technology, but to broader trends in medicine and health. After 1945 there was a significant increase in the construction of hospitals and training of healthcare professionals, which facilitated access to all forms of medical care.¹⁰⁹ More healthcare facilities, combined with technological developments allowing for the effective storage of blood and plasma for longer periods of time, facilitated its spread in the post-war years.¹¹⁰ By 1953, for example, all British colonies in Africa had organized blood transfusion services.¹¹¹ Blood transfusion and the use of blood products quickly became routine medical practice, but the scale was still limited as relatively few transfusions took place.

Blood and blood products in the immediate post-war era were largely organized on a national basis with little trade between countries. Nonetheless, the International Red Cross was careful to affirm the importance of non-remuneration at its first post-war conference in 1948. At the Seventeenth International Red Cross Conference hosted in Stockholm, the IRC affirmed its commitment to the principle of volunteerism and the potential for cooperation with the newly formed World Health Organization. After a brief debate regarding what was meant by ‘free

108. William H. Schneider, *The History of Blood Transfusion in Sub-Saharan Africa* (Athens: Ohio University Press, 2013).

109. Ibid. 28.

110. Ibid.

111. Ibid., 44.

blood' and the meaning of the original text written in French, the IRC passed "Resolution XLVII, Role of the Red Cross in Blood Transfusion:"

The XVIIth International Red Cross Conference recommends that national Societies take an active part in the matter of blood transfusion, and co-operate with their respective Governments in the establishment of blood transfusion centres or, if necessary, themselves organize such centres, recommends that, so far as possible, the principle of free blood, given and received, be universally applied, recommends that the standardization of supplies, equipment and methods of transfusion be studied, adopts Resolution No. IV of the Health Advisory Committee, adopted by the XIXth Session of the Board of Governors (Oxford 1946), adding "the World Health Organization" to the agencies mentioned in paragraph 4 of this Resolution as bodies from which the League of Red Cross Societies can obtain information on questions of blood transfusion.¹¹²

The promotion of non-remuneration was largely successful in the decade following World War Two with a large number, if not most, of blood transfusions being carried out in countries with legislation that limited if not banned profit from the sale of blood. France was not alone in banning profit in 1952. The Netherlands forbade the trade in blood in the 1961 Human Blood Act.¹¹³ Other countries implemented de facto bans by granting the Red Cross a monopoly on the collection of blood in their countries, which prevented commercial firms from entering the market. By the time Piet Hagen published his review of the global blood industry in 1982, this arrangement was in effect in twenty countries, including Australia, Belgium, Canada, Indonesia, the Netherlands and Switzerland.¹¹⁴

The early history of the IRC and the promotion of non-remuneration and its influence on the economic organization of blood globally was a qualified success that occurred within an institutional and historical context that initially limited the commercialization of blood. The

112. International Red Cross, *Seventeenth International Red Cross Conference* (Stockholm, August 1948), 99.
https://www.loc.gov/rr/frd/Military_Law/pdf/RC_XVIIth-RC-Conference.pdf

113. Hagen, *Blood*, 93.

114. *Ibid.*, 82.

spread of non-commercialization laws occurred not so much as a result of the pioneering influence of the IRC, but rather from the IRC as an international organization staffed by Europeans and heavily influenced by trends in Europe. Secondly, as Titmuss remarked in *The Gift Relationship*, the development of blood services could not be understood without reference to the national health systems they were part of. European countries did not need much prodding to ban the profit in blood donation since national healthcare systems were significantly expanded in the post-war era as states sought to insure health access to a larger portion of their population. In healthcare systems where the state paid for a portion of the services provided, any increase in the price of blood resulted in higher health budgets for the government, which provided strong incentives to limit or eliminate profits. Additionally, the success of the IRC and national governments to provide blood and impede commercialization was initially limited to whole blood, not more sophisticated blood products such as plasma, albumin and Factor VIII.

Despite bans and limitations on the collection of blood on a for-profit basis, pharmaceutical companies were the principal producers of blood products in most countries. Although arrangements varied country-to-country, blood products were most often the result of public-private partnerships or profit-nonprofit partnerships. As was the case in the United States during World War II, blood was frequently collected by local branches of the Red Cross and then delivered to private companies for processing into plasma, albumin, clotting factors, and other products. Bans on profit making in blood products were often porous compared to bans on profiting from the collection of whole blood even in the most stringently monitored markets. In France, for example, the pharmaceutical company Institut Mérieux imported placentas and blood from the developing world even after for-profit selling had been banned in France. The country

circumvented the ban by then exporting the products to other countries.¹¹⁵

Blood emerged as an international health economic topic in the early 1970s due to a confluence of academic attention to the problem of hepatitis, technological development and the desire of international organizations to prevent the further commercialization of blood. The influential publications of Titmuss and Allen, published in 1971 and 1972 respectively, gave critics of commodification an empirical case for the negative health effects of paying donors as well as a social philosophy opposing reductive economic analysis. The development of the topic over the course of the 1970s did not emerge strictly from academic debate and publications, but also from the co-occurrence of an increase in the global trade in blood products, development of new blood products, increasing use of these blood products as well as the development of the first tests that could successfully screen for hepatitis B.

Although the exact origins of the international trade in blood and blood products could not be located with any degree of certainty, the Division of Biologicals at NIH was aware of nine blood fractionation centers in 1971 located in Latin America.¹¹⁶ A fractionation center called Hemo Caribbean in Haiti was the first to receive attention in the American press and paid hundreds of plasma donors \$3 in exchange for a liter of plasma, which netted a profit for the company of \$2 per liter.¹¹⁷ The company exported up to six thousand liters a month to pharmaceutical companies in the US, West Germany and Sweden.¹¹⁸ Like many of the exposés

115. For a history of the practice of importing placentas and exporting products outside of France see: Charles Merieux, *Le virus de la découverte* (Paris: R. Laffont, 1988).

116. Starr, *Blood*, 233.

117. Hagen, *Blood*, 167.

118. Starr, *Blood*, 233.

published on the deplorable conditions of the clinics and poor health of American donors in the United States, reports in the *New York Times* observed that many donors “had medical problems of their own” and while the caloric in-take of Haitians was one of the lowest in the Americas, “only 1 to 2 percent are rejected because they are too weak.”¹¹⁹

The success and eventual closing of Hemo Caribbean, however, demonstrated the growing globalization of the blood supply as well as the backlash against commercialism that was well underway before international organizations began their more vocal advocacy of non-remuneration. Although the company could count Armour Pharmaceutical and Cutter Laboratories as their customers, two of the world’s largest producers of blood products, by November 1972 the company was closed. Unhappy with the attention and scandal that had been caused by articles in American newspapers Jean Claude Duvalier had forced the company to close.¹²⁰ The Haitian Red Cross, which had begun operating in 1957, responded to the end of the commercial trade by increasing their efforts. By September 1975 was operating four blood centers that met approximately 50% of the country’s blood needs.¹²¹

The WHO had published a detailed technical booklet outlining best practices in blood transfusion and the organization of a national blood transfusion service since 1971, but the WHO did not directly address the growing traffic in blood, how it might influence medical practice, or the politics of remuneration.¹²² The WHO’s description of paid donation recognized “the

119. Ibid.

120. Hagen, *Blood*, 167.

121. Hagen, *Blood*, 168.

122. World Health Organization Organization, *Blood Transfusion. A Guide to the Formation and Operation of a Transfusion Service* (Geneva: WHO, 1971).

disadvantage of commercializing so precious a product as human blood,” but emphasized the potential negative impact on the health of individual donors rather than the transmission of hepatitis to patients.¹²³ Alluding to problems highlighted in the *New York Times* article regarding the poor health and nutrition of donors in developing countries such as Haiti, the WHO warned that excessively frequent donation and the absence of adequate medical supervision could result in anemia and hypoproteinaemia since paid donors were often already in poor health and suffered nutritional deficiencies.¹²⁴ The WHO concluded that such health concerns and “the indisputable fact that such donors mostly come from the lowest social strata where alcoholics and drug addicts are often found” had discredited the potential of paid blood donation in most places.¹²⁵

The WHO’s attention to the topic of commercial blood collection began in the early 1970s when the League of Red Cross Societies alerted WHO officials that numerous commercial firms were obtaining blood and plasma from paid donors in developing countries in order to produce blood products for sale in wealthier markets.¹²⁶ Paid donation largely took the form of plasmapheresis and was sometimes repeated on the same donor several times a week. In a report to the 28th World Health Assembly, the Director General estimated that “that this practice started about 10 years ago in Central and South America and has more recently spread to Asia and

123. Ibid., 15.

124. Ibid.

125. Ibid.

126. Twenty-Eighth World Health Assembly, “Utilization and supply of human blood and blood products. Information provided by the Director-General of the World Health Organization, Box A0 730/1, File “Plasma, 1973-1975,” Archives of the League of Red Cross Societies, Geneva Switzerland.

Africa.”¹²⁷ The WHO began investigating the global blood trade in 1973 through its regional offices and concluded that evidence seemed to confirm “an extensive trade in human blood and its derivatives in many countries.”¹²⁸ And yet, the data was thought to be inadequate to be presented to the health authorities of Member States because it consisted mainly of views of individuals rather than of official confirmation from governments.”¹²⁹

The League of Red Cross Societies was more eager to act quickly. The 1973 Inter-American Red Cross Seminar in Guatemala was the first international gathering to discuss commercial plasmapheresis in developing countries, which was followed by the 22nd Annual League of Red Cross Societies Conference later that same year.¹³⁰ Held in Tehran, the IRC used the conference as a platform to call attention to the international trade in blood and problems associated with remuneration. Observing that half of the national chapters of the Red Cross operate a blood service, “14 of whom meet their nations’ complete blood service needs,” the IRC reviewed the numerous resolutions it had adopted over the years supporting the creation of voluntary blood service programs.¹³¹ The IRC adopted resolutions in 1936, 1948, 1952 and the 1957 commending the creation of blood donor services and vigorously advocating for only volunteer donation in 1948 as did the The League of Red Cross. The IRC’s 1973 resolution read:

127. Ibid.

128. Ibid.

129. Ibid.

130. Hagen, *Blood*, 86.

131. Report of the Working Group of Red Cross Blood Transfusion Experts, Tehran, 29-30 October 1973, file “Plasma, 1973-1975,” box A0 730/1, Archives of the League of Red Cross Societies, Geneva, Switzerland.

that the XXIIInd International Conference of the Red Cross affirms that a service based on voluntary blood donation, motivated by humanitarian principles, is the safest and most effective way of supplying blood needs,

that the XXIIInd International Conference of the Red Cross urges the governments of all nations to adopt the highest standards for a safe blood service to their citizens and formulate those standards on the concept of non-remunerated blood donation.

that the XXIIInd International Conference of the Red Cross recommends to each national society and its government that they undertake a strong mutual effort to attain the humanitarian objectives of a total national blood service based on the broad voluntary participation of the people.¹³²

The IRC wrote the resolution with the explicit knowledge of the growing commercialization of blood as well as the arguments suggesting that remuneration was an effective strategy to increase the number of donations given. The IRC was aware that although they sought to promote volunteer donations, “it was realized, however, that in some countries it could not be realistic at the present time to cover the total needs of plasma and its fractions following this principle.”¹³³ Unlike Titmuss, the IRC and international organizations were concerned primarily with the more lucrative international trade in blood products. However, the ultimate ideal of non-payment was never abandoned. In return for their service donors should receive communal recognition, but no material reward. “Anything is payment,” the working group on blood explained, “if its intrinsic value is the determining factor in whether a person gives blood or not.”¹³⁴

By the mid-1970s the work of international organizations began to yield results as governments in both Latin America and Africa started banning for-profit blood collection, took

132. International Red Cross, “XXII Conference of the International Red Cross,” *International Review of the Red Cross* 14, no. 154 (January 1974): 19-44.

133. *Ibid.*

134. *Ibid.*

steps to stop the export of blood products to developed countries, and began constructing their own national blood systems. Of the twelve countries that responded to a World Health Assembly questionnaire regarding commercial plasmapheresis centers, four had reported that for-profit operations had been closed by 1975.¹³⁵ According to Piet Hagen, specialists at the WHO and the League of Red Cross Societies believed that by the end of the 1970s the trade in plasma from developing countries had at least not increased.¹³⁶ Representatives of the pharmaceutical industries claimed “plasma collection in Third World countries had largely stopped,” which had represented 20% or more of plasma processed in the United States only a few years prior.¹³⁷

Conclusion

Looking back at the previous two decades of government involvement in the regulation of the blood market, the 1985 congressional report *Blood Technology and Policy* noted the surge in public interest in blood as well as federal attempts to legislate better transfusion practices. The origins of this surge, according to the report, were unequivocal:

This round of debate was sparked largely by the publication of *The Gift Relationship* by Professor Richard Titmuss, a British scholar and student of social welfare policy. Professor Titmuss excoriated the commercial market for whole blood in the United States on both safety and ethical grounds. His book received much attention in the news media and inspired a television documentary which highlighted the hepatitis problem and featured pint after pint of blood being poured down the drain to dramatize the wastage problem.¹³⁸

135. Questionnaire, file A28/WP/6, Archives of the World Health Organization, Geneva, Switzerland.

136. Hagen, *Blood*, 165.

137. MM Le Coney, “The Growing Plasma Shortage,” *Plasma Quarterly* (1979).

138. US Congress, *Blood*, 33.

While the report's assessment may not have sufficiently weighed the economic and legal precedent of *Kansas City Community Blood Banks v. The Federal Trade Commission* or the long standing feud between the AABB and the ARC regarding how blood donor systems should be organized, the comparatively rapid pace of reform in the 1970s following the publication of *The Gift Relationship* suggested Titmuss had at least uncovered a public interest issue that was quickly adapted by American journalists and policy makers. Whereas blood collection at the beginning of the 1970s was largely an unfettered market split between the AABB, the ARC, pharmaceutical companies and 60 commercial whole blood collectors, by the mid-1970s blood systems had become topics of both economic analysis and public scrutiny.

In contrast to the preceding chapters of this dissertation, the economics of blood systems marginalized economists both intellectually and in policy. Despite the well-reasoned critiques of widely cited economists such as Arrow and Solow, members of the U.S. Congress and the Nixon Administration moved forward with modest reform proposals without hesitation or verification of the empirical claims contained within *The Gift Relationship*. Although Titmuss' conflation of remunerated donation with capitalism and American social policy may have been simplistic, American social policy makers responded quickly to the threat posed to patients by hepatitis. Largely ignoring the broader critique of capitalism and the value of altruism in modern societies, policy makers and journalists were nonetheless quick to denounce the efficiency failings of a market where approximately 30% of human blood was ultimately discarded.

Conclusion

Beginning with studies of the economic impact of malaria and ending with blood policy debates in the 1970s, this dissertation has surveyed the transformation of the economic analysis of health and the founding of health economics. By examining how the economic study of health first emerged among social scientists and public health workers as part of an advocacy program to attract more resources to health programs, this dissertation has also sought to call attention to relationships between public health and economics as academic discourses.

Between the late 1950s and the blood donation debates of the 1970s economists transformed the economic study of health by undermining the assumptions employed by public health researchers and establishing health as a legitimate topic of economic analysis. Applying well-established economic concepts to healthcare and systematically analyzing what made it an economic topic uniquely suited to the expertise of economists, health economics re-oriented the field away from public health and laid claim to a topic of study that had previously been the purview of health professionals. Over the course of less than two decades the economic study of health became more a branch of economics and less a subfield of public health.

In this conclusion I will revisit the original research themes presented in the introduction that guided my analysis of the history of health economics and reflect on the principal findings of this dissertation. The introduction identified three fundamental sets of research topics: the divergence of health economics from public health, the definition of healthcare as a commodity, and the limits of economic discourse in public policy. By comprehensively examining how the four chapters of the dissertation addressed these three research themes I hope to better summarize the different arguments contained in this project and explore the implications of these

claims. Lastly, the final section of this conclusion will explore the limitations of this dissertation as well as advance an argument in favor of research on economic topics within the history of the health sciences.

Divergence

The first and most fundamental set of questions that guided this dissertation aimed to understand how economists founded health economics as a social science discipline and marginalized the public health and medical professionals that had traditionally studied economic aspects of health. In the process of professionalization, how did economists transform the understanding of health and change the relative importance of disease as an economic phenomenon?

To answer this question, the dissertation began with a focus on malaria as a topic of economic study to establish how public health researchers originally incorporated economics into their discipline before the topic attracted the attention of economists. The choice of malaria and the World Health Organization's Malaria Eradication Program (MEP) was not made out of a special interest in the economics of this particular disease or its large impact on global health, but in the central role malaria played in the development of the economic analysis of health both before and after the founding of health economics. As Leonard Bruce-Chwatt noted even eight years after the end of the MEP, no other disease attracted as many attempts to quantify its direct and indirect impact on socio-economic conditions. The timing of the MEP, conducted between 1955 and 1969, also provided an ideal case study of a health program that began in the years before the founding of health economics and ended after the discipline had separated from public health.

The two chapters analyzing the history of the malaria campaign began by exploring foundational texts in both public health and health economics before turning to how such analyses were applied to malaria. The initial studies of the economic impact of malaria eradication in 1958 by Sonti Dakshinamurty and Michael Kaser demonstrated a strong continuity with the early works of John Sinton (1935-1936) and mid century public health scholarship. Among this group of researchers, the intellectual challenge of analyzing the economic implications of malaria was not thought to originate in the difficult to answer question of whether or not the campaign to eradicate malaria would result in economic benefits. Most researchers assumed that to be the case and a consensus existed that any epidemic disease, malaria in particular, would have a profound economic impact. The ultimate scientific challenges were the “enormous difficulties of evaluating the effect in economic terms.”¹

For public health researchers, the results of such studies were ultimately not considered to be the definitive answers as to whether or not a particular public health campaign should proceed since health was still considered one of the fundamental rights of every human being, which merited attention regardless of the economic implications. Researchers such as John Sinton, CEA Winslow and Sonti Dakshinamurty all belonged to a tradition of public health analysis that placed the ultimate value of health and human life above the desire to improve economic efficiency. However, as healthcare professionals and experienced administrators, they also recognized the ability of economic arguments to attract support for the health projects they worked on in order to ultimately reduce human suffering. Public health researchers were careful to note that the values of health transcended monetary values, but accepted the selective use of

1. Leonard J. Bruce-Chwatt, “The Challenge of Malaria: Crossroads or Impasse?” *Tropical Medicine from Romance to Reality, Proceedings of a Conference 12-14 December 1977*, ed. Clive Wood (London: Academic Press, 1978), 403.

such values when necessary to advocate for health programs. Economic arguments were ultimately a way of making the intangible value of health into something more tangible that would promote health. As Dakshinamurty explained, it was a strategy of translating “from deaths to dollars” the value of eradication.

Health economists in the 1960s initially pursued the economic study of disease as a means to a different end: the establishment of an economic science and rational decision-making tool. Economists did not necessarily seek to undermine the guiding values of health and human life that public health researchers sought to support, but rather provide what they believed to be a more rigorous analysis that would enable those values to be more fully achieved. Burton Weisbrod’s reformulation of Hermann Bigg’s original claim that societies could choose to lower mortality rates at will through increased spending on health neatly summed up a seemingly minor, yet ultimately subversive, critique of public health advocacy. Weisbrod’s version of this analysis, “public health is purchasable-at a price!”, indicated a fundamentally distinct orientation regarding health as an investment that indicated a desire to not follow in the public health tradition of simply searching for data to support the expansion of health programs.

In contrast to prior studies, Robin Barlow’s and Edwin Cohn’s research on malaria demonstrated a concentrated effort to upend many of the most basic assumptions employed by non-economists. Outlining how public health research neglected basic accounting concepts such as discounting and falsely assumed that economies always operated at full employment, Cohn and Barlow applied well-established analyses to health. The analytical concepts they utilized may not have been novel in economics or accounting, but their use to analyze malaria and critique public health research provided a clear example of how health economics diverged from

public health in its willingness to pursue analytical criticism and more closely align itself with economics.

The first chapters of the dissertation presented evidence of transformative trends in health economics and the new discipline's relationship to public health, but they also provided interesting implications regarding the promotion of values in healthcare. Although not explored in detail in the body of the dissertation, the history of the MEP suggested that the professionalization of the economic study of health resulted not only in the divergence of health economics from public health, but also in the promotion of economic values such as efficiency. As analyzed in the second chapter, Barlow's and Cohn's analyses did not preclude the possibility that economic study could prove eradication, or other health programs, could be economically beneficial. Neither did they even present economic data suggesting that they did not. On the contrary, both studies examined how unlikely eradication was to be economically beneficial given different assumptions regarding discount rates and demographic trends. Health economists in the 1960s did not dispute that malaria eradication or other public health programs could improve health and improve economic performance. Rather, the main critique was whether or not spending on such health programs was the most efficient use of resources. In their studies of malaria, Cohn and Barlow did not criticize the value of better health as much as seek to replace it with a more economic proxy: efficiency. Whereas public health researchers viewed economic studies as a means of attracting additional resources to existing health program, health economists proposed the use of economic calculations to promote the efficient allocation of resources, which they believed to be necessary, if not synonymous, with better health. In studies of the economic effects of malaria, however, cost-benefit studies were often as lacking in scientific rigor as the public health discipline it sought to replace. As analyzed in greater detail in

Chapter 2, Cohn's analysis pointed to the conceptual problems regarding the assumptions of prior studies, but his analysis was so lacking in empirical data that it was as speculative as the studies it criticized. Such cost-benefit analyses frequently took the improved allocation of health funding as the unstated but ultimate goal of economic analysis without first establishing whether or not efficiency could be empirically tested. The underlying assumption that efficiency had an inherent value frequently became a guiding, alternative principle to the original concept of health as a human right. Lacking reliable economic data, economists introduced efficiency as a value in healthcare and as a normative assessment of the relative success of health programs.

Another important implication of this research was the new relationship between health as a humanitarian pursuit and modern healthcare as an economic phenomenon. As one economist commented after the end of the MEP, "Humanitarian arguments now require support from economic arguments."² A central point of the critique of public health was the re-framing of the economic impact of disease as just one component of a much broader economy. Even when economic benefits could be demonstrated, economists argued that the merits of health had to be weighed against other national goals and priorities. An intellectual orientation that considered health to be a commodity like any other allowed for the possibility that better health was not always the best use of funds, which was fundamentally opposed to public health as a social science and means of social amelioration. By the end of the MEP, the transformation of the economic understanding of malaria had challenged public health's attempt to use economic estimates to garner support to the point where such calculations were a burden. Rather than a useful strategy, economic estimates had become a liability to public health researchers and supporters of social medicine. The history of the MEP suggests that while public health

2. Gladys Conly, "The Impact of Malaria on Economic Development. A Case Study," *The American Journal of Tropical Medicine and Hygiene* 21, no. 5 (1972): 668.

researchers did not understand their investigations into the economic effects of malaria as contributing to the founding of a new economic discipline, their work nonetheless had a significant role in the development of health economics by providing a platform for economists and public health researchers to debate the economic analysis of disease and the role it should play in attempts to treat it.

Health(care) as Commodity

Closely related to the topic of how health economics diverged from public health, the definition of healthcare as a commodity represented one of the ways health economics defined itself apart from public health and founded a new and professionalized academic discourse. The third chapter of the dissertation examined in depth how the definition of health economics' subject of analysis, as originally formulated by the economist Kenneth Arrow, demonstrated how the discipline not only applied new methodologies and critiques to the analysis of health, but also focused on a new economic phenomenon.

Whereas early health economists such as Burton Weisbrod and Rashi Fein continued with public health's focus on the analysis of disease, health economists from the early 1960s onwards generally dedicated their studies to the analysis of the health services constructed to treat illness. Kenneth Arrow's article, considered by economists as a turning point in health economics, made this distinction explicit: "It should be noted that the subject is the medical care industry, not health."³ This change in subject was indicative of a fundamental shift in the intellectual orientation of the economic study of health as well as the role of healthcare in society. In contrast to the WHO's struggle with a lack of funding and health infrastructure in developing countries,

3. Arrow, Kenneth. "Uncertainty and the Welfare Economics of Medical Care," *American Economic Review* 53, no. 5 (December 1963): 941.

health economists in the United States were responding to medical and economic developments in a domestic healthcare system where spending had approximately doubled from 2.7% to 5.4% of the national economy over the preceding thirty years and was growing at an increasingly rapid rate. Many health problems remained untreated and a significant portion of the population lacked health insurance and access to medical care, but resources for domestic health programs were abundant when compared to global health programs such as the MEP. Rather than focus on the losses that resulted from disease, many economists and some policy makers were more worried about the growing burden of spending such sums on healthcare and the expanding number of services and institutions created to respond to chronic illness. In contrast to the concern with the impact of disease on industrial productivity, American health economists in the 1960s were concerned with healthcare as an emerging part of the service sector economy and the potential problems of diverting national resources to it inefficiently.

A central part of both the attempt to better understand this emerging problem and define health economics as a social science was the analysis of healthcare as a commodity. Whereas the first and second chapters of the dissertation examined how economists applied traditional economic analyses to health, the third chapter focused on how Kenneth Arrow sought to also examine what made healthcare services unique and difficult to understand as an economic phenomenon. Public health analysis from the early twentieth century to the early 1960s understood the economics of health as being driven by disease and the ultimately preventable losses society suffered as a result of biological phenomenon. Investigating the question of how economists defined healthcare as a commodity, the research presented in this chapter pointed to Arrow's identification of two less tangible fundamentals in the analysis of healthcare: uncertainty and information. By pointing to the central roles of uncertainty and information,

Arrow defined health as a commodity using fundamental attributes that it shared with other economic phenomena. Although healthcare was perhaps unique in the extent to which the uncertainties presented by disease dictated the use of healthcare services, uncertainty was nonetheless fundamental to the study of economics in general. In this way, Arrow's research and health economics in general not only used economic analysis to examine healthcare, but also used the economics of health to illustrate aspects important to the study of economics. An important implication of this research is the central role the economic understanding of healthcare came to have in the understanding of the contemporary economy. As difficult as healthcare was to analyze using traditional economic analyses, the intangible qualities of healthcare as a commodity were used to illustrate the even more difficult to understand, yet equally central, role of the information economy in postindustrial societies.

The Limitations of Economic Analysis

Criticism of the economic studies used to justify the Malaria Eradication Program and the identification of healthcare services as the primary topic of study both established health economics as a professionalized academic field. These accomplishments, however, did not secure the discipline uncontested authority in health policy. The fourth chapter of the dissertation sought to question the impact of this new and fast changing economic discourse in health policy and on the public health research it had seemingly displaced. Whereas public health researchers found themselves increasingly marginalized in the economic analysis of malaria and struggled to defend their policy priorities in the area of international health, economists likewise struggled in the 1970s to shape blood donation debates and defend their own views of the value of efficiency as compared to product safety.

In a compelling reversal of the economic critique of the MEP, economists and policy makers found their justifications for a minimally regulated system of blood donation under attack following the publication of *The Gift Relationship* in 1971. Although not formally trained in academic economics, Richard Titmuss conducted a thorough comparison of the blood donor systems of the United States and the United Kingdom to illustrate the value of a donation system based on altruism as compared to one that paid donors. Titmuss used his study of blood to develop a critique of economic analysis and capitalist practices in general, but also strategically employed data that suggested efficiency in blood collection was better supported by promoting the value of altruism and undermined economists on their own terms. Far from the model of efficiency such a market system should be, paid donor systems collected less blood than unpaid and resulted in significantly larger amounts of blood being wasted and never put to use.

Economists such as Paul Samuelson and Kenneth Arrow quickly published responses that explained why Titmuss' criticism did not represent an existential threat to economic analysis in general, but the defense of their discipline and the real oversights of Titmuss' work did not dampen the impact of the study. The positive reception of Titmuss' book among both policy makers and the public as well as the relatively rapid pace of reform demonstrated the continued relevance of non-economists in health-economic debates. Studies by US regulatory agencies likewise confirmed Titmuss' claims regarding the inefficiency of paid donation and the failings of economic analysis in the face of empirical research. In contrast to the authority accorded to Edwin Cohn's and Robin Barlow's studies of the economics of malaria, economic analysis played only a marginal role in the blood policy developments of the 1970s as both national governments and international organizations cooperated to promote the volunteer donation of whole blood and curtail the expansion of for-profit plasmapheresis.

Investigating the legacy of social medicine in the 1970s and the limits of economic analysis, the fourth chapter of the dissertation provided an empirical study that demonstrated the muted voice of economists in a contested health issue. An important implication of this research is the historical tension between economic justifications for health policies and values other than efficiency. Following Titmuss' critique, economic analyses of blood donation in the 1970s were closely linked to the concern for patient safety and the risk to health posed by hepatitis transmission. Titmuss' analysis of the inefficiency of paid donation was substantiated by further research, but it was ultimately the concern for the safety of blood as a product that policymakers targeted for reform. Following the publication of Titmuss' book and numerous journalistic investigations exposing the realities of paid donation, the value of efficiency became distinctly secondary to the health and safety of blood recipients.

History and the Economics of Healthcare

The study of the blood donor debate not only demonstrated the limits of economic expertise in health policy, but also suggested the limitations of this dissertation and recent scholarship in the history of the health sciences. Alluded to throughout the dissertation, the development of health economics in general and of the blood debate in particular were not only matters of academic discourse and the founding of a new discipline, but were closely tied to fundamental economic changes in healthcare and society. Public health departments and researchers dedicated most of their research to analyzing the economic organization of blood donor systems and focused primarily on the transmission of Hepatitis B, but the existence of blood as a health issue was predicated on the emergence of chronic disease as the primary medical and health economic problem facing both affluent and developing countries. The dramatic increase in the need for donated blood and the expansion of blood service infrastructure

in the 1960s originated from the advent and accessibility of expensive new procedures to treat heart disease and cancer that required massive blood transfusions. As rates of chronic disease increased and expensive procedures such as open-heart surgery became available to a larger portion of the global population, the economics of blood became a central concern.

In the 1960s health economics developed as a politically powerful and academically influential discourse, but the new discipline was not the driver of the economic trends it sought to scientifically explain. A reflection of the growing problem of healthcare spending in the United States and other industrial societies, the economic study of health and its changing foci served as academic indicators of the transition towards a postindustrial economy and the new economic challenges presented by chronic diseases. Malaria eradication presented its own unique challenges as a health program that had been achieved with considerable success in some countries and remained elusive in others, but chronic disease presented the insuperable challenge of treating patients suffering from diseases that could never be eradicated by using expensive and constantly changing medical procedures. The recognition of health economists of the impact of healthcare services and institutions on society represented not only an intellectual turning point in public health and economic discourse, but also a fundamental shift in the economic and social organization of modern societies. Healthcare was a distinctly postindustrial economic phenomenon that presented its own set of problems. Just as malaria was understood by many economists to be distinctive of the struggle of rural societies to develop into industrial economies, healthcare was also seen as emblematic of the economic development of deindustrializing economies.

Despite the role of the economic organization of health as one of the defining political debates of the past several decades and nearly 20% of the contemporary American economy,

recent scholarship in the history of the health sciences has largely ignored the influence of economic thought on healthcare or the more empirical study of the economic history of medicine. The lack of attention to this topic over the past thirty years, however, has been more a matter of recent scholarly neglect than historical tradition. Published in 1982 and the winner of the Pulitzer Prize in 1984, Paul Starr's *The Social Transformation on American Medicine* described "one of the underlying movements in the transformation of medicine," the conversion of healthcare into a commodity, and the profound historical significance of the transition from the household to the market as the dominant institution tasked with the care of the sick.⁴

Examining the relationship between healthcare as both an economic and cultural institution, Starr argued:

Precisely because of what is now taking place, it has become more necessary to understand medicine as a business as well as a cultural phenomenon-and perhaps most important, to understand the relationship between the two.⁵

Despite the ubiquity of Starr's book on history of medicine syllabi and, in the light of the past thirty years of healthcare, his prescient observations on the historical development of medicine and its relation to corporate trends, his call for attention to business and economic practices in medicine has largely been neglected while cultural histories of medicine have flourished. Starr's ambitious research agenda may be too vast for any one study, but it is a research area in which this dissertation is intended to make at least a modest contribution.

4. Paul Starr, *The Social Transformation of American Medicine; The Rise of a Sovereign Profession and the Making of a Vast Industry* (United States: Basic Books, 1982), 22.

5. *Ibid.*, x.

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