

Constructing International Health: The Communicable
Disease Center, Field Epidemiologists and the Politics of
Foreign Assistance (1948-1972)

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December, 2011

A thesis submitted to McGill University in partial fulfillment of the
requirements of the degree of Doctorate of Philosophy in History

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Abstract

Following World War II, new institutions were created to manage international health issues and assist developing nations in addressing their public health problems. Bilateral aid agencies and multilateral organizations designed, promoted, financed and implemented various programs to alleviate the burden of disease in the Third World, but also pursued political goals. In this dissertation, I analyze the development of international health activities of the Communicable Disease Center (CDC) from 1948 to 1972, from the first overseas assignment of a CDC officer until the end of major global public health campaigns at the beginning of the 1970s. My focus is on the role and motivations of CDC leaders and field epidemiologists who aimed and worked to transform the public health agency from a marginal international player into an important actor in the institutional constellation.

In extending activities from the U.S. to the international arena, the CDC, as a national health agency, faced legal and political obstacles which limited its access to foreign localities where international health programs were being implemented. I argue that if expertise in field epidemiology existed in Atlanta and CDC leaders expressed a desire to see their agency take a more prominent role, the deployment of CDC personnel overseas remained problematic. To circumvent these obstacles, the CDC utilized development agencies, public health technologies and multilateral health organization as conduits to get access to foreign environments, procure international field experience to its epidemiologists and make an impact on the control of infectious diseases. As I show, it was especially during the 1960s that these three trajectories coalesced to ensure CDC's place as a public health actor of international reach and contributed in establishing its credibility. The exploration of the CDC's relationships with these international health actors and technologies also demonstrates the tensions deriving from the arrival of a new actor of

international health, the limits of expertise when opposed by political considerations and the various tactics employed to secure a role in the design, implementation and management of public health programs abroad.

Key words: Communicable Disease Center; Centers for Disease Control; international health; bilateral assistance; field epidemiology; malaria; smallpox; surveillance; history of public health; history of U.S. foreign relations.

Résumé

Après la Deuxième guerre mondiale, de nouvelles institutions sont créées afin de gérer les dossiers de la santé internationale et d'assister les nations en voie de développement dans la prise en charge de leurs problèmes de santé publique. Les agences d'aide bilatérale et les organisations multilatérales ont imaginé, promu, financé et implanté plusieurs programmes dans le but d'alléger le poids des maladies dans le Tiers monde, mais aussi à des fins de politique étrangère. Dans cette thèse, j'analyse la construction des activités de santé internationale du Communicable Disease Center (CDC) de 1948 à 1972, période correspondant à sa première mission outremer jusqu'à la fin d'importants programmes de santé internationale au début des années 1970. Je me concentre sur le rôle et les motivations des dirigeants du CDC et des épidémiologistes de terrain, qui visaient à transformer leur agence de santé publique, d'abord un acteur marginal, en un joueur important dans la constellation institutionnelle de la santé internationale.

Dans l'expansion de leurs activités de la scène nationale à l'échelle internationale, le CDC, en tant qu'agence de santé nationale, a été confronté à des obstacles légaux et politiques limitant leur accès aux territoires étrangers où les programmes de santé internationale sont implantés. Je démontre que si le CDC disposait d'une expertise en épidémiologie de terrain et même si leurs dirigeants désiraient jouer un rôle international important, le déploiement des officiers du CDC à l'étranger demeurerait problématique. Afin de contourner ces obstacles, le CDC utilisa les agences de développement international, les technologies de santé publique ainsi que les organisations multilatérales comme conduits afin d'accéder aux territoires d'outremer, donner une expérience internationale à ses épidémiologistes de terrain et modifier profondément les conventions sur le contrôle des maladies infectieuses. Tel que je le démontre,

ces trois trajectoires fusionnent dans les années 1960 afin de confirmer le statut du CDC en tant qu'acteur de la santé internationale et contribuent à établir la crédibilité de l'institution. L'exploration des relations du CDC avec ces institutions et les technologies de santé publique permettent également de mettre en relief plusieurs éléments : les tensions découlant de l'arrivée d'un nouvel acteur institutionnel de la santé internationale, les limites de l'expertise qui est parfois en opposition avec des considérations politiques et les diverses tactiques utilisées pour s'assurer une place dans la mise sur pied, l'implantation et l'administration des programmes de santé publique à l'étranger.

Mots clés : Communicable Disease Center; Centers for Disease Control; santé internationale, aide bilatérale; épidémiologie de terrain; malaria; variole; veille sanitaire; histoire de la santé publique; histoire des relations étrangères américaine

Dedication

To my father (1951-2008) and my children: my links to the past and the future

Acknowledgements

My first words of thanks go my family and friends who supported me through this long process. Their patience and understanding were invaluable. Tania pushed me and comforted me in times of doubt. Without her, this dissertation would never have seen the light of day and I would not have escaped with my sanity intact. To Florent and Charles Vincent: the time spent playing with them was my daily reward. Frédéric Jean remained interested in learning about my research and rekindled my flame about my own work. Igor, Jean-Frédéric, and Jonathan offered much needed breaks and showed me it was possible to be done. Very special thanks to Melissa for the hospitality and to Mireille who really came through at the last minute. My father passed away as I was starting my dissertation but he was an inspiration in doing good work. To my mother: she never questioned my choice and encouraged me in going as far as I can. Guy and Diane believed in me and were sources of motivation. Their help with everything cannot be overstated.

My supervisor Thomas Schlich was always there for all kinds of support and gave me the freedom to explore this fascinating subject. He was unwavering in his belief that this could be done even during difficult times. His patience and comments were ingredients that allowed me to sit down and get to work. I wish every graduate student to find as good a supervisor as Thomas was to me. I would also like to thank George Weisz who first believed in this project and offered precious advice to further my research. Andrea Tone and Lorenz Lüthi were always there in case of need and contributed greatly in expanding my knowledge in new directions.

George Dehner and Randall Packard graciously provided me with documents and comments to improve the quality of my work. Thank you to Gilberto Hochman,

Ted Brown Bob Reinhardt, Michael Bresalier for taking the time to read parts of this dissertation and generously offering their insights.

This work would not have been possible without the financial support of the Social Sciences and Humanities Research Council of Canada, the Fonds de recherche du Québec - Société et culture, the Tomlinson Fellowship and other grants from McGill University.

I received much help from archivists and librarians in finding documents. Rob Richards at the NARA facilities in Morrow, Georgia and Tab Lewis in College Park went out of their way to find boxes and obscure documents and offered continual support throughout the years. Mary Hilpertshauser and Joel Hewett assisted in finding and assembling sources from the David J. Sencer Museum at the CDC. Thanks to Jessica Murphy of the Countway Library of Medicine, Marjorie Kehoe of the Alan Mason Chesney Medical Archives, Doug Atkins of the National Library of Medicine, Charles Florey and Eman Hamman of the International Epidemiological Association, and Romain Ledauphin of the UN Archives. This extends to the staff of the Health Sciences and Osler Libraries at McGill University, especially Christopher Lyons who was available to answer my many questions.

My research has greatly benefited from participation of former CDC members who graciously accepted to be interviewed: Teeb Al-Samarrai, Philip S. Brachman, William H. Foege, Donald A. Henderson, Joan Millar, Robert G. Scholtens and an anonymous informant. A very special thanks to Don Millar, who accepted to read and comment part of this work and accepted to share some of his personal papers, and to David J. Sencer (1924-2011) who was very generous with his time and also provided me with documents from his collection.

Finally my thanks go to friends, faculty, professors and staff who assisted me in many ways over the years: Anne Emmanuelle Birn, Alberto Cambrosio, Jim, Karen Connors, Mitali Das, Andrea Emrick, Amy Fairchild, Paul Greenough, Christine Hudon, Peter Keating, Nicholas King, Loes Knaapen, Maureen Malowany, Pierre Minn, Raul Necochea, Colleen Parish, Tobias Rees, Jason Szabo, Adele Tarantino, and Wilson Will.

Table of contents

Abstract.....	2
Résumé.....	4
Dedication	6
Acknowledgements.....	7
Table of contents	10
1. Introduction: Institutions of International Health	13
1.1 Introduction	13
1.2 Institutionalization of International Health before World War II: Multinational Organizations, Private Foundations and Colonial Legacies	20
1.3 International Health and Technical Assistance: Postwar Institutions	28
1.4 Technology and International Public Health.....	36
1.5 National Health Institutions	38
1.6 Localities, Linkages and Conduits.....	39
1.7 Methodology and Sources	45
1.8 Organization of the Dissertation.....	50
Chapter 2: International Health in the United States: Actors, Expertise and the Communicable Disease Center (1945-1970)	53
2.1 Introduction	53
2.2 The CDC: Origins and History	55
2.3 Field Epidemiology: the Epidemic Intelligence Service.....	61
2.4 International Health in Atlanta: 1950s.....	69
2.5 President Dwight Eisenhower and Senator Hubert Humphrey	73
2.6 Public Health, Experts and Foreign Aid	79
2.7 Barriers, Obstacles and Missed Opportunities	91
2.8 Ambitions for the Future	97
2.9 International Health in Atlanta: the 1960s	103
2.10 Conclusion.....	107
Chapter 3: Technological Pathways – The Case of Jet Injectors (1962-1970)	109
3.1 Introduction	109
3.2 Immunization Techniques Old and New	112
3.3 Tonga and India: Success at the Periphery – Failure at the Center	119
3.4 Creating a Technological Breakthrough: Assessing Jet Injectors in Brazil	122

3.4.1 First trip: 1964.....	125
3.4.2 Second Trip: 1965	130
3.5 Hingson and Henderson.....	135
3.6 Embedding the Technology: Program Proposal and CDC Ambitions.....	140
3.7 West and Central Africa	144
3.8 Operation Elephant.....	155
3.9 Reliability and Bifurcated Needles	161
3.10 Conclusion: Technological Determinism and Ideology	164
Chapter 4: Regime Change: Surveillance, the CDC and the WHO	169
4.1 Introduction	169
4.2 WHO and CDC: the 1950s	171
4.3 Laboratory Surveillance and Influenza.....	173
4.4 Asian Influenza and the CDC	177
4.5 Surveillance in the Field – Alex Langmuir in East Pakistan	184
4.6 International Health at the Epidemiology Branch	189
4.7 Defining Modern Surveillance in the U.S.	191
4.8 Meeting of the IEA – Princeton 1964.....	194
4.9 WHO: Raskà-Langmuir-Henderson	197
4.10 South America: International Organizations and Disease Surveillance.....	201
4.11 Reality Check: PAHO, Surveillance and Commitments	206
4.12 Popularity of Langmuir.....	214
4.13 Surveillance, Quarantine and Regulations.....	218
4.14 Conclusion: Tanks in Prague	227
Chapter 5: Bilateral Assistance Part 1: Insecticides and Politics (1948-1960)	231
5.1 Introduction	231
5.2 Malaria Eradication: Origins.....	234
5.3 Introducing DDT	238
5.4 Modernization, Politics and Mosquitoes: Justin Andrews in Iran (1948)	240
5.5 The Technical Development Laboratories	248
5.6 Flies in Liberia: Diplomacy and Technical Autonomy (1957)	256
5.7 Pathological Boundaries vs. Administrative Barriers.....	265
5.8 Crisis in Central America: CDC and resistance (1959)	267
5.9 East Pakistan vs. Central America	277
5.10 Conclusion.....	279

Chapter 6: Bilateral Foreign Assistance part 2: Malaria, the USAID and Field Epidemiologists (1961-1972)	281
6.1 Introduction	281
6.2 Bilateral Assistance: The 1960s.....	284
6.3 USAID, USPHS and the MEP	288
6.4 Beyond Evaluation: Taking over Malaria Eradication? (1964-1966).....	297
6.5 Negotiations over Immunization: Child and Maternal Care	303
6.6 In the Field	307
6.7 Cultural Clashes in Malaria (1966-1970).....	316
6.7.1 Funding.....	319
6.7.2 Manpower.....	321
6.7.3 Self-help	323
6.7.4 A Geopolitical vs. an Epidemiological World	325
6.8 Politics and/of Eradication	330
6.9 Control or Eradication.....	334
6.10 CDC's Epitaph to Malaria Eradication	339
6.11 Conclusion.....	343
7. Conclusion.....	345
Bibliography	355

1. Introduction: Institutions of International Health

1.1 Introduction

In January 2010, an earthquake struck Haiti. In July 2010, a young Epidemic Intelligence Service (EIS) officer assigned to New York City received a phone call to travel there to replace a fellow Center for Disease Control and Prevention (CDC) officer who was just finishing her tour of duty in the island nation. As Teeb Al-Samarrai got there six months after the earthquake, she found herself in the overwhelming situation of a country whose limited public health infrastructure had literally collapsed, including the Ministry of Health building. Arriving in Haiti, she was struck by the extent of the devastation and by how much work there was to do for every aspect, including clearing the rubble. Serving as the coordinator for the surveillance system set up by CDC to monitor for outbreaks among the internally displaced people living in refugee camps in and around Port-au-Prince, she found herself in the middle of data circulating from NGOs to her computer: “I was receiving data every week and sometimes everyday, from multiple different Non-governmental organizations (NGO) working in camps throughout Port-au-Prince. Each NGO’s health clinic would send a tally of patients presenting with fevers, respiratory illness, suspected malaria, or suspect dengue, diarrhea, measles, diphtheria etc. I worked with the rest of the CDC team to clarify case definitions for the different diseases or syndromes to monitor for potential outbreaks within camps.”¹

As part of the CDC emergency response, she found herself working and collaborating with a myriad of national and international organizations such as Partners in Health, Médecins sans frontières, the United States Agency for International Development, the Pan American Health Organization and the

¹ Interview with Teeb Al-Samarrai by author, November 29, 2011.

World Health Organization, which coordinated these efforts through a health cluster – a model of disaster response developed during the Indonesian tsunami called One Response.² “My responsibility was to keep the lines of communication open with NGO staff in all camps, ensure that the data was coming in, and work with the staff of the Ministry of Health. Establishing a surveillance system in the first place was challenging because there was no baseline for anything and it was difficult to estimate denominator data because the population in camps was fluid”, Teeb explained. However the relations with her partners were good:

I was not in a leadership role, but I think in general CDC staff tries to be really respectful. There was definitely a dialogue and we really tried to listen to the different concerns of Ministry of Health and NGO staff to understand and identify obstacles to providing care, collecting and sending surveillance data, collecting laboratory specimens, or conducting testing at the national laboratory. We worked with the Ministry of Health to develop a training program for NGO clinic staff to ensure that that data was being collected in a standardized, systematic way throughout the different clinics, camps and by the different NGO staff. Although we provided support, the Ministry of Health led the training. This was key because we wanted to ensure that they felt a sense of ownership over the surveillance system and were seen as the authorities and partners by the NGO staff.³

When asked about her personal experience, the memories of working in a difficult situation emerged: “I think it was really humbling to see that response and how challenging it was to work in this context. It was also humbling because I quickly realized that the work would be continuing for many years to come

² On the One Response for Haiti, see <http://oneresponse.info/Disasters/Haiti/Health/Pages/default.aspx>.

³ Interview with Teeb Al-Samarrai by author, November 29, 2011.

because of all the challenges of reconstruction”, she recalled, “You are just a small part of a disaster response that needs to be organized.” Looking back at her experience, she remembered the steep learning curve and the frustration synonymous with short term international assignments: “you arrive in a situation that is so overwhelming and you have to be patient with that feeling and understand that it’s normal and you learn to plan and respond and not wade in that situation. And although it was incredibly meaningful work, at times it felt simply like a band-aid in the greater scheme of a disaster response as the one in Haiti. [...] I was only there for a short period of time and by time I got ‘comfortable’ it was time to leave.”⁴

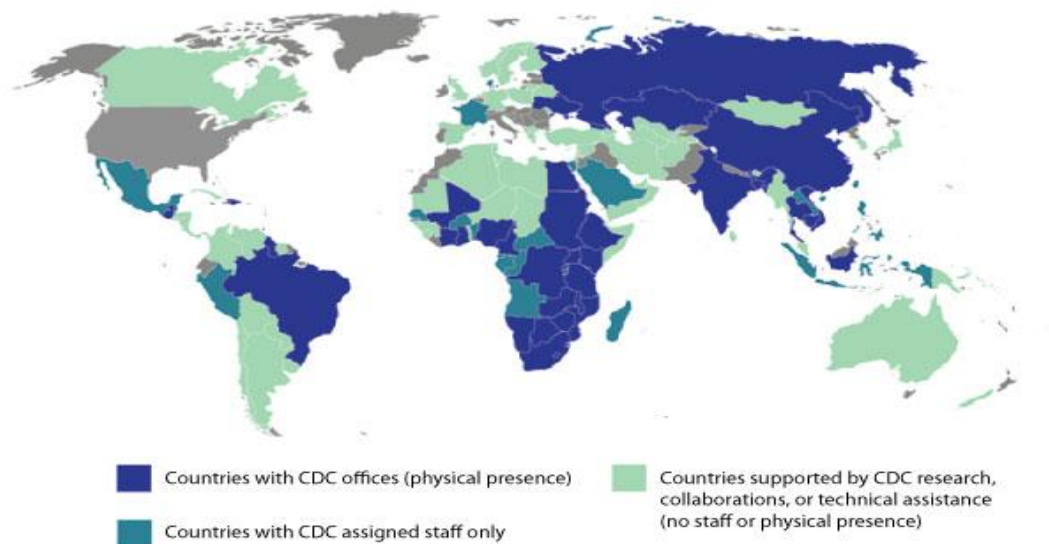
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The personal involvement in global health of CDC officers, like Teeb’s, has its institutional counterpart. In January 2010, the Centers for Disease Control and Prevention created its Center for Global Health (CGH) to serve as focal point for all CDC overseas programs, evaluate U.S. initiatives in public health abroad and administer partnerships with other organizations. The CDC receives over \$2 billion in federal funding to support a broad range of programs and topics. Based in Atlanta, the CGH is responsible for the Global Disease Detection Program and the Field Epidemiology and Laboratory Training Program. It manages the U.S. involvement with HIV/AIDS abroad, provides assistance for international emergency and refugee health, investigates foodborne infections and collects data for global tobacco control, to name a few examples. Moreover, the CGH assigns personnel in over 50 countries and international organizations and is at the center of a network of offices located in South America, Africa and Asia. In addition to its own deployment abroad, the CDC cooperates with a wide variety of organizations also engaged in global health for a variety of topics and initiatives: child health with UNICEF; polio eradication with Rotary International;

⁴ Interview with Teeb Al-Samarrai by author, November 29, 2011.

Public Health Schools without Walls with the Rockefeller Foundation; grants support and assignment of staff to the World Health Organization; etc. If this cataloging of CDC's participation of global health fails to encompass its entire range of activities, these elements clearly signify the place and role of the institution as a major center of today's global health landscape.⁶ But how did it come to this?

Figure 1.1: The CDC in the World (2011)



Source: www.cdc.gov/globalhealth/countries/

Stories such as Teeb's fuelled my initial fascination with global/international health. Spectacular and dramatic EIS missions overseas, where field epidemiologists track and contain outbreaks of strange and deadly diseases, account for the core of popular medical literature that captures the imagination and contributes in ensuring the CDC's presence in the media. Authors such as Laurie Garrett, Richard Preston and Mary McKenna take us on the frontline with those CDC disease detectives. However, larger questions remain unexplored and nourish my interest in exploring the international assignments and historical

⁶ This information were gathered from various pages on <http://www.cdc.gov/Globalhealth/>, accessed November 27, 2011.

development of the CDC.⁷ More specifically, these stories are silent on the political, policy and institutional aspects supporting and justifying the presence of field epidemiologists in foreign nations. Intuitively, I suspected that their presence in foreign nations resulted from more than the mere presence of pathogens and outbreaks. It necessitated administrative machinery to answer international calls for assistance and an institutional culture that supported, and even encouraged, a domestic agency to tackle and take part in its own way in global health initiatives.

These initial questions pushed my investigations away from individual missions overseas to concentrate on the historical development of international health activities in Atlanta from which current assignments abroad and the CGH derive. Few studies examine in detail the emergence of the CDC as an actor of global health. In her history of the CDC, Elizabeth Etheridge explains that the “boom of jet travel increased the possibility of introducing exotic disease from abroad”; and veterans from the Vietnam War returned to the U.S. carrying resistant strains of malaria and other venereal diseases. This, argues Etheridge, “converged in the 1960s to turn CDC’s attention to international health.”⁸ Her interpretation suggests that external forces coalesced to expand the CDC’s spheres of activity outside of U.S. borders.

Other works on international health activities of the CDC focused on the implementation of programs (smallpox eradication and measles control in West Africa) and the spread of practices and concepts (e.g. surveillance) rather than

⁷ Laurie Garrett, *The Coming Plague: Newly Emerging Diseases in a World out of Balance* (New York: Farrar, Straus and Giroux, 1994). Richard Preston, *The Hot Zone* (New York: Random House, 1994). Maryn McKenna, *Beating Back the Devil: On the Front lines with the Disease Detectives of the Epidemic Intelligence Service* (New York: Free Press, 2004) Other examples: Joseph B. McCormick and Susan Fisher-Hoch, *Level 4: Virus Hunters of the CDC*, (Atlanta: Turner Publishing, 1999) C.J. Peters and Mark Olshaker, *Virus Hunters: Thirty Years of Battling Hot Viruses around the World* (New York: Anchor Books, 1997). Mark Pendergrast, *Inside the Outbreaks: The Elite Medical Detectives of the Epidemic Intelligence Service* (Boston: Houghton Mifflin Harcourt, 2010).

⁸ Elizabeth Etheridge, *A Sentinel for Health: A History of the Centers for Disease Control* (Berkeley: University of California Press, 1992), p. 178.

aiming at providing an explanation of the expansion from the domestic to the international arena.⁹ In a recent textbook, a typology of international health actors categorized the CDC as a “Technical Agency” whose activities include the supply of technical assistance and “capacity-building support to government disease-control programs in a variety of settings.”¹⁰

These interpretations generally assume that an extension from the domestic arena to the international sphere functions by unproblematic application of expertise or “technical resources” initially developed in Atlanta and brought to bear on public health problems abroad. But as Paul Weindling wrote: “[W]e cannot assume a dynamic flow of expert knowledge from elite agencies in the United States to peripheral locations.”¹¹ If expertise on a variety of diseases existed in Atlanta, its application overseas was complicated by virtue of the CDC’s mandate and mission centered upon assisting U.S. states and addressing the health needs of the American population. As a national health agency, the CDC was limited in its access to foreign settings (mostly developing countries) where international health programs were underway and jointly administered by organizations, designed to operate overseas, and their local partners. As Weindling and Steven Palmer further argue, organizations acquired and modified their approach through local interactions in foreign environments, thus stressing

⁹ Jack Hopkins, *The Eradication of Smallpox: Organizational Learning and Innovation in International Health* (Boulder, CO.: Westview Press, 1989). François Buton, “De l’expertise scientifique à l’intelligence épidémiologique : l’activité de veille sanitaire”, *Genèses*, Vol. 4, No. 65 (2006), p. 71-91. Those involved in writing the history of CDC’s international involvement are often former and current members. For example, William H. Foege, *House on Fire: The Fight to Eradicate Smallpox* (Berkeley: University of California Press; New York: Milbank Memorial Fund, 2011). D.A. Henderson. *Smallpox: The Death of a Disease* (Amherst, New York: Prometheus Book, 2009). Jeffrey P. Koplan and Stephen B. Thacker, “Fifty Years of Epidemiology at the Centers for Disease Control and Prevention: Significant and Consequential”, *American Journal of Epidemiology*, Vol. 154, No. 11 (December 2001), p. 982 -984. Horace G. Ogden, *CDC and the Smallpox Crusade* (Atlanta: Centers for Disease Control, 1987).

¹⁰ Anne-Emmanuelle Birn, Yogan Pillay and Timothy H. Holtz, *Textbook of International Health: Global Health in a Dynamic World*, Third edition (New York: Oxford University Press, 2009), p. 68-69, 97.

¹¹ Paul Weindling, “American Foundations and the Internationalizing of Public Health” in Susan Gross Solomon, Lion Murard and Patrick Zylberman (eds.), *Shifting Boundaries of Public Health: Europe in the Twentieth Century* (Rochester: University of Rochester Press, 2008), p. 64.

the importance of field experience in the expansion of international health activities.¹² These interactions in the field became elements in the establishment of credibility and stepping stones in the gradual construction of international health activities within institutions such as the Rockefeller Foundation. So how did an organization such as the CDC circumvent problems in accessing developing countries to construct its international health activities?

Alliances and alignment with some of the defining elements of international public health, coupled with individual ambitions of key members of the CDC, enabled the agency to bridge the national and international divide and carve itself a role as an agency of global reach. Aware of its limits, the agency turned to the existing institutions of bilateral assistance and international health as sources of legitimacy, funds and authority to learn about international health work, deploy its officers and modify the international regulations on infectious diseases along the lines of CDC practices. In addition to inter-agency cooperation, the CDC used its close association with technologies of public health utilized in developing countries, such as DDT and immunization technologies, as pathways to developing countries and as arguments to assume program control. Furthermore, malleability of CDC's basic institutional mission, in addition to individual ambitions, provided a conceptual basis supporting the pursuit of an international role. In sum, the pragmatic manner in which the CDC grew as an actor of international health is a result of internal forces that recognized the opportunities to apply its expertise overseas that would allow the public agency to circumvent barriers (legal, political, financial), build its credibility and gain experience.

In following this process of construction of international health in Atlanta through these 'partnerships', CDC officers became increasingly aware of the

¹² Paul Weindling, "American Foundations and the Internationalizing of Public Health", p. 64. Steven Palmer, *Launching Global Health: The Caribbean Odyssey of the Rockefeller Foundation* (Ann Arbor: University of Michigan Press, 2010), p. 2-5.

limits and problems in translating their knowledge and practices from the U.S. to the global arena. Technologies of public health, while crucial to public health endeavours in the Third World, sometimes proved unable to convince development agencies to relinquish their hold over public health assistance abroad. And when the CDC obtained authority from bilateral aid agencies to administer programs abroad, it became acutely aware of foreign policy objectives behind technical assistance as political commitments trumped epidemiology. Access to the field for testing, promoting and implementing certain public health practices, such as surveillance, on an international level met with obstacles as CDC field epidemiologists faced the realities of public health infrastructures and priorities in developing nations. Professional networks and access to decision making centers in Geneva proved more fruitful in initiating a profound modification in how nations would contain the global spread of infectious diseases. In a sense, the 1948-1972 period covered in my dissertation, from when the CDC sent its first officer overseas to the end of smallpox eradication in West Africa and the abandonment of malaria eradication, was a time of individual and institutional learning about international health work and its actors. These years saw the gradual establishment, through the exploitation of opportunities and despite setbacks, of the CDC as a credible actor of international health mainly, but not exclusively, through field epidemiologists' ever increasing involvement in providing solutions to the health problems of developing nations. But where does the CDC, as a national health agency, fit in the history and historiography of the institutionalization of international health?

1.2 Institutionalization of International Health before World War II:

Multinational Organizations, Private Foundations and Colonial Legacies

The roots of international health date back to the black plague and the Atlantic slave trade; the history of its institutions and their enshrinement into

conventions and treaties begins in the mid-19th century.¹³ In a context of colonial expansion, cholera pandemics and threats to commerce, twelve European nations met in Paris for a first International Sanitary Conference in 1851 to discuss measures to prevent the introduction and the spread of plague, cholera and other infectious diseases. This first concerted effort to establish quarantine regulations of ships, however, failed to rally participating nations despite accumulating scientific evidence on disease transmission, notably by John Snow, for cholera. Represented mainly by diplomats, the 1851 attempt to enact regulations were plagued by dissensions over national interests and commercial imperatives as governments, especially British representatives, opposed any measures which would affect trade.¹⁴

While sanitary conventions included an increasing number of nations such as the United States, seven Latin American countries, China, Japan and Liberia, joining for the fifth International Sanitary Conferences held in Washington in 1881, agreements remained difficult to reach. For instance, some countries opposed U.S. proposals for a disease notification mechanism. A first International Sanitary Convention deriving from the conferences came into effect in 1892 and 1893 to control cholera around the Suez Canal and in Europe. Other conventions followed in the late 19th century but it was in the early 20th century that participating countries agreed on the creation of a permanent institutional seat for international health. A result of the 1903 International Sanitary Convention, the *Office International d'Hygiène Publique* (OIHP) opened its doors in 1909 in Paris to collect and disseminate epidemiological information to member states

¹³ Anne-Emmanuelle Birn, Yogan Pillay and Timothy H. Holtz, *Textbook of International Health*, chapter 2.

¹⁴ William F. Bynum. "Policing Hearts of Darkness: Aspects of the International Sanitary Conferences", *Hist. Phil. Life Sci.*, Vol. 15, No. 3 (1993), p. 428, 431. On British quarantine policy, see Anne Hardy, "Cholera, Quarantine and the English Preventive System, 1850-1895", *Medical History*, Vol. 37, No. 3 (July 1993), p. 250-269; and Krista Maglen, "British Quarantine and the Port Sanitary Authorities in the Nineteenth Century", *Social History of Medicine*, Vol. 15, No. 3 (December 2002), p. 413-428.

and implement the Convention.¹⁵ If the OIHP was the first permanent organization dedicated to international health to include members from multiple continents, another institution contributed to this initial wave of institutionalization.

In 1902, the United States and seven other American governments created the first permanent multinational health organization: the Pan American Sanitary Bureau (PASB). In a region where the U.S. was the dominant influence, colonial and political rivalries did little to hinder the process of institutionalization and the establishment of regulations on trade and disease notification. Headed by American Surgeon-Generals until 1947, the PASB reflected U.S. commercial and financial interests in a wide variety of economic sectors (mining, banking, agriculture, etc.); its expansion included additional member states (21 by 1924) and the drafting of its regulations heavily involved Latin American nations.¹⁶ If the epidemics and infectious diseases covered most of PASB activities, other areas such as maternal health emerged after pressure from Latin American countries, making this multilateral organization a forum to discuss and disseminate ideas on public health.¹⁷ These two organizations served as foundations and basic structure for the creation of the World Health Organization after World War II.¹⁸

In addition to the OIHP and the PASB, other types of institutions also appeared in the 19th century but it was during the interwar period that an increasing number

¹⁵ Neville Goodman, *International Health Organizations and Their Work*, Second edition (Edinburgh, 1972), p. 49-79 for information on the OIHP.

¹⁶ Anne-Emmanuelle Birn, Yogan Pillay and Timothy H. Holtz, *Textbook of International Health*, p. 45-46.

¹⁷ The PASB was originally named the International Sanitary Bureau before changing to PASB in 1923 and to the Pan American Health Organization in 1958. Anne-Emmanuelle Birn, "‘No More Surprising than a Broken Pitcher’: Maternal and Child Health in the Early Years of the Pan American Sanitary Bureau", *CBHM/BCHM*, Vol. 19, No. 1 (2002), p. 17-46. For references on the history of the Pan American Health Organization, see Marcos Cueto, *The Value of Health: A History of the Pan American Health Organization* (Washington, D.C.: Pan American Health Organization, 2007)

¹⁸ Javed Siddiqi, *World Health and World Politics: The World Health Organization and the UN System* (Columbia, SC: University of South Carolina University Press, 1995), p. 18.

of public health organizations joined the field of international health. Among the early health-related actors was the International Red Cross established in Geneva in 1863 by Henry Dunant to assist military health services in aiding wounded soldiers. The ICRC and its member national societies extended their role to the care of civilians during peacetime as a result of intense internal debates and divisions.¹⁹ More directly involved in public health and medical education between 1913 and 1951 in numerous countries was the International Health Division (IHD) of the Rockefeller Foundation. An outgrowth of a campaign to eradicate hookworm disease in the U.S. South, the IHD extended its activities to Latin America, Europe and Asia in the promotion of science-based public health intervention.²⁰ Historians have unearthed the lasting influence, positive or otherwise, of the IHD as it undertook disease eradication programs, trained medical personnel, financed laboratory research and contributed to the creation of transnational networks of institutions and researchers.²¹

¹⁹ John F. Hutchinson, "'Custodians of the Sacred Fire': the ICRC and the Postwar Reorganisation of the International Red Cross" in Paul Weindling (ed.), *International Health Organisations and Movements, 1918-1939* (New York: Cambridge University Press, 1995), p. 17-35. In the same volume, see Bridget Towers, "Red Cross Organisational Politics, 1918-1922: Relations of Dominance and the Influence of the United States", in Paul Weindling (ed.), *International Health Organisations and Movements, 1918-1939* (New York: Cambridge University Press, 1995), p. 36-55.

²⁰ John E. Ettling, *The Germ of Laziness: Rockefeller Philanthropy and Public Health in the New South* (Cambridge, Mass.: Harvard University Press, 1981).

²¹ Marcos Cueto, "The Cycles of Eradication: the Rockefeller Foundation and Latin American Public Health, 1918-1940", in Paul Weindling (ed.), *International Health Organisations and Movements, 1918-1939* (New York: Cambridge University Press, 1995), p. 222-243. Anne-Emmanuelle Birn, *Marriage of Convenience: Rockefeller International Health and Revolutionary Mexico* (Rochester, NY: University of Rochester Press, 2006). John Farley, *To Cast Out Disease. A History of the International Health Division of the Rockefeller Foundation (1913-1951)* (New York: Oxford University Press, 2004). Lise Wilkinson, "Burgeoning Visions of Global Public Health: The Rockefeller Foundation, The London School of Hygiene and Tropical Medicine, and the 'Hookworm Connection'", *Stud. Hist. Phil. Biol. & Biomed. Sci.*, Vol. 31, No. 3 (2000), p. 397-407. Illana Löwy and Patrick Zylberman, "Medicine as a Social Instrument: Rockefeller Foundation, 1913-1945", *Stud. Hist. Phil. Biol. & Biomed. Sci.*, Vol. 31, No. 3 (2000), p. 365-379. Randall Packard and Paulo Gadehla, "A Land Filled with Mosquitoes: Fred L. Soper, the Rockefeller Foundation, and the Anopheles Gambiae Invasion of Brazil", *Medical Anthropology*, Vol. 17, No. 3 (May 1997), p. 215-238. PJ Brown, "Failure-as-Success: Multiple Meanings of Eradication in the Rockefeller Foundation Sardinia Project, 1946-1951", *Parassitologia*, Vol. 40, No. 1-2 (1998), p. 117-30. Socrates Litsios, "Selskar Gunn and China: The Rockefeller Foundation's 'Other'"

Interpretations on the underlying motives and ultimate goals of the IHD are varied as Rockefeller philanthropy is presented as a disinterested endeavour by some, while others viewed it as a means to further expand the U.S. capitalist model and imperialism.²² Recent studies have refuted this latter school of thought, but nonetheless noted the success of the Rockefeller in transforming their reputation from “robber barons” to medical benevolence, and the local adaption of the IHD campaigns against hookworm by stressing negotiations and the learning process of Rockefeller officers.²³ Regardless of these conflicting interpretations, these studies on the IHD have made evident the flexibility of the Rockefeller Foundation in pursuing and defining of its own agenda in terms of demonstration and training programs. Indeed, the IHD entered into direct negotiations with national and local governments, entered in partnership with established academic institutions and collaborated with multinational health organizations. Noticing these characteristics, Paul Weindling remarked: “Foundations have had a greater freedom than state agencies to support experimental projects and to disseminate standards on best practice derived through international training programs.”²⁴ In addition to the IHD, other U.S. private foundations such as the Milbank Memorial Fund and the Carnegie

Approach to Public Health”, *Bull. Hist. Med.*, Vol. 79 (2005), p. 295-318. Marcos Cueto (ed.), *Missionaries of Science: The Rockefeller Foundation and Latin America* (Bloomington, IN: Indiana University Press, 1994). Ilana Löwy, “Epidemiology, Immunology and Yellow Fever: The Rockefeller Foundation in Brazil, 1923-1939,” *J History of Biology*, Vol. 30, No. 3 (1997), p. 397-417.

²² A celebratory interpretation of the Rockefeller philanthropy is found in Raymond B. Fosdick, *The Story of the Rockefeller Foundation* (New York: Harper & Brothers Publishers, 1952). For critical studies stressing imperialist and capitalist interests see E.R. Brown, “Public Health and American Imperialism: Early Rockefeller Programs at Home and Abroad”, *American Journal of Public Health*, Vol. 66, No. 9 (1976), p. 897-903 and Anne-Emmanuelle Birn, *Marriage of Convenience: Rockefeller International Health and Revolutionary Mexico*. This approach can certainly be linked to the revisionist histories of U.S. foreign policy deriving from William Appleman Williams, *The Tragedy of American Diplomacy* (New York: Dell Pub. Co., 1962).

²³ John Farley, *To Cast Out Disease*, and Steven Palmer, *Launching Global Health: The Caribbean Odyssey of the Rockefeller Foundation* (Ann Harbor: University of Michigan Press, 2010).

²⁴ Paul Weindling, “American Foundations and the Internationalizing of Public Health”, p. 63. As does Iris Borowy in *Coming to Terms with World Health: The League of Nations Health Organisations, 1921 – 1946* (Frankfurt am Main: Peter Lang GbmH, 2009), p. 28-29.

Commonwealth were also free to finance and promote public health demonstrations notably in Eastern Europe.²⁵

In the wake of World War I and the Treaty of Versailles, nations of Europe, Asia and the Americas convened to create the League of Nations to preserve peace and ensure collective security. The founding document of this new multilateral organization, the League of Nations Covenant, planned to create a division dedicated to health. Thus was born the League of Nations Health Organization (LNHO) in 1921 under the leadership of Ludwik Rajchman.²⁶ With the enforcement of sanitary conventions in the hands of the still independent OIHP, the LNHO was a multifunctional organization which addressed a broader range of issues such as rural health, nutrition, and health problems of social origins. Iris Borowy argues that the LNHO marks a major turning point in the institutional history of international health: "Created after the First World War, the LNHO was the first global health organization, endowed with a vague, i.e. malleable mandate, a technical sub-organization of the first institutionalized community of nations in world history. It lacked tradition, precedence and a stable framework, which was a source of insecurity as well as of freedom of action."²⁷ The LNHO utilized this freedom of actions to expand its activities beyond European confines notably to China and South East Asia, where it sponsored rural health demonstrations, contributed to the development of strong national health services and created a regional disease surveillance network despite some resistance from member-nations.²⁸ Additionally, the LNHO became a key site in

²⁵ Paul Weindling, "American Foundations and the Internationalizing of Public Health", p.63-86.

²⁶ On the League of Nations Health Organization, see Iris Borowy, *Coming to Terms with World Health*. For a more succinct presentation, see Martin David Dubin, "The League of Nations Health Organization" in Paul Weindling (ed.), *International Health Organisations and Movements, 1918-1939* (New York: Cambridge University Press, 1995), p. 56-80.

²⁷ Iris Borowy, *Coming to Terms with World Health*, p. 32.

²⁸ James A. Gillespie, "Europe, America, and the Space of International Health", in *Shifting Boundaries of Public Health: Europe in the Twentieth Century* (Rochester: University of Rochester Press, 2008), p. 116. Lenore Manderson, "Wireless Wars in the Eastern Arena: Epidemiological surveillance, disease prevention and the work of the Eastern Bureau of the League of Nations

the dissemination of public health ideas inspired by social medicine.²⁹ If the LNHO took a broader mandate and geographical scope than the older OIHP, it faced interference in its attempt to expand in the Americas due to PASB opposition and absence of the United States as member of the organization.³⁰ For historian Norman Howard-Jones, the simultaneous existence of the OIHP and the LNHO during the interwar created organizational problems plaguing the rational expansion of international public health; multinational cooperation was affected by political tensions between member states.³¹

Another trajectory in the institutionalization of international public health is found in the colonial expansion of European nations and the United States. As these nations embarked on endeavours to rule and assume their perceived 'civilizing mission', they also came into contact with diseases and ailments unknown in Northern climates which could decimate colonies and settlements and become obstacles to the economic exploitation of native labour and resources. A result of these contacts, tropical medicine emerged at the end of the 19th century in the United Kingdom as a new discipline focusing on diseases hindering colonial rule. White settlers were the first targets of this new body of knowledge and practices but it soon extended to labourers exploiting colonial resources.³² Public health measures deriving from tropical medicine mostly

Health Organisations, 1925-1942" in Paul Weindling (ed.), *International Health Organisations and Movements, 1918-1939* (New York: Cambridge University Press, 1995), p. 109-133.

²⁹ Paul Weindling, "Social Medicine at the League of Nations Health Organisation and the International Labour Office Compared", in Paul Weindling (ed.), *International Health Organisations and Movements, 1918-1939* (New York: Cambridge University Press, 1995), p. 134-153.

³⁰ The LNHO did however collaborate with U.S. public health experts through the Rockefeller Foundation and as evidence by the detailing of medical statistician Edgar Sydenstricker of the USPHS and appointed to the Milbank Memorial Fund to LNHO where he created the statistical service in 1923-24. James A. Gillespie, "Europe, America, and the Space of International Health", p. 73-76.

³¹ Norman Howard-Jones, *International Public Health between the Two World Wars – The Organizational Problems* (Geneva: World Health Organization, 1978), p. 6.

³² See the collected essays and the introduction for an overview in David Arnold (ed.), *Warm Climates and Western Medicine: The Emergence of Tropical Medicine, 1500-1900* (Amsterdam: Rodopi, 1996).

focused on enforcement of boundaries, strategies of avoidance, isolation and segregation of populations in colonized territories and the establishment of sanitary cordons.³³

Historians of colonial medicine have explored the intimate relationship between imperialism and public health in the era of European, and subsequent American, expansion in Africa, Asia and Latin America. A large body of literature addressed how colonial/tropical medicine contributed to the legitimization of colonial rule, the disciplining of subject's bodies and the creation and expansion of political/state structures in conquered territories each with their local versions and characteristics.³⁴ Parallel to the dissemination of western public health practices, ideas about race, disease and health through colonial expansion, institutions dedicated to the study of tropical disease and the training of medical professionals appeared in metropolises. For instance, in the United Kingdom, the London School of Tropical Medicine and Hygiene and the Liverpool School of Tropical Medicine are direct results of the spread of British imperialism, especially in Asia and Africa.³⁵ Empires could also facilitate the expansion of

³³ Nicholas B. King, "Security, Disease, Commerce: Ideologies of Postcolonial Global Health", *Social Studies of Science*, Vol. 32, No. 5-6 (October-December 2002), p. 772-773.

³⁴ David Arnold, *Colonizing the Body: State Medicine and Epidemic Disease in Nineteenth-Century India* (Berkeley: University of California Press, 1993). Warwick Anderson, *Colonial Pathologies: American Tropical Medicine, Race, and Hygiene in the Philippines* (Durham: Duke University Press, 2006). Douglas Melvin Haynes, *Imperial Medicine: Patrick Manson and the Conquest of Disease* (Philadelphia: University of Pennsylvania Press, 2001). Philip D. Curtin, *Disease and Empire: The Health of European Troops in the Conquest of Africa* (New York: Cambridge University Press, 1998). David McBride, *Missions for Science: U.S. Technology and Medicine in America's African World* (New Brunswick: Rutgers University Press, 2002). Lenore Manderson, *Sickness and the State: Health in Illness in Colonial Malaya, 1870-1940* (New York: Cambridge University Press, 1996). Myron J. Echenberg, *Black Death, White Medicine: Bubonic Plague and the Politics of Public Health in Colonial Senegal, 1914-1945* (Portsmouth, Heineman, 2002). Anne Perez Hattori, *Colonial Dis-Ease: U.S. Navy health politics and the Chamorros of Guam, 1898-1941* (Honolulu: University of Hawai'i Press, 2004). Laurence Monnais-Rousselot, *Médecine et colonisation : l'aventure indochinoise, 1860-1939* (Paris: CNRS Éditions, 1999).

³⁵ Helen J. Power, *Tropical Medicine in the Twentieth Century: A History of the Liverpool School of Tropical Medicine, 1898-1990* (London: Kegan Paul International, 1999). Lise Wilkinson and Anne Hardy, *Prevention and Cure: The London School of Hygiene & Tropical Medicine: a 20th century quest for global public health* (London: Kegan Paul International, 2001). In the United States, institutionalization of tropical medicine followed the Spanish-American War in the late 19th century. Cuba and the Philippines came under U.S. rule and the USPHS more directly involved

private research centers such as the *Institut Pasteur* through the establishment of facilities or field missions in North Africa and Indochina.³⁶ Thus, imperial expansion signified more than the management and exploitation of colonies, it led to the creation of institutions geared towards the production of knowledge on diseases largely absent in Western countries, and the education of professionals for the implementation of public health measures in tropical settings.

1.3 International Health and Technical Assistance: Postwar Institutions

From the ashes of World War II emerged a new set of institutions to manage not only international relations and matters of peace and security, but also a series of specialized agencies addressing issues of global reach such as agriculture, culture, economic development and health. Discussions regarding the creation of an international health organization which inherited the role and functions of the LNHO, the OIHP and the wartime United Nations Relief and Rehabilitation Administration (UNRRA) began in March 1946 at the request of the Economic and Social Council of the United Nations (ECOSOC). During this two year period, an Interim Commission oversaw the application of the International Sanitary

with health and disease in tropical settings. See Warwick Anderson, *Colonial Pathologies*. Bobby A. Wintermute, *Waging Health: the United States Army Medical Department and Public Health in the Progressive Era, 1890-1920* (Ph.D. dissertation, Temple University, 2006). Alexandra Minna Stern, "Yellow Fever Crusades: US Colonialism, Tropical Medicine, and the International Politics of Mosquito Control, 1900-1920" in Alison Bashford (ed.), *Medicine at the Border: Disease, Globalization and Security, 1850 to the Present* (Houndmills Basingstoke: Palgrave Macmillan, 2006), p. 41-59.

³⁶ It must be specified that the *Institut Pasteur* expanded in both French colonies and foreign countries. Anne Marie Moulin, "Tropical without the Tropics: The Turning Point of Pastorian Medicine in North Africa" in David Arnold (ed.), *Warm Climates and Western Medicine: The Emergence of Tropical Medicine, 1500-1900* (Amsterdam: Rodopi, 1996), p. 160-180. Kim Pelis, *Charles Nicolle, Pasteur's Imperial Missionary: Typhus in Tunisia* (Rochester: Rochester University Press, 2006). Anne Marie Moulin, "Patriarchal Science: The Network of the Overseas Pasteur Institutes" in Patrick Petitjean et al. (eds.), *Science and Empires: Historical Studies about Scientific Development and European Expansion* (Boston: Kluwer Academic Publishers, 1992), p. 307-322. Annick Guénel, "The Creation of the First Overseas Pasteur Institute, or the Beginning of Albert Calmette's Pastorian Career", *Medical History*, Vol. 43, No. 1 (January, 1999), p. 1-25.

Regulations and other essential public health functions such as providing assistance to Egypt during a cholera epidemic in 1947.³⁷ The WHO formally started its existence on April 7, 1948.³⁸ Negotiations between delegates leading to the creation of the WHO made health a fundamental right for every human and defined it as not simply the absence of disease or infirmity but rather as “a state of physical fitness and mental and social well-being.”³⁹ Technical meetings to define the scope and range of activities explicitly reflected the universal aspirations of delegates to be included in this new organization. Indeed, delegates agreed on the universality of the WHO by not restricting membership to UN members and believed that “only a universal organization could effectively control the international spread of disease and promote health among all people through coordinated global action.”⁴⁰ To this end, members of the WHO Interim Committee and delegates imagined a structure of regional offices, in addition to a central headquarter in Geneva, to oversee and coordinate operations and meet the needs of its members.⁴¹

Table 1.1: Regional Offices of the World Health Organization

Regional Office	Headquarters
Africa (AFRO)	Brazzaville
Americas (PAHO)	Washington
Eastern Mediterranean (EMRO)	Cairo
Europe (EURO)	Copenhagen
Southeast Asia (SEARO)	Delhi
Western Pacific (WPRO)	Manila

³⁷ Javed Siddiqi, *World Health and World Politics: The World Health Organization and the UN System* (Columbia, SC: University of South Carolina University Press, 1995), p. 194-195.

³⁸ On the influence of UNRRA strategies and methods on the WHO, see James A. Gillespie, “Europe, America, and the Space of International Health”, p. 116-127.

³⁹ Amy L. Sayward, *The Birth of Development: How the World Bank, Food and Agriculture Organization, and World Health Organization Changed the World, 1945-1965* (Kent, OH: Kent State University Press, 2006), p. 133.

⁴⁰ Amy L. Sayward, *The Birth of Development*, p. 134.

⁴¹ Amy L. Sayward, *The Birth of Development*, p. 146.

Although tensions over the inclusion of the PASB within the WHO structure and the affiliation of member states to regional officers based upon national interests rather than geographical and epidemiological criteria affected the global deployment of the young organization, it became the predominant international health actor until the late 1970s when other institutions, such as the World Bank, challenged its quasi-monopoly.⁴²

As the flagship of international health for almost three decades, the WHO has garnered the attention of historians mapping the development of the organization, the influence of Cold War politics and the implementation of programs in various countries. Building on the commissioned institutional histories by Norman Howard-Jones detailing WHO programs and operations for the first two decades, scholars have only recently started to assess critically the contributions, orientations, and tensions emanating from Cold War politics and inter-agency cooperation.⁴³ While a project by Marcos Cueto, Elizabeth Fee and Theodore Brown for a non-official history of the WHO is underway, we still lack a comprehensive historical analysis of the organization. Nevertheless, through a biographical approach, John Farley revealed the internal workings of the institution under the WHO's first Director-General, Brock Chisholm from 1948 to

⁴² Amy L. Sayward, *The Birth of Development*, p. 135, 146-150. Jeanne L. Brand, "The United States Public Health Service and International Health, 1945-1950", *Bull. Hist. Med.*, Vol. 63, No. 4 (Winter, 1989), p. 588-594. Paul F. Basch. *Textbook of International Health*, Second edition (New York, Oxford: Oxford University Press, 1999), p. 48. Recent work has documented the entry of new actors in international public health from the 1970s onward challenging the dominance of the WHO. See Theodore M. Brown, Marcos Cueto and Elizabeth Fee, "The World Health Organization and the Transition From "International" to "Global" Public Health", *American Journal of Public Health*, Vol. 96, No. 1 (2006), p. 62-72. Jennifer Prah Ruger, "The Changing Role of the World Bank in Global Health", *American Journal of Public Health*, Vol. 95, No. 1 (January 2005), p. 60-70.

⁴³ WHO, *The First Ten Years of the World Health Organization* (Geneva: World Health Organization, 1958). WHO, *The Second Ten Years of the World Health Organization* (Geneva: World Health Organization, 1968). More recently, Socrates Litsios has taken over these histories. Socrates Litsios and WHO, *The Third Ten Years of the World Health Organization, 1968-1977* (Geneva: World Health Organization, 2008)

1953.⁴⁴ From his perspective, the WHO became a site where national interests and Cold War politics unfolded, threatening the existence of the organization and leading to the marginalization of public health programs based upon the principles of social medicine. Also focused on the institutional development of the WHO, Amy Seyward situates its creation within the larger context of postwar UN specialized agencies active in ‘development’ in the broad sense of the term. In the case of the international health agency, she points to a community of internationally-minded medical professionals that infused the Geneva-based organization with their ideas and visions of transnational cooperation. Seyward argues that the WHO is the institutional manifestation of the professional status and authority of physicians who had “promoted the idea that their profession was grounded in science and able to improve society.”⁴⁵ In her analysis of the “construction of international credibility in WHO”, Seyward places the organization in the larger institutional context by emphasizing collaboration, in addition to the professional credentials of its staff, with other specialized agencies, noting “excellent relations with other specialized agencies.”⁴⁶

As a result of her in-depth study of the IHD, Anne-Emmanuelle Birn formulates a more critical appraisal of the WHO for the period covered by my dissertation and presents the organization as the heir to the principles and methods devised during the prewar era by the Rockefeller Foundation. As a testimony to the dominance of the Geneva-based organization, Birn maintains that the WHO replicated the five Rockefeller principles of international health: 1) agenda

⁴⁴ John Farley, *Brock Chisholm, the World Health Organization, and the Cold War* (Vancouver, UBC Press, 2008)

⁴⁵ Amy L. Sayward, *The Birth of Development*, p. 137.

⁴⁶ Amy L. Sayward, *The Birth of Development*, p. 155. Studies looking at specific programs and later initiatives emphasized rather organizational divergences between major stakeholders of international health. For instance, William Muraskin notes clashing conceptions in the development of child vaccines between the WHO and UNICEF. William Muraskin, *The Politics of International Health: The Children’s Vaccine Initiative and the Struggle to Develop Vaccines for the Third World* (Albany, NY: State University of New York, 1998). An initial partner in the Malaria Eradication Program, UNICEF also pulled out its financing as the campaign encountered mounting difficulties, leaving the WHO (along with the U.S. Agency for International Development) as sole major supporters of the programs.

setting from above, 2) budget incentives to align recipient countries to commit to specific health programs, 3) a priori parameters of success defined by time limits, geographical areas or disease, 4) consensus via transnational professionals and finally 5) technobiological paradigm⁴⁷ to which I will turn below. Until the 1978 Alma-Ata Declaration that displaced the vertical campaigns (i.e. targeting a single disease) by the promotion of primary health care rooted in the needs of local communities, inserted international public health into the context of broader social change and more generally challenged the Rockefeller principles, Birn points to the Malaria Eradication Campaign (1955-1970s) and the Smallpox Eradication Campaign (1958-1979) to support her claims on the persistence of the Rockefeller model in the postwar era.⁴⁸ Nevertheless, she rightly insists on the dominance of vertical campaigns, i.e. targeting a single disease, as a central feature of WHO public health programs prior to the adoption of Primary Health Care at the end of the 1970s.⁴⁹ Other examinations of the WHO, mainly from a political perspective, have emphasized its place at the center of a regulatory regime constructed around the control of communicable diseases and framed

⁴⁷ Anne-Emmanuelle Birn, *Marriage of Convenience*, p. 270, p. 273-278.

⁴⁸ Birn further argues that Western interests and the Rockefeller undermined the primary health care approach by favouring *selective* primary health care which renewed the narrow technical approach of the WHO, UNICEF and other donor agencies through the distribution of children vaccines, oral rehydration, nutriment supplies, etc. While she is critical of the WHO, Birn believes in the organization making contributions to amelioration health conditions if it aligns its public health programs with broader social issues such as poverty reduction, increased literacy, etc. Anne-Emmanuelle Birn, *Marriage of Convenience*, p. 273-279. On primary health care vs. selective primary health care, see Marcos Cueto, "The Origins of Primary Health Care and Selective Primary Health Care", *American Journal of Public Health*, Vol. 94, No. 11 (November 2004), p. 1864-1874.

⁴⁹ Single disease, vertical, approach is also reflected in the official histories of the WHO by organizing the books around programs aimed at those diseases: smallpox, yaws, malaria, tuberculosis, etc. See WHO, *The First Ten Years of the World Health Organization*. WHO, *The Second Ten Years of the World Health Organization*. Socrates Litsios has taken over the project of WHO institutional history by decade. Socrates Litsios and WHO, *The Third Ten Years of the World Health Organization, 1968-1977*.

the organization as a forum where competing demands and expectations have negatively affected its reputation and status.⁵⁰

The ubiquity of the WHO in postwar international health is further demonstrated in historical studies focusing on specific diseases and geographic areas. Scholarship on malaria and smallpox especially has made the WHO a central actor of narratives charting the implementation of programs mainly in developing countries. For instance, Sunil Amrith and Sanjoy Bhattacharya have explored the role and limits of WHO interventions and leadership in South Asia, and particularly India, in public health programs mainly targeting infectious diseases (smallpox, tuberculosis, etc.) in a context of nationalism and decolonization.⁵¹ Other cases include the studies on malaria by Marcos Cueto and Randall Packard whose work encompass more aspects than the multilateral organization, but nonetheless stress the key role in the launch and persistence of the global eradication campaign.⁵² Others have extended the histories of disease-focused WHO interventions to influenza, leprosy, immunology and family planning, further contributing to the omnipresence of the organization in the historiography of postwar international health.⁵³

⁵⁰ David Leive, *International Regulatory Regimes: Case Studies in Health, Meteorology, and Food* (Lexington, Mass.: Lexington Books, 1976). Javed Siddiqi, *World Health and World Politics*.

⁵¹ Sunil S. Amrith, *Decolonizing International Health: India and Southeast Asia, 1930-1965* (Houndmills Basingstoke: Palgrave Macmillan, 2006). Sanjoy Bhattacharya, *Expunging Variola: The Control and Eradication of Smallpox in India, 1947-1977* (New Delhi: Orient Longman, 2006)

⁵² Marcos Cueto, *Cold War Deadly Fevers: Malaria Eradication in Mexico, 1955-1975* (Baltimore: Johns Hopkins University Press, 2007), especially chapter 2. Randall M. Packard, *The Making of a Tropical Disease: A Short History of Malaria* (Baltimore: Johns Hopkins University Press, 2007), chapters 6 to 8. Others have also studied the malaria eradication program as a case example. Javed Siddiqi, *World Health and World Politics*, part III. Amy L. Sayward, *The Birth of Development*, chapter 10.

⁵³ George Dehner, "WHO Knows Best? National and International Responses to Pandemic Threats and the "Lessons" of 1976", *Journal of the History of Medicine and Allied Sciences*, Vol. 65, No. 4, (2010), p. 478-513. George Weisz and Jess Olszynko-Gryn, "The Theory of Epidemiologic Transition: The Origins of a Citation Classic", *Journal of the History of Medicine and Allied Sciences*, Vol. 65, No. 3, (2010), p. 287-326. Judith Justice, *Policies, Plans & People: Culture and Health Development in Nepal* (Berkeley: University of California Press, 1986). Matthew James Connelly, *Fatal Misconception: The Struggle to Control World Population* (Cambridge, Mass.: Harvard University Press, 2008). More oriented towards U.S. policy is John Sharpless, "World

For the 1945-1970s period, bilateral assistance agencies, as actors of international health, are less historically studied than the WHO. A recent typology of international health actors has made a list of bilateral aid and development agencies and their priorities and budgets.⁵⁴ The largest single bilateral aid agency, the United States Agency for International Development (USAID), is a direct result of Cold War politics and the policy of containment aimed at limiting the expansion of Soviet power and influence through a series of regional alliances (NATO, SEATO, CENTO, etc.) and by shoring up anti-communist regimes. While political and foreign relations historians have been engaged in mapping the role of development assistance in the larger Cold War context, historians of international health have only recently started examining the importance of bilateral aid agencies in influencing public health policies and their implementation in developing countries.⁵⁵ Jeanne L. Brand first remarked that: “The history of the overseas health assistance missions from the early 1940s until the mid-1970s – a potentially absorbing, albeit complex, subject for analysis

Population Growth, Family Planning, and American Foreign Policy”, *Journal of Policy History*, Vol. 7, No. 1 (1995), p. 72-102. On smallpox, Erez Manela, “A Pox on Your Narrative: Writing Disease Control into Cold War History”, *Diplomatic History*, Vol. 34, No. 2 (April 2010), p. 299-323. On leprosy, see John Manton, “Global and Local Contexts: The Northern Ogaja Leprosy Scheme, Nigeria, 1945-1960”, *História, Ciências, Saúde – Manguinhos*, Vol 10, Supplement 1 (2003), p. 203-223. A final example on immunology and training, Richard Hankins, “The World Health Organization and Immunology Research and Training, 1961-1974”, *Medical History*, Vol. 45, No. 2 (April 2001), p. 243-299.

⁵⁴ Anne-Emmanuelle Birn, Yogan Pillay and Timothy H. Holtz, *Textbook of International Health*, 89-92.

⁵⁵ A few examples: Samuel H. Butterfield, *U.S. Development Aid--An Historic First: Achievements and Failures in the Twentieth Century* (Westport, CT: Praeger Publishers, 2004). Kristin L. Ahlberg, *Transplanting the Great Society: Lyndon Johnson and Food for Peace* (Columbia: University of Missouri Press, 2008). Nils Gilman, *Mandarins of the Future: Modernization Theory in Cold War America* (Baltimore: Johns Hopkins University Press, 2003). Michael Latham, *The Right Kind of Revolution: Modernization, Development, and U.S. Foreign Policy from the Cold War to the Present* (Ithaca: Cornell University Press, 2011). David Porter, *U.S. Economic Foreign Aid: A Case Study of the United States Agency for International Development* (New York: Garland Pub., 1990). Louis A. Picard and Terry F. Buss, *A Fragile Balance: Re-Examining the History of Foreign Aid, Security and Diplomacy* (Sterling, VA: Kumarian Press, 2009). Sergei Y. Shenin, *America's Helping Hand: Paving the Way to Globalization (Eisenhower's foreign aid policy and politics)* (New York: Nova Science Publishers, 2005).

and evaluation – has not been examined in any detail.”⁵⁶ In his examination of internationalism in public health, Milton E. Roemer also noted the financial contributions of the U.S. to health assistance through bilateral aid totalling about \$3 billion in 1980, thus making USAID an influential actor in international public health.⁵⁷ Cueto convincingly demonstrated the importance of U.S. bilateral aid in garnering international support for the malaria eradication campaign and in providing supplies and funds to national programs in developing areas.⁵⁸ Donaldson analyzed the origins of U.S. population policy by focusing on the USAID as locus of conflicting ideas and priorities but that would eventually lead to the WHO embarking on family planning.⁵⁹ Narratives drawing on archival material on U.S. bilateral assistance in international public health remain rare however. Access to documents remains restricted or difficult as files and boxes are still not catalogued nor indexed.

From 1948 to the 1970s, the WHO and bilateral aid agencies, mainly those of the U.S., dominated the institutional landscape of international health. These organizations, along with earlier private foundations, share a basic commonality in their design. As functionalist agencies, these institutions were conceived with a global scope from their very inception. While tensions between member-states, the boycott of UN agencies by the Eastern bloc countries from 1949 to 1957 and the influx of new members resulting from decolonization affected the WHO’s orientations and direction of public health interventions, few questioned its presence across continents. Obviously, problems in establishing credibility and navigating around financial and political obstacles could limit the ambitions

⁵⁶ Jeanne L. Brand, “The United States Public Health Service and International Health, 1945-1950”, p. 594.

⁵⁷ Milton E. Roemer, “Internationalism in Medicine and Public Health” in Dorothy Porter (ed.), *The History of Public Health and the Modern State* (New York: Routledge, 1994), p. 403-423, especially p. 413.

⁵⁸ Marcos Cueto, *Cold War Deadly Fevers*, chapter 2 and especially p. 30-33 and 59-97.

⁵⁹ Peter J. Donaldson, “On the Origins of the United States Government's International Population Policy”, *Population Studies*, Vol. 44, No. 3 (1990), p. 385-399.

of the most ardent health internationalist, but nonetheless universality of health as a right is deeply enshrined in the origins of the WHO. A similar logic also operated in the creation of U.S. bilateral aid agencies. As stated above, their origins are intimately associated with the rise of the U.S as a superpower. Institutions of bilateral assistance were associated with furthering overt or covert political goals in developing countries across the globe and therefore possessed the legal authority to operate abroad. Their involvement was additionally justified by the recognition of international health programs as a tool to consolidate U.S. security and commerce.⁶⁰ In sum, these institutions were the cornerstone upon which postwar international health was constructed and one of its defining features. They were to be present in diverse localities of very different culture and tradition by virtue of its universal mandate, in the case of the WHO, or as actors engaged in furthering national interests and demonstrating humanitarian concerns simultaneously through technical assistance. If the WHO and bilateral aid agencies are the institutional features of international public health from 1948 to the 1970s, a second equally important characteristic is faith in technology applied to public health.

1.4 Technology and International Public Health

Historians have identified the use of technology in public health, and in development more largely, as another feature of postwar international health. If Birn has pointed to the IHD as promoting a technobiological paradigm defined as a “narrowing of international health problems to diseases amenable to technical solutions” during the 1920-1940s period, technological innovations available after World War II have influenced disease control and public health programs in

⁶⁰ Marcos Cueto, “International Health, the Early Cold War and Latin America”, *CBHM/BCHM*, Vol. 25, No. 1 (2008), p. 26. King also identifies security and commerce as a major driver behind U.S. involvement in the control of infectious diseases for a later period, Nicholas B. King, “Security, Disease, Commerce: Ideologies of Postcolonial Global Health”, p. 770.

developing nations.⁶¹ Sunil Amrith demonstrated how technologies permitted intensive interventions over large areas of the world while requiring few public health workers.⁶² Vaccines, antibiotics and residual insecticides, he argued, bolstered the power of international health organization but at the same time these officials became aware of their limits as disease and illness persisted. Nevertheless, instead of viewing technology as a tool of domination and hegemony, Amrith noted the excitement and enthusiasm of both international health planners and beneficiaries (or victims).⁶³

In his study of malaria eradication and international development, Randall Packard noted the appeal of technology to the U.S. government as it sought to “build support for local governments” and their American backers.⁶⁴ His work shows the association between public health, international development and technologies as a set of ideas that “precluded the need to pay any attention to social or economic circumstances.”⁶⁵ While eventually some technologies (DDT for instance) failed in delivering the promise of a world free of disease for the period studied, they were a main driving force behind the initiation of major international public health campaigns that would confine interventions to the realm of mostly individual bodies (or households) without eliciting profound and expensive social and political reforms challenging existing structures.

⁶¹ Anne-Emmanuelle Birn, *Marriage of Convenience*, p. 271.

⁶² Sunil S. Amrith, *Decolonizing International Health*, p. 16-17.

⁶³ Sunil S. Amrith, *Decolonizing International Health*, p. 17.

⁶⁴ Randall M. Packard, “Malaria Dreams: Postwar Visions of Health and Development in the Third World”, *Medical Anthropology*, Vol. 17, No. 3 (1996), p. 283.

⁶⁵ Randall M. Packard, “Malaria Dreams: Postwar Visions of Health and Development in the Third World”, p. 288-290. In the same issue, Socrates Litsios associates Cold War politics unfolding in the U.S. and internationally to explain the orientations of bilateral aid agencies and the WHO in malaria control. Urgency in tackling the disease coupled with pressure to fight communism, Litsios argues, contributed to the marginalization of strategies (and their advocates) involving social reforms. Armed with DDT, malariologists pursued more aggressive control methods which avoided “getting caught up in other policy issues [e.g. land tenure reforms] which would divert or delay attention given to malaria.” Socrates Litsios, “Malaria Control, the Cold War and the Postwar Reorganization of International Assistance”, *Medical Anthropology*, Vol. 17, No. 3 (1996), especially p. 269-273, quote on p. 272.

1.5 National Health Institutions

My focus on a national health institution in the construction of international health does not specifically aim at challenging these features presented above. The WHO, in collaboration with other multilateral institutions, and U.S. bilateral agencies were the major institutional stakeholders of international health influencing the shape and means of programs carried out in diverse developing countries. Nor do I dispute the reliance on technology as a key characteristic of postwar public health programs aimed at the Third World. The basic aim of my research is to enrich our understanding of postwar international health by focusing on national health institutions taking the Communicable Disease Center (now Centers for Disease and Prevention) as a case example.⁶⁶ Studies on the implementation of public health programs in India and Brazil, for example, have certainly illustrated vividly the limits to the power and influence of the WHO and of other development agencies in eliciting compliance to the agendas, priorities and methods developed in the West. National health institutions of the South, as interfaces and local partners of WHO/bilateral aid agencies, have adapted, adopted and successfully resisted the initiatives of those institutions.⁶⁷ However,

⁶⁶ Jeanne L. Brand studied the role played by the USPHS in the creation of the WHO, briefly described some of early technical assistance missions and presented the officers behind the involvement in the shaping of postwar international health institutions and priorities. Her analysis stops before the adoption and implementation of the defining programs of the Cold War era (malaria eradication, smallpox eradication, primary health care, etc.) Jeanne L. Brand, "The United States Public Health Service and International Health, 1945-1950". Mary E. Corning, then Assistant Director to International Programs at the National Library of Medicine, mainly documented international programs of the NLM. However, she also included sections on presidential and congressional initiatives, untangled the administrative machinery supporting international programs in public health, biomedical research and medical communications. Her analysis however does not follow actors in the field as they carried out these policies. Mary E. Corning, *A Review of the United States Role in International Biomedical Research and Communications: International Health and Foreign Policy* (Washington: United States Government, 1980)

⁶⁷ Gilberto Hochman explored the local response of the Brazilian National Malaria Programs and the National Malaria Service in particular. Gilberto Hochman, "From Autonomy to Partial Alignment: National Malaria Programs in the Time of Global Eradication, 1941-1961", *CBMH/BCHM*, Vol. 25, No. 1 (2008), p. 161-191. National institutional actors are also under the

there is a gap in this account concerning the role of the national health agencies of the North (and the U.S. specifically) where much of the knowledge about diseases of the South is generated and where expertise resides.

In studying another type of organization active in international health programs after World War II, as the “emerging web” of actors presented above coalesced around technology-based strategies to address the common goals of “controlling and eliminating disease from remote rural areas”, protecting foreign travellers and stimulate the “production of goods for the market economy”⁶⁸, I have drawn from the work of David Wade Chambers and Richard Gillespie to conceptualize the emerging institutional landscape as series of centers and peripheries. This allowed me to situate the CDC and its movement from being marginal to becoming an unavoidable actor in programs targeting infectious diseases and their surveillance on a global scale.⁶⁹ While my aims are not primarily toward addressing theoretical issues, their analysis of the literature on the emergence of colonial science and locality in the history of science serves as a useful framework to follow the rise of the CDC as an international health actor.

1.6 Localities, Linkages and Conduits

In their review of the historiography of colonial science, Chamber and Gillespie noted the gradual adoption of constructivist approaches by historians as they increasingly focused on the “*locally* contingent character of the knowledge-

microscope in Marco Cueto’s examination of the Mexican malaria eradication campaign, Marcos Cueto, *Cold War Deadly Fevers*, chapter 3. Similarly, Sanjoy Bhattacharya focused on tension between the WHO and the National Institute for Communicable Disease (NICD) during the smallpox eradication campaign. Sanjoy Bhattacharya, *Expunging Variola*, chapter 3.

⁶⁸ Marcos Cueto, “International Health, the Early Cold War and Latin America”, p. 36.

⁶⁹ David Wade Chambers and Richard Gillespie, “Locality in the History of Science: Colonial Science, Technoscience, and Indigenous Knowledge”, *Osiris*, Vol. 15 (2001), p. 221-240. While their main focus is the inclusion of indigenous knowledge in modern scientific networks and colonial scientific localities, they provide an interesting framework to understand center and peripheries in science and the linkages between localities and international exchanges.

making process.”⁷⁰ This shift in approach derived from a series of empirical studies focusing on science in diverse colonial settings emphasizing the *difference* rather than the *deficit* in accounts of science in non-European localities. Moreover, this went along with the ‘decentering’ of Europe as a site and science as an object, as non-Western localities, broadly defined as places where “science is accomplished” (region, city, country, single institutions), formed the core of narratives analyzing production of new knowledge in China, Iran, India, etc. Extending their focus on locality in science to the emergence and institutionalization of modern science in Europe during the 17th century, Chambers and Gillespie argue that this process is better understood literally and metaphorically as a polycentric communication network composed of scientific centers and peripheries.⁷¹

This image of a polycentric and local emergence of modern science applies to the emergence of international health as a polycentric enterprise overlapping colonial and postcolonial eras, although ultimate goals may have shifted. In this view, these centers of international health are of different natures, such as colonial health department, private philanthropies, multilateral organizations and bilateral assistance agencies, each subject to their own local contingencies influencing the construction of different versions of international public health, whether inspired by social medicine, commercial imperatives, political (Cold War) considerations and/or technologically-focused. As international health entered the postwar era - to extend upon the comparison with the emergence of modern science - centers and peripheries of varied nature also participated in its construction. These could be institutions (WHO, UNICEF), countries or regions (United States, the West, India) or epistemic communities (malariologists, former IHD officers) The survey of the institutionalization of international health

⁷⁰ David Wade Chambers and Richard Gillespie, “Locality in the History of Science: Colonial Science, Technoscience, and Indigenous Knowledge”, p. 221-222.

⁷¹ David Wade Chambers and Richard Gillespie, “Locality in the History of Science: Colonial Science, Technoscience, and Indigenous Knowledge”, p. 223-224.

presented above has certainly made clear the omnipresence of the WHO and, more recently, of bilateral aid agencies, in historical studies focusing on the postwar era. It can be argued that these can be construed as ‘centers’, based upon their global reach, human and financial resources, universal mandate or close association with Cold War strategies and priorities, as they deployed internationally and enlisted local partners to carry out their respective mission.

While, as Birn argues, developing countries are generally peripheral in setting the priorities and strategies of the public health agenda, national health institutions also constituted an institutional periphery of international health. This was the case of the CDC when it was created in 1946, and despite being located physically in an emerging superpower. As I show in chapter 2, the Atlanta-based agency had limited access to resources, it was located far down the administrative ladder, and, more crucially, it had no mandate or authority to engage in international activities in foreign settings.

Another analogy from studies on colonial sciences is useful in understanding the gradual movement of the CDC from a marginal actor to an institutional center in global health. Chambers and Gillespie note two phenomena at work in localities of science. They suggest the term “vectors of assemblage, which encompasses elements of process and accumulation” characterizing the local scientific infrastructure, which is “made up not only of organizations, buildings, museums, gardens, laboratories, instruments, chemicals, disciplines, schools, textbooks, and journals, but also of ideas and strategies, metaphors, theories and taxonomies, values, communities of trained personnel, and new socioprofessional roles for them to fill.”⁷² In the case of the CDC, Elizabeth Etheridge has identified these characteristics of the public health institution by focusing on the domestic activities, the construction of buildings, the changing of orientations, etc. and more limitedly to the knowledge construction and

⁷² David Wade Chambers and Richard Gillespie, “Locality in the History of Science: Colonial Science, Technoscience, and Indigenous Knowledge”, p. 229-230.

application through field missions, scientific investigations and other similar endeavours. My interest lies less with these vectors of assemblage involved in the knowledge making process or resulting in the CDC's particular kind of public health. However, I am using field epidemiologists as one vector of assemblage and analytical unit by following this group of trained officers in their ever increasing involvement in international activities contributing to CDC's emergence as a 'center' of international health.

In my thesis, situating field epidemiologists, and more broadly field epidemiology, in the larger context of the development of epidemiology as a discipline is of secondary concern. This would constitute a different research project by itself. However, one should be aware of the divide between what a former CDC member named "set piece epidemiology or academic epidemiology", which is characterized by an epidemiological methodology featuring trials with control groups, randomization, and causal relationships, on the one hand, and epidemiology applied to the detection and control of infectious disease epidemics on the other.⁷³ Although discussions between these two branches did take place, historians and professionals interested in the development of epidemiology have mostly focused on conceptual innovations, institutionalization, individual figures, and the 'epidemiological transition', a change of focus from infectious to chronic diseases.⁷⁴ My approach, by contrast,

⁷³ Interview with Thomas Mack by Melissa McSwegin, July 11, 2008, <http://globalhealthchronicles.org/smallpox/record/view/pid/emory:16s23>, accessed November 25, 2011.

⁷⁴ As the editor of the *American Journal of Epidemiology* Warren Winkelstein Jr. remarked in 2002, a comprehensive history of epidemiology remains to be done. He notes the existence of several books on particular epidemics, epidemiologists, and particular aspects of the discipline. Warren Winkelstein Jr., "From the Editor", *American Journal of Epidemiology*, Vol. 155, No. 8 (2002), p. 776. A small sample of this literature follows. On the origins of U.S. epidemiology, David E. Lilienfeld and Abraham E. Lilienfeld, "Epidemiology: A Retrospective Study", *American Journal of Epidemiology*, Vol. 106, No. 6 (1977), p. 445-459. Daniel Thomas, *Wade Hampton Frost, Pioneer Epidemiologist, 1880-1938: Up to the Mountain* (Rochester, NY: University of Rochester Press, 2004). Two collective volumes include chapters on statistical methods, national variations in epidemiological thought and institutions, and biographies of key figures in epidemiological thought and practices. Alfredo Morabia (ed.), *A History of Epidemiologic Methods and Concepts* (Basel: Birkhäuser Verlag, 2004). Walter Holland et al. (eds.), *The*

is to follow field epidemiologists and related notions of disease prevention through surveillance, immunization and other activities as instruments fuelling the CDC's increasing engagement in international health. This focus also includes and justifies the predominance of the Epidemiology Branch in my analysis. In other words, field epidemiology was the interface through which the CDC penetrated international health programs and institutions.

Chambers and Gillespie identify a second process contributing to my conceptual analysis of CDC's international health activities: the local and international connections and linkages made between scientific localities. Still drawing from histories of early modern science, they note: "this network, the international science system, becomes ever more polycentric and hierarchical, with major and minor centers and close and distant peripheries defined not geographically but in terms of scientific authority and social power."⁷⁵ As seen above, the international health landscape was in a process of redistribution of power and authority in the first half of the 20th century before undergoing an institutional reconfiguration following World War II as organizations left the field (IHD), disappeared (LNHO, OIHP), new ones appeared (WHO, bilateral aid agencies) and were subsequently challenged again by novel actors such as the World Bank and

Development of Modern Epidemiology: Personal Reports from Those Who Were There (Oxford: Oxford University Press, 2008). Sander Greenland, *Evolution of Epidemiologic Ideas: Annotated Readings on Concepts and Methods* (Chestnut Hill: Epidemiology Resources, 1987). Abraham M. Lilienfeld (ed.), *Times, Places and Persons: Aspects of the History of Epidemiology* (Baltimore: Johns Hopkins University Press, 1980). A more comprehensive approach to the origins of epidemiology is Roth Dora, *The Scientific Basis of Epidemiology: An Historical and Philosophical Enquiry*, Ph. D. diss. (Berkeley: University of California, 1976). Mervyn Susser and Ezra Susser, "Choosing a Future for Epidemiology: I. Eras and Paradigms", *American Journal of Public Health*, Vol. 86, No. 5 (May 1996), p. 668-672. Mervyn Susser and Ezra Susser, "Choosing a Future for Epidemiology: II. From Black Box to Chinese Boxes and Eco-epidemiology", *American Journal of Public Health*, Vol. 86, No. 5 (May 1996), p. 674-677. Mervyn Susser, "Epidemiology in the United States after World War II: The Evolution of Technique", *Epidemiologic Reviews*, Vol. 7 (1985), p. 147-177. On social determinant of health from a global perspective, see Harold J. Cook, Sanjoy Bhattacharya and Anne Hardy (eds.), *History of the Social Determinants of Health: Global Histories, Contemporary Debates* (Hyderabad, India: Orient BlackSwan, 2009).

⁷⁵ David Wade Chambers and Richard Gillespie, "Locality in the History of Science: Colonial Science, Technoscience, and Indigenous Knowledge", p. 231.

more recently the Gates Foundation.⁷⁶ Between 1948 and the 1970s, the CDC gradually moved from being a minor center to a major actor by engaging in closer relations with technical assistance agencies and multilateral health organizations and also through its alignment with technologies (vaccines and insecticides) synonymous with postwar international public health. Through these linkages, the CDC became a “center of calculation” where priorities, strategies and methods to address the public health problems of the developing world were defined.⁷⁷ Atlanta, and more precisely the Epidemiology Branch, became a site where field epidemiology-oriented professionals articulated a certain vision of international health and formulated solutions based upon their expertise and available resources.

In the process of the CDC’s international emergence, access to developing countries was crucial in gaining institutional experience in working abroad. For an agency lacking authority to operate internationally and designed to tackle the public health problems of the U.S. population, the ability to gain access to these foreign settings and deploy its methods and officers contributed in establishing its credibility in the minds of bureaucrats of international organizations, local public health officials, and development experts with more experience overseas than the field epidemiologists from Atlanta. Therefore, in addition to considering the WHO and the USAID as centers of international health, I conceptualize them as conduits, or pathways, along which CDC members were able to travel to negotiate and gain access to developing countries despite limited authority and mandate. This meant using WHO’s universal mandate and place at the heart of a system to prevent the international spread of disease; it meant utilizing USAID’s

⁷⁶ Theodore M. Brown, Marcos Cueto and Elizabeth Fee, “The World Health Organization and the Transition From “International” to “Global” Public Health” and Anne-Emmanuelle Birn, Yogan Pillay and Timothy H. Holtz, *Textbook of International Health: Global Health in a Dynamic World*, p. 61-131 for a panoramic overview.

⁷⁷ On the locality of the global, see Bruno Latour *Reassembling the Social. An Introduction to Actor-Network-Theory* (Oxford: Oxford University Press, 2005), p. 175-186. On calculation centers more precisely, see Bruno Latour, *Science in Action: How to Follow Scientists and Engineers through Society* (Cambridge, Mass.: Harvard University Press, 1987), chapter 6.

goal of furthering U.S. foreign policy objectives through technical assistance; it also meant mobilizing the ubiquity and faith in technology for public health in developing nations to justify the presence of CDC members abroad. The exploitation of opportunities built the CDC's credentials and secured its place among the constellation of international health actors.

1.7 Methodology and Sources

The organization of the dissertation and the topics explored in the chapters are largely determined by the available sources, and while indicative of the CDC's international health activities, they do not claim complete and exhaustive coverage of all projects conducted under the sole leadership of the CDC or in collaboration with other organizations and agencies. Therefore, the choice of systematically tracing and following the construction of international health in Atlanta through alliances appeared especially suited and pertinent as it allows understanding the amplitude and the complexity resulting from the extension of activities abroad for a domestic health agency. The objective of this step-by-step approach is the highlighting of the networks that formed around inter-agency relationships, technologies, diseases and public health concepts such as surveillance. This approach enables me to follow certain actors, for example, David Sencer, Alan Donaldson and Alexander Langmuir, who aimed at developing international activities at CDC from the late 1940s to the 1970s. Finally, it allows a clear view of the incremental steps taken by the CDC to play a growing international role. Indeed, the Atlanta-based agency established itself as an actor of international health by exploiting punctual opportunities offered by bilateral agencies, multilateral organizations and the reliance on technology in public health that, taken together, contributed to the international affirmation of the CDC.

My thesis should be read as an exploratory investigation of a specific case, aiming less at making theoretical claims on the place and role of national health institutions in past and current global health contexts than enrich our institutional picture of postwar international health. In other words, the means through which the CDC established itself as an actor of international health cannot serve as a model to explain the rise by other similar agencies onto the global health scene.

In addition, the decision to primarily focus on field epidemiologists does not intend to minimize the contributions of other activities and CDC professionals associated with international health, such as the laboratory services, the training of foreign public health workers and veterinary public health. Concentration on the field epidemiologists derives from my interest in a specific type of international health activity, the direct involvement of CDC members on foreign soils, generally developing countries, and the activities and deliberations of other important stakeholders such as the WHO and U.S. development agencies. Therefore, rather than trace the indirect influence of practices and individuals or the spread of CDC methods and approach on the training of foreign nationals, I have placed emphasis on the tangible activities and programs which either altered the basic underpinnings of international health or showed the presence of CDC members in various countries to apply disease control and prevention measures.

The emphasis placed on field epidemiologists, their participation in international health programs and the focus on one agency entails a particular treatment of the subject. Other studies which investigated the role of international agencies or colonial administrations in public health over a longer period of time and limited to a single country or a single disease treat the subject in depth with special attention to the cultural, social and political context at the local level. By this very approach, these narratives are able to trace the subtle transformations

and changes in a well-defined geographical area. As noted above, Anne-Emmanuelle Birn analyzed in detail the influence of the Rockefeller Foundation and its relationship with the Mexican state over a twenty year period. Similarly, Sanjoy Bhattacharya was able to study the intricate links between nationalist aspirations, the role of international organizations and smallpox eradication over thirty years because of the continued presence of the same institutional actors and his focus on a single disease and country.

Because of the very nature of the CDC as a young agency during the period covered in this dissertation, the generally short-term assignments of field epidemiologists in very diverse countries, and the variety of diseases under their scrutiny, a treatment similar to those of Bhattacharya, Birn and others, is not appropriate to the case at hand. During the period under study, the only sustained presence of the CDC in a foreign environment was in West Africa for a five year period to eradicate smallpox and immunize against measles. This explains my focus on a range of activities as deployed in very different countries such as Bangladesh, Iran and Brazil. My approach has thus been to focus on particular types of CDC activity and its engagement with particular diseases in combination with relationships with either an organization or a technology. Studied in this way, the deployment and direct interventions in those various locations emerge as the results of those very relationships which the CDC exploited to fuel the construction of its international health activities.

One of the perils of focusing on CDC activities in Atlanta and exploring a variety of localities, relationships and diseases is to fall into dry institutional history. Drawing from the history of laboratories, Robert Kohler observed a decline of historians' interest in these institutions after a period of sustained and innovative work during the 1970s and 1980s. Looking for explanations for this phenomenon, Kohler suggested that a cultural turn in history in general "has left

institutional history seeming rather dowdy and dated.”⁷⁸ Nevertheless, historians of medicine and science studying institutions of health and knowledge did produce studies of methodological and theoretical originality which inspired this dissertation. In her *Designs for Life* Soraya de Chadarevian concentrates on the institutions of molecular biology. Her examination of local institutional contingencies leading to the discovery of DNA also includes the cultural, social and political ramifications of laboratory work.⁷⁹ Similarly, in his work on the history of orthopaedic surgery, Thomas Schlich dissected the work and the institutional strategies of the AO Foundation in not only promoting but also regulating the application of surgical techniques, developed locally in Switzerland, in operation rooms across Europe and North America. His approach to institutional history uncovered the means to standardize procedures patented by the organization and the ways utilized to protect the ‘AO brand’ as the organization gradually expanded.⁸⁰

These studies share the same methodological approach in simultaneously exploring the internal construction of knowledge and their dissemination through various means. My approach differs slightly as my focus is clearly on the insertion of CDC practices and officers inside existing networks and organizations of international health. A consequence of this orientation is diminished attention to the scientific content of public health ‘produced’ in Atlanta, the office micro-politics, the individual rivalries, the professional identities, and the adoption of certain programs and public health concepts over others, etc. These local aspects of CDC history were largely studied by Elizabeth Etheridge, and I build upon her observations and analysis. Rather, it is the international deployment of these professionals, mainly field epidemiologists, which is my main concern.

⁷⁸ Robert E. Kohler, “Lab History. Reflections”, *Isis*, Vol. 99, No. 4 (2008), p. 763-764.

⁷⁹ Soraya de Chadarevian, *Designs for Life: Molecular Biology after World War II* (New York: Cambridge University Press, 2002)

⁸⁰ Thomas Schlich, *Surgery Science and Industry: A Revolution in Fracture Care, 1950s-1990s* (New York: Palgrave MacMillan, 2002)

The core of my sources consists of CDC records located at the National Archives and Records Administration (NARA) and at the David J. Sencer CDC Museum in Atlanta. I have selected all documents mentioning foreign nations, international organizations and federal agencies involved in health projects abroad such as the USAID, this regardless of diseases involved (cholera, malaria, etc.) or point of provenance within the CDC (e.g. Office of Director, Epidemiology Branch, Laboratory Branch). This resulted in a collection of 4000 pages of unpublished memorandums, pamphlets, instruction manuals and correspondence. Unfortunately however, as the NARA archive center changed location, boxes were misplaced and therefore some records used by Elizabeth Etheridge for her history of the CDC were unavailable. Furthermore, several boxes containing material related to international health were either destroyed or recalled by the CDC and are no longer available to the public.⁸¹

To supplement the CDC archives, I also consulted the records of the USPHS and of the Office of the Assistant Secretary for Health related to international health and cooperation with other agencies with a special attention to references to the CDC. This added almost 3000 pages. Limited access because of restrictions and yet incomplete indexing of boxes complicated my consultation of USAID records. However, some records of technical assistance related to health were found in the archives of the USPHS. Sources also include Alexander D. Langmuir papers located at the Countway Medical Library, which is a collection of Epidemic Assistance Memorandums. From the National Library of Medicine, I obtained copies of the *International Epidemiologic Reports* and images of CDC members and operations. Finally, George Dehner kindly provided WHO historical records related to the establishment of the WHO Influenza Reference Center in the Americas. I also consulted all WHO expert committees reports (Technical Reports

⁸¹ An additional note on sources from NARA: in the thesis, I have used the call numbers (or slip numbers) for all records from NARA College Park. For the NARA Morrow records, I am using the older access number found in the older finding aid and utilized by the NARA staff.

Series) in which CDC, USPHS and USAID personnel were involved. These records are available online.

One source of information and documents related to CDC involvement in the West African Measles Control and Smallpox Eradication Campaign is the Global Health Chronicles website, a collaboration between the CDC, the Emory University Libraries and the Rollins School of Public Health. I have made usage of interviews conducted by various researchers and consulted records pertaining to smallpox. To further my understanding of the CDC, I have interviewed former CDC officials actively involved in the development of international health activities. Unfortunately, several of the early pioneers had passed before I started this research. Therefore some of the first initiatives are less documented than later ventures. In addition to published scientific articles by CDC personnel found in public health and medical journals, David J. Sencer and J. Donald Millar provided me with some of their personal papers.

1.8 Organization of the Dissertation

The thesis dissects the CDC expansion into international health thematically, with each chapter organized chronologically. Chapter 2 introduces actors of international health in the U.S. government and presents an overview of the CDC's history from its creation after World War II to the early 1970s. It also presents a short history of the CDC from its wartime origins to the consolidation of various programs during the 1960s and early 1970s when it officially became the Centers for Disease Control. Its focus is on the institutional actors, the control of expertise within the broader context of public health in the 1950s and their repercussions on the CDC. From this overview of both CDC's internal dynamic and external situation, the chapter argues that the Epidemiology Branch emerged as a key site within the CDC in the construction of international health activities but also that the Atlanta-based agency needed to circumvent legal

barriers and financial limitations to expand its involvement abroad. After this introductory chapter, the following sections examine the various alliances and manners that all contributed in some way in the expansion of the CDC in international health. Thus, each chapter focuses on a specific facet that explains the construction of international health in Atlanta. Chapter 3 follows the contribution of technology from 1961 to 1969 in providing pathways to foreign nations. Using the case of jet injectors utilized to vaccinate against smallpox, this chapter shows how the CDC appropriated the technology and used its access and expertise as a key to open new geographical and that positioned the agency within the global smallpox eradication campaign. Through the technology, field epidemiologists were able to travel to various countries, to witness firsthand the nature of international health work and to gain experience abroad. Chapter 4 examines the relationship of the CDC with the WHO from the late 1940s to 1969. By focusing on disease surveillance, I demonstrate that collaboration with the WHO through the personal networks of the CDC's Chief Epidemiologist facilitated a fundamental transformation of international regulations and practices from quarantine measures to surveillance as practiced and promoted by the CDC after failures in fostering implementation through collaboration with local public health authorities in East Pakistan and Brazil. This chapter also shows the limits of the piecemeal promotion of surveillance through individual field missions and the necessity of resorting to the authority of the World Health Organization to apply disease surveillance on a global scale. Chapters 5 and 6 explore the relationships between the CDC and bilateral aid agencies with a focus on malaria. Chapter 5 charts early CDC involvement with U.S. technical assistance organizations from 1948 to 1960. This chapter explains the increasingly technical nature of CDC collaboration with bilateral aid agencies around insecticide testing and development. Instead of limiting the CDC's possibilities in expanding its international health activities, the chapter demonstrates how the provision of technical services became a springboard to

increased involvement with bilateral agencies, a means to acquire authority to operate overseas and a source of funds to finance this expansion. This chapter also demonstrates the risks, frustrations and opportunities entailed by closer collaboration with bilateral agencies as some projects were abandoned because of failed negotiations between the CDC and its international development counterpart. Chapter 6 continues exploring the cooperation between the CDC and the USAID from 1961 to 1972 by examining more specifically the malaria eradication program and the smallpox eradication campaign in West Africa. In this final chapter, I demonstrate how tensions rose, as field epidemiologists took a more prominent role in CDC-USAID collaboration to eventually manage U.S. participation in those two programs. A clash between epidemiologically-informed and geopolitically-based worldviews, in addition to different styles of work and bureaucratic rivalry, effectively ended large scale CDC involvement in bilateral programs until the 1980s. Nevertheless, through the USAID, the CDC gained precious experience and lost some of its naiveté about the realities of managing and implementing public health programs abroad.

Chapter 2: International Health in the United States: Actors, Expertise and the Communicable Disease Center (1945-1970)

2.1 Introduction

In October 1950, Willard L. Thorp traveled to St-Louis to lay out new programs in international health to the American Public Health Association. “I am here today because world-wide health improvement has become a major concern of American Foreign Policy. Health has become recognized as a major factor in economic and social progress through the world – and thus in the preservation of peace” explained the State Department official.¹ Thorp’s presence at the annual meeting of the American Public Health Association came following President Harry Truman’s announcement of the Point IV program in 1949 launching the U.S. on the path of international development. From this point on, the weight and resources of the Federal government would support diverse health-related projects in countries across the globe with the triple goal of improving living conditions, creating goodwill towards the U.S. and diminishing the influence of the communist model. Inside the United States, this commitment heralded a period of institutional rivalries over control of international health programs, policy and resources.

This chapter examines the domestic institutional, political and legal context of international health in the U.S. government as well as the emergence of the Communicable Disease Center (CDC) from a fledging organization to a mainstay on the public health scene. I analyze the interplay of bureaucratic turf wars over expertise, the influence of political figures and the ambitions of CDC members to see their agency assume a leadership in the control and prevention of disease abroad. Therefore, this chapter surveys the international health landscape in the

¹ Willard L. Thorp, “New International Programs in Public Health”, *American Journal of Public Health and the Nation’s Health*, Vol. 40, No. 12 (December 1950), p. 1479.

United States from 1950 to the 1970s, a period of expansion for the CDC's overseas activities, and situates the public health institution in relation to debates and initiatives in the field of international health.

I begin by presenting a short overview of the CDC's history from its creation as the Office of Malaria Control in War Areas in 1942 to the 1970s. This section focuses on the growth of domestic activities through the acquisition of programs before turning to the creation of the Epidemic Intelligence Service (EIS), a program training field epidemiologists from 1951 onwards. In this exploration of the EIS, I analyze some of the principles underpinning the program allowing for an almost seamless transition from domestic missions to deployment overseas.

After this examination of the domestic activities, I survey international health initiatives in Atlanta during the 1950s. The decade is characterized by limited engagements abroad, slowly emerging interest from CDC leaders, and political involvement in mobilizing U.S. health resources to meet political goals. Political leaders influenced these timid first steps in international health as the Eisenhower administration sought to utilize intervention in public health in the Middle East. Of more direct consequence to the CDC was the interest of Senator Hubert Humphrey who solicited assistance from CDC personnel and favoured greater participation of the Atlanta-based agency in public health programs abroad. This allows for a better understanding of the problems affecting international health initiatives and their implementation but also limitations and obstacles to burgeoning ambitions in Atlanta to expand its own international operations.

The battle over the control of public health expertise also affected the CDC in its ability to contribute to programs abroad. I thus analyze the political economy of international health expertise and the rise of development assistance agency that occurred at the expense of the United States Public Health Service (USPHS) which lost in 1957 its monopoly over programming and staffing of missions

overseas. As a result, it had to share these responsibilities with the growing technical assistance agencies. Finally, I return to the CDC to present the ambitions and ideas of some of its influential members, the pattern of institutional growth in international health through exploitation of opportunities and some of the programs and projects undertaken during the 1960s and 1970s not covered in the following chapters.

2.2 The CDC: Origins and History

The CDC is a child of World War II.² It originates from a wartime organization, the Malaria Control in War Areas (MCWA) created to combat malaria around military facilities and industrial areas in the southern U.S. Officially established in 1942, the MCWA was essentially the brainchild of Dr. Joseph W. Mountin, director of the USPHS States Services, who planned for an organization of national scope grouping various specialities (entomologists, sanitary engineers and physicians) to protect the health of military personnel and ensure the continued operation of defence industries. In terms of staff, entomologists and sanitary engineers constituted the major professional groups of the MCWA as it concentrated on field control activities, with a small number of physicians assigned to clinical evaluation of malaria cases and parasitologists serving as head of laboratory services.

Surgeon General Thomas Parran established the MCWA headquarters in Atlanta and appointed Dr Louis L. Williams as chief of the new organization. The new health agency expanded in Georgia by acquiring the Henry Rose Carter Laboratory in Savannah to develop equipment and test chemicals, including the newly developed DDT, used for insect control. It also expended in the control of

² This section draws mainly from the work of historian Elizabeth Etheridge, *Sentinel for Health*, which traces the growth of the Atlanta-based health agency. Elizabeth Etheridge, *Sentinel for Health: A History of the Centers for Disease Control* (Berkeley: University of California Press, 1992)

other vector borne diseases, notably yellow fever, dengue and typhus. Not willing to see the service-oriented institution disappear, Mountin ensured the transition of the MCWA to a civilian agency responsible of protecting the health of the general population against infectious disease. The Communicable Disease Center was officially created in July 1st, 1946 to assist States with their public health issues and provide much needed expertise for understaffed local and State health departments.

The basic organizational structure of the CDC created in 1951 remained relatively unchanged for almost three decades until a major reorganization in the early 1980s. At the headquarters level, four divisions (or branches) composed the CDC: Epidemiology, Laboratory, Training and Technology.³ The role of these constituent parts was rather straightforward. The Epidemiology Branch under Alexander Langmuir conducted investigations of an increasing number of infectious diseases and, from the 1960s onwards, of chronic diseases as well; it also assisted States during immunization campaigns such as polio and measles and housed the field-oriented Surveillance Section and laboratory-focused Investigation Section which tracked disease occurrences in the United States. A crucial component of the Epidemiology Branch was the Epidemic Intelligence Service to which we will turn below.

The Laboratory Branch designed diagnostic tests, provided reagents to collaborating facilities and confirmed clinical cases from samples received from field investigators. Research on viruses was also conducted, initially on influenza and, from the mid-1960s, on pathogens responsible for new emerging infectious diseases such as Marburg, Ebola and Lassa fevers. The World Health Organization designated CDC laboratories as world reference centers for influenza, shigella and salmonella thus confirming their worldwide status. Etheridge has noted the rivalry and the rift between the Epidemiology and Laboratory branches over the

³ Elizabeth Etheridge, *Sentinel for Health*, p. 60.

years as strong personalities at the head of those divisions clashed and jockeyed for position and resources. The Training Branch produced educational material for a variety of professionals engaged in disease control or laboratory work (malariologists, parasitologists, sanitary engineers, etc.) and provided direct training to public health personnel from local and State health departments. An important aspect of the Training Branch was the production of audio-video material for distribution in the U.S. and around the world.⁴ Finally, the Technology Branch administered the Technical Development Laboratories in Savannah. Its main responsibilities included the development of equipment utilized in disease control operations, such as sprayers for insecticides or air samplers for the detection of pathogens, research of new compounds for pest control and the conduct of toxicological studies.

Table 2.1: CDC Chiefs: 1942-1960

Louis L. Williams, MD	1942-1943	MCWA
Mark D. Hollis, ScD	1944-1946	MCWA-CDC
Raymond A. Vonderlehr, MD	1947-1951	CDC
Justin M. Andrews, ScD	1952-1953	CDC
Theodore J. Bauer, MD	1953-1956	CDC
Robert J. Anderson, MD, MPH	1956-1960	CDC

Source: www.cdc.gov/about/history/pastdirectors.htm

The growth of the CDC from a small operation into an agency occurred essentially by the acquisition of various programs scattered within the USPHS. According to Harry Marks, the institution served as a “dumping ground” for declining programs or for program in which there was little interest for in the first place.⁵ Nevertheless, these acquisitions brought to Atlanta resources to secure its place and ensure its survival when its existence seemed threatened. This process started in 1957 when the CDC absorbed the Venereal Disease Division, formerly

⁴ Elizabeth Etheridge, *Sentinel for Health*, p. 56.

⁵ Harry M. Marks, “Review of *Sentinel for Health*”, *Journal of Southern History*, Vol. 60, No. 1 (February 1994), p. 170.

one the most prestigious branches of the USPHS.⁶ The importance of this transfer is apparent as the budget of the VD Division exceeded that of the CDC by \$1 million.⁷ As the program transferred to Atlanta, it brought with it the public health advisors, auxiliary health professionals trained in logistics and capable of dealing with the managerial aspects of public health and conducting basic investigations.⁸ However, the Tuskegee syphilis studies also came under the aegis of the CDC along with its ethical and civil rights implications.⁹

As the new decade began, the CDC obtained responsibility for the tuberculosis prevention program and acquired the National Office of Vital Statistics which printed the *Morbidity and Mortality Weekly Report*, a publication distributing epidemiological data which the CDC would also use to expose its position on health issues. The Atlanta-based agency became a central actor of immunization campaigns, a consequence of its key role during the polio vaccination campaign, and the Asian influenza epidemic during the 1950s. The Vaccination Assistance Act voted in 1962 officially embarked the Federal government, consequently the CDC, on providing assistance and supplies to States for diphtheria, whooping cough, tetanus and polio immunization and, from 1965, measles.

At the end of the 1960s and in the early 1970s, the CDC added a new field of activities through the dismantlement of the Health Services and Mental Health

⁶ On the USPHS Venereal Disease Division, see Allan M. Brandt, *No Magic Bullet: A Social History of Venereal Disease in the United States since 1880* (New York: Oxford University Press, 1985)

⁷ In 1957, CDC's budget amounted to \$5 million and the USPHS venereal disease program received \$6 million. Elizabeth Etheridge, *Sentinel for Health*, p. 88.

⁸ The contribution of PHAs to U.S. public health is presented in Beth E. Meyerson, Fred A. Martich and Gerald P. Naehr, *Ready to Go: The History and Contributions of U.S. Public Health Advisors* (Research Triangle Park: American Social Health Association, 2008)

⁹ The implication of the CDC during its management of these studies lies outside the scope of my research but the subject has been studied by historians. Susan Reverby, *Tuskegee's Truth: Rethinking the Tuskegee Syphilis Studies* (Chapel Hill: University of North Carolina Press, 2000). Reverby revisited the subject in Susan Reverby, *Examining Tuskegee: The Infamous Syphilis Study and its Legacy* (Chapel Hill, University of North Carolina Press, 2009) James H. Jones, *Bad Blood: The Tuskegee Syphilis Experiment* (New York: Free Press, 1993). Paul A. Lombardo and Gregory M. Dorr, "Eugenics, Medical Education, and the Public Health Service: Another Perspective on the Tuskegee Syphilis Experiment", *Bulletin of the History of Medicine*, Vol. 80, No. 2 (Summer 2006), p. 291-316.

Administration (HSMHA). Thus, from 1969 to 1973, the CDC added nutrition to its mandate and administered the National Clearing House on Smoking and Health. A final important addition during the period under investigation was the National Institute of Occupational Safety and Health (NIOSH) whose mandate was the prevention of occupational diseases and injuries deriving from exposure to potentially dangerous chemicals such as lead, asbestos, etc. In this short overview of CDC's history from 1946 to 1973, we notice that the expansion of the Atlanta-based agency in the U.S. public health system from 1946 to 1973 unfolded mainly through multiple acquisitions of existing programs. How did this growth process affect CDC's position within the public health U.S. apparatus?

Table 2.2: CDC Chiefs/Directors: 1960-1977

Clarence A. Smith, MD, MPH	1960-1962	CDC
James L. Goddard, MD, MPH	1962-1966	CDC
David J. Sencer, MD, MPH	1966-1977	NCDC/CDC
William H. Foege, MD, MPH	1977-1983	CDC

Source: www.cdc.gov/about/history/pastdirectors.htm

Administratively, the CDC was under the authority of the Bureau of State Services (BSS) until its abolition in 1967. This entity served as the focal point of all federal and interstate programs in community health, training and utilization of health manpower, control of infectious diseases, sanitation and environmental health.¹⁰ In 1953, a first major reform affected the CDC as the Eisenhower administration transferred the USPHS from the FDR-era Federal Security Administration to the newly created Department of Health, Education and Welfare. As a consequence, the Surgeon General lost some of his independence as he reported directly to a cabinet-level secretary. Etheridge notes the increasing importance of politics in public health resulting from this reform.¹¹

¹⁰ This brief description is available on NARA's website, <http://www.archives.gov/research/guided-fed-records/groups/512.html>, point 512.2, General Records of the Health Services and Mental Health Administration, accessed September 22, 2011.

¹¹ Elizabeth Etheridge, *Sentinel for Health*, p. 104.

The personal inclinations of Surgeon General Leonard Scheele, who showed little interest in the Atlanta-based institution, negatively influenced the importance accorded to the CDC's needs and demands. If appropriations for the USPHS quadrupled to \$840 millions in the 1950s, the largest share went to the NIH as its budget increased from \$100 millions in 1955 to \$200 million in 1957 and reaching over \$1 billion by 1968.¹² Scheele prioritized medical research by a massive increase of the NIH's budget while refusing requests for construction of new facilities in Atlanta to regroup all activities distributed between fifty-three buildings.¹³ Unfortunately, Etheridge provides few numbers on the CDC's budgetary growth from its creation to the 1970s. Its initial appropriations were of \$1 million in 1946 and by 1953 had reached \$6 million before being cut to \$4 million in the same year. By 1957, the CDC's budget had increased to \$5 million. While the historian does not include any figures, she provides the information that during David Sencer's directorship (1966-1977) the budget more than doubled as a consequence of the Johnson-era Great Society programs.¹⁴

During the 1960s and 1970s, the CDC moved from one administrative unit to another passing from the Bureau of Disease Prevention and Environmental Control to HSMHA and was raised from division to bureau status. While the CDC affirmed its place in the public health bureaucracy, symbolized with a change of name to National Communicable Disease Center (NCDC) in 1967, a major reorganization initiated in 1966 further diminished the role of the USPHS and of the commissioned corps. A secretarial directive transferred authority from the Surgeon General to the Health, Education and Welfare Secretary with a

¹² Edward Shorter, *The Health Century* (New York: Doubleday, 1987), p. 70-73. The spectacular growth of the NIH, and biomedical research in general, is mapped in Robert Cook-Degan and Michael McGeary, "The Jewel in the Federal Crown?" in Rosemary A. Stevens, Charles E. Rosenberg and Lawton R. Burns (eds.), *History and Health Policy in the United States* (New Brunswick: Rutgers University Press, 2006), p. 176-201.

¹³ After lobbying by CDC Chief Theodore Bauer and Coca-Cola Chairman Robert Woodruff, Eisenhower accepted CDC's demands for construction of a new building in 1955 on lands donated by Emory University. CDC moved to its current 1600 Clifton Road facilities in June 1960. See Chapter 7 in Elizabeth Etheridge, *Sentinel for Health*.

¹⁴ Elizabeth Etheridge, *Sentinel for Health*, p. 58-59, 88, 105-8 and 167.

simultaneous push to increase the number of civil service employees. This trend continued as the Surgeon General lost his line of responsibility over public health programs in favour of the assistant secretary for health and scientific affairs, a first in the history of the USPHS. The power had shifted from the commissioned corps to political appointees. Nonetheless, the CDC continued its rise to administrative prominence, which culminated in 1973 when the institution became a full-fledged USHPS agency on par with other constituting units such as the NIH and the Food and Drug Administration. Finally, the institution reverted back to its CDC acronym with its designation as the Center for Disease Control in 1970. Thus in nearly 30 years, the CDC had grown from a marginal office, described by a former director as an operation akin to a “mom and pop” store, located away from Washington, to become the seat of applied public health for infectious and chronic diseases and an indispensable actor within the USPHS.¹⁵

2.3 Field Epidemiology: the Epidemic Intelligence Service

In the development of the CDC, the arrival of Alexander Langmuir as head of the Epidemiology Branch in 1949 and the subsequent creation of the Epidemic Intelligence Service (EIS) two years later are crucial events which oriented the growth and the sphere of activity of the institution. Prior to Langmuir’s arrival, epidemiological operations were peripheral activities. CDC leaders in Atlanta noted the needs in advancing knowledge about disease transmission mechanisms, delineation of affected areas in times of epidemic, identification of animal reservoirs and evaluations of results. This was concurrent to difficulties in

¹⁵ Interview with William H. Foege by author, September 23, 2011. However, this view is certainly counterbalanced by Cook-Degan and McGeary in their short exposition on the NIH and its continued high funding following World War II. Robert Cook-Degan and Michael McGeary, “The Jewel in the Federal Crown?”, p. 196. For example in Fiscal Year 2004, the CDC ranked third in terms of appropriations, six times below NIH’s \$27.7 billion. This amount constituted sixty percent of the total amount allocated to the USPHS. Foege also compared the CDC in the early 1960s to a college campus with young physicians and epidemiologists concerned about social justice and interested in engaging in international health.

attracting staff with a medical background to tackle these issues. According to Etheridge, few medically trained candidates showed interest in joining an institution dominated by sanitary engineers and scientists.¹⁶ Under Langmuir, and largely because of the EIS, the CDC reinvented itself from an agency dedicated to spraying operations in the South to become the institutional seat of (field) epidemiology in the U.S. able to attract some of the brightest medical school graduates.

Born in California in 1910 and Chief Epidemiologist from 1949 to 1970, Alexander Duncan Langmuir first studied physics at Harvard University before deciding upon a career in public health. Influenced by the likes of Margaret Sanger, the birth control activist, and Dr. George Bigelow, Massachusetts' health commissioner, Langmuir attended Cornell University Medical College and interned at the Boston City Hospital. His interest in epidemiology specifically stemmed from his first job as an epidemiologist in training under New York State health commissioner Dr. Edward S. Godfrey, Jr., described by Langmuir as the "paragon of the shoe-leather epidemiologist", a metaphor for public health officials investigating cases in the field.¹⁷ Subsequently, he studied at Johns Hopkins University where he received a degree in public health in 1940. The academic institution was arguably the beacon of epidemiology in the country as the curriculum had been designed by Wade Hampton Frost, father of the discipline in the U.S.¹⁸ There Langmuir learned some of the methods, such as case-control studies, that he would later apply in the training of EIS officers. After graduation, he returned to New York State as a regional health officer before rejoining the Johns Hopkins School of Hygiene and Public Health in 1949 as faculty member. Parallel to his academic and public health activities, Langmuir served as consultant on the Armed Forces Epidemiological Board and, later on,

¹⁶ Elizabeth Etheridge, *Sentinel for Health*, p. 4.

¹⁷ Elizabeth Etheridge, *Sentinel for Health*, p. 40.

¹⁸ On Wade Hampton Frost, see Thomas M. Daniel, *Wade Hampton Frost: Pioneer Epidemiologist, 1880-1938: Up to the Mountain* (Rochester: Rochester University Press, 2004)

as committee member of the Army Chemical Corps's Advisory Council. From 1942 to 1949, the CDC's future Chief Epidemiologist was heavily involved in U.S. programs and policy on biological warfare.¹⁹ Theodore Brown and Elizabeth Fee describe in details Langmuir's involvement with the military which stirred his concern for biopreparedness and the necessity of developing such capacities in the nascent Cold War context.²⁰

Rudimentary ideas about disease investigation and rapid responsiveness during epidemics predated Langmuir's arrival at the CDC in 1949 but he was the one who formalized the program, training and service.²¹ As the Korean War began in June 1950, discussions over detection of covert biological attacks on water supplies, food chains and industrial areas took place at the USPHS' upper echelons on July 10th 1950. In this volatile context, to which Langmuir contributed by fanning the flames of suspicion and insecurity through public speeches on television, the creation of the EIS program as a defence mechanism against such threats was rapidly officialised a week later.²² In 1951, a first cohort of 23 EIS officers arrived in Atlanta.

¹⁹ In his recent book, Mark Pendergrast presents the experience of Langmuir's children, growing up with a major public health figure. Langmuir attachment to the EIS officers significantly affected his family life as they recalled. Mark Pendergrast, *Inside the Outbreaks: The Elite Medical Detectives of the Epidemic Intelligence Service* (Boston: Houghton Mifflin Harcourt, 2010), p. 54-55.

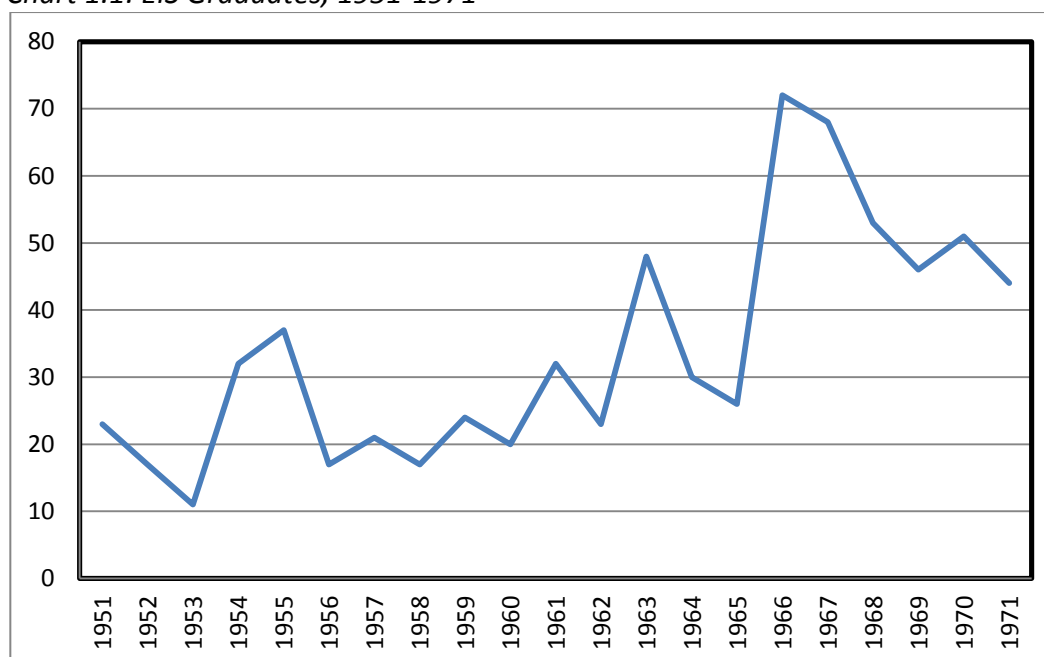
²⁰ Elizabeth M. Fee and Theodore M. Brown, "Preemptive Biopreparedness: Can We Learn Anything From History?", *American Journal of Public Health*, Vol. 91, No. 5 (May, 2001), p. 721-722. Elizabeth Etheridge, *Sentinel for Health*, p.41-42. For a non-American perspective, see François Buton, "De l'expertise scientifique à l'intelligence épidémiologique : l'activité de veille sanitaire", *Genèse*, Vol. 4, No. 95 (2006): p. 71-91.

²¹ The first formulation of epidemic intelligence is attributed to Joseph Mountin, a USPHS officer who envisioned the CDC and made possible the transition of the MCWA into a permanent agency. Elizabeth M. Fee and Theodore M. Brown, "Preemptive Biopreparedness: Can We Learn Anything From History?", *American Journal of Public Health*, p. 722. An earlier example is the Epidemic Commission of the LNHO. Marta Aleksandra Balinska, "Assistance and Not Mere Relief: the Epidemic Commission of the League of Nations, 1920-1923" in Paul Weindling (ed.), *International Health Organisations and Movements, 1918-1939* (New York: Cambridge University Press, 1995), p. 81-107.

²² Elizabeth M. Fee and Theodore M. Brown, "Preemptive Biopreparedness: Can We Learn Anything From History?", p. 722-723.

Langmuir and his disciples placed field epidemiology and the EIS programs at the end of a long line of contributions by illustrious 19th century public health leaders and reformers mainly from the United Kingdom. Among the inspirations cited by Langmuir, Stephan Thacker and Jeffrey Koplan figure British statisticians, public health thinkers and reformers such as Edwin Chadwick (1800-1890), John Simon (1816-1904) and especially John Snow (1813-1858) and William Farr (1807-1883), a civil servant responsible for the creation of life-tables as tools to assess the healthiness of places by comparison of mortality and morbidity rates. Thus presented, the EIS was the logical extension of epidemiology applied to the investigation and control of outbreaks in the interest of the public.²³

²³ The list of influence on Langmuir, his epidemiology and the EIS was drawn by a former CDC director and a member of the Epidemiology Program Office, Jeffrey P. Koplan and Stephen B. Thacker, "Fifty Years of Epidemiology at the Centers for Disease Control and Prevention: Significant and Consequential", *American Journal of Epidemiology*, Vol. 154, No. 11 (2011), p. 982-983. The heavy influence of British epidemiology and public health practice on Langmuir would appear to be at odds with the development of disease investigation in the United States following the birth of bacteriology. Anne Hardy argued that bacteriological methods developed at the end of the 19th century were followed by laboratory-based, contact-tracing methods of infectious disease investigations in the United States. In comparison, she maintains that in the British context, epidemiologists clung to observational and deductive methods in addition to the adoption of statistical tools for field investigations. Anny Hardy, "Methods of Outbreak Investigation in the 'Era of Bacteriology' 1880-1920" in Alfredo Morabia (ed.), *A History of Epidemiologic Methods and Concepts* (Basel: Birkhäuser Vase, 2004), p. 199-206.

Chart 1.1: EIS Graduates, 1951-1971

Source: EIS Directory, August 8, 2010. The EIS program refers to graduates according to their year of admission. For example, the class of 1951 graduated in 1953.

This program eventually became the core and one the most renowned aspects of CDC activities. It attracted some of the brightest medical students to Atlanta and steered them into public health careers.²⁴ During the Cold War, some doctors also took advantage of the two-year training at the CDC to meet the obligations of military service.²⁵ In the first years of its existence, these EIS officers were mainly assigned to State and local public health department but they also served as staff in an ever increasing number of programs such as disease surveillance or polio immunization. Assignments to states and programs functioned through a matching system. After their training, officers listed three preferences and requests for assignment to State health departments, CDC headquarters or the various field stations. Over the years, the EIS program and its graduates became

²⁴ Interview with David J. Sencer by author, October 26, 2010.

²⁵ For instance, this was the case for D.A. Henderson. Interview with D.A. Henderson by author, August 18, 2010.

the core the CDC. It has been described as the backbone of the institution and secured the CDC's status as "the jewel of the crown" of the USPHS.²⁶

Field epidemiologists trained through the EIS program were especially well-suited to overseas assignments and were a crucial asset in the CDC's expansion into international health. In addition to being trained in the surveillance and control of infectious diseases, the focus of most major international health initiatives by multilateral and development organizations following World War II, the military roots of the program and the relationship of the CDC towards U.S. states allowed for an almost seamless transition from the national scene onto the global arena. As explained above, the origins of the EIS are inseparable from Cold War fears over introduction of biological weapons into the United States by communist agents. While the initial focus and motivations supporting the creation of the program were the surveillance, localization and containment of biochemical attacks on U.S. soil, these views and practices could readily be applied overseas.²⁸ EIS officers were thus trained in investigating outbreaks or suspicious cases of infectious diseases whether of natural origins or resulting from deliberate attacks. These methods of localization and containment of diseases at points of origin superseded quarantine measures introduced in the 19th century which aimed at blocking case importation at ports of entry. Focusing on ports of entry to contain outbreaks was not relevant in the case of biochemical attacks, therefore the EIS training prepared epidemiologists in finding cases abroad to prevent the introduction and spread of infectious diseases to the U.S.²⁹ In short, the health of the U.S. population could be as readily protected by dispatching EIS officers in case of an attack from Cold War

²⁶ Elizabeth Etheridge, *Sentinel for Health*, p. 48. Interview with William H. Foege by author, September 23, 2011.

²⁸ Nicholas B. King, "Security, Disease, Commerce: Ideologies of Postcolonial Global Health", *Social Studies of Medicine*, Vol. 32, No. 5-6, (October-December, 2002), p. 763-789.

²⁹ Interview with William H. Foege by author, September 23, 2011.

enemies or sending field epidemiologists to tackle an outbreak abroad, regardless of risks of importation.

Training of EIS officers and the role of the CDC as support to state and local health departments also facilitated a leap from public health actions in the U.S. to deployment across the globe. Fundamentally, the CDC was, and still is, a service organization whose mission was summed by the motto: “We exist to serve the states”.³⁰ This short definition of the CDC’s role in the U.S. public health system provided a basic approach and worldview when it came to expansion into international health. As William Foege explains, training hammered into EIS recruits the notion of being hosts in states asking for assistance during public health crises. Officers were expected to approach their assignment with humility in order to avoid tensions and clashes resulting from Federal involvement into the affairs of states. On international assignments EIS officers were instructed to adopt a similar stance as their presence overseas was also the result of calls for assistance on the part of foreign governments or international health organizations (WHO, PAHO).³¹ EIS officers and the CDC thus served multiple ‘states.’ As explored in greater details in the coming chapters, the CDC assisted the Federal state (USAID, Department of Agriculture, the U.S. Army) by supplying expertise and manpower to programs in the U.S. and abroad. ‘States’ also included foreign countries where the CDC sent personnel to contain outbreaks and epidemics. Therefore, a strong sense of its role in public health allowed the CDC to consider and take part in international health activities in collaboration with other types of ‘States’ without provoking a major rupture in what had been an axiomatic principle since its inception.

If considering ‘state’ as polysemous facilitated an almost natural extension from U.S. to international public health, this also meant treating calls for assistance in a similar manner regardless of foreign culture. EIS officers responding to

³⁰ Elizabeth Etheridge, *Sentinel for Health*, p. 58.

³¹ Interview with William H. Foege by author, September 23, 2011.

overseas requests basically prepared for and treated these calls as if they came from the U.S.³² Preparation for short term assignments lacked cultural and language training with the focus almost exclusively on suspected pathological entities at cause and their means of transmission. Interviews with CDC members revealed diverging views on the importance of culture when dispatched on short notice on foreign assistance. For instance, William Foege stressed the need to send “culturally sensitive” officers and Don Millar recalled a particular sensibility for the Indonesian culture when deployed in South East Asia, and conversely D.A. Henderson, Phillip Brachman, David Sencer minimized its importance at the time and the usefulness of such preparation for the containment of outbreaks overseas.³³ For longer term assignments, ranging from a few months to years during the CDC’s involvement in smallpox eradication in West Africa and India during the second half of the 1960s and 1970s, training included cultural and language training but this proved to be an exception. For example, when the CDC acquired responsibility for malaria eradication (see chapter 6), personnel involved in the program during the same years lacked such preparation.³⁴ Thus, for most EIS assignments overseas, aside from smallpox eradication, cultural training was not on the curriculum. Hosts, carriers, parasites, etc. were the focus

³² Interview with Philip S. Brachman by author, October 5, 2010.

³³ Interview with William H. Foege, by author, September 23, 2011. Interview with Don Millar by author, November 17, 2010. Interview with D.A. Henderson, August 18, 2010. Interview with Philip S. Brachman by author, October 5, 2010. Interview with David J. Sencer by author, October 26, 2010. When questioned about cultural preparation and deployment EIS officers, D.A. Henderson and David Sencer expressed reservations on whether cultural training could fully prepare for deployment abroad to contain an outbreak. Philip Brachman noted that there was little difference whether an EIS officer traveled to Nebraska or in Central America. On the other hand, Don Millar vividly recalls his encounter with the Indonesian culture when joined a WHO team. Finally, William Foege stresses the importance of culture in international health campaigns but also acknowledges that EIS officers dispatched on short notice could make up what they lacked in cultural training with cultural sensitivity. This view is presented in his recent book, William H. Foege, *House on Fire: The Fight to Eradicate Smallpox* (Berkeley: University of California Press, 2011), pp. 35, 44-45, 138, 169.

³⁴ Interview with anonymous informant by author, November 12, 2010.

of investigation and little difference existed whether one searched for these in the United States or abroad.³⁵

Through the EIS program, the CDC had at its disposal a group of young field epidemiologists readily deployable across the globe, conceptual foundations derived from the military origins of the program and a vision of its role in respect to 'states' which facilitated expansion onto the international health arena. If the tools, concepts and resources existed in Atlanta to allow expansion of activities overseas, what characterized CDC involvement in international health in its first 15 years? Who showed interest in seeing the institution extend its tentacles abroad?

2.4 International Health in Atlanta: 1950s

Expansion of international health activities at the CDC resulted from individual interest in this domain. If the following chapters explore in greater details how the institution projected its expertise, personnel and influence from Atlanta to other organizations and foreign countries through various alliances, this section focuses on the place and importance accorded to international health activities at headquarters and the individuals who formulated plans for deployment. Initial consideration for involvement at the global level came from CDC Chief Justin Andrews in 1952. His motivations derived from three elements: his personal experience abroad, the interconnectedness of U.S. and international public health and the continued survival of the CDC. As further detailed in chapter 5, Andrews travelled to Iran in 1948 on behalf of the Department of State to assess the epidemiological status of malaria and explore the opportunity for the Iranian

³⁵ This is apparent when consulting the 'Epi Aid Memoranda', or field reports of EIS officers deployed abroad as the focus and explanations concerning outbreaks are centered around cases, contact with disease vectors, lack of vaccination, symptoms, etc. A collection of such documents is available in the Alexander D. Langmuir Papers, Epidemic Aid Memoranda, 1953-1972, Series 1, Box 1, Folders 7 to 39, Box 2, Folder 3, Center for the History of Medicine, Harvard Medical School, Boston.

government to conduct a vector control campaign in the context of a large-scale modernization project. Furthermore, Andrews believed that “Better health in the world pays dividends in America”, thus applying the CDC’s growing expertise on tropical diseases abroad was in line with the institution’s mission in the U.S. Finally, by suggesting involvement in international health, the CDC’s new Chief sought ways to prevent the possible dismantlement and merging of his institution with the NIH.³⁶ The timing of such of a proposal coincides with the closure of the International Health Division (IHD) of the Rockefeller Foundation in 1951. The IHD had been the vanguard of U.S. involvement in international health for nearly half a century through the training of health workers around the globe, disease eradication campaigns and medical research. As a result of the reorientation of the Rockefeller Foundation activities towards agricultural concerns and a changing institutional landscape with the creation of the WHO and announcement of the Point IV program by the Truman administration, the IHD failed at reinventing itself and finding a new role in this context.³⁷ It is unclear whether Andrews saw in the Rockefeller Foundation’s retreat from public health an opportunity for the CDC to carry on the torch of U.S. involvement in this domain, but nonetheless, circumstantial evidence suggests that CDC’s Chief believed his institution could be the heir of some of the IHD’s activities, notably in attacking communicable diseases abroad and thus prevent its absorption by the NIH.³⁸

The successive CDC Chiefs during the 1950s did not build on Andrews’ ambition to develop a coherent and structured plan for expansion into international

³⁶ Elizabeth Etheridge, *Sentinel for Health*, p. 49.

³⁷ John Farley, *To Cast Out Disease: A History of the International Health Division of the Rockefeller Foundation (1913-1951)* (New York: Oxford University Press, 2004), p. 279-280.

³⁸ There is evidence of contacts between Justin Andrews and Paul Russell, an IHD malariologist and proponent of eradication, when Andrews approached Russell to probe IHD’s interest in supporting the Iranian’s government malaria control in the 1940s. This is further explored in chapter 4. Justin M. Andrews, *Malaria Control Recommendations to Imperial Iranian Government*, March 1949, Records of the CDC, Office of the Chief Files – 1959, RG 442.60.A0140 Box 3, Folder: Disease (and Conditions) Correspondence and Reports, NARA, Morrow, Georgia, p. 22.

health nor did they imagine a role for the institution. The focus, as presented above, was on domestic issues such as polio immunization and more generally establishing and consolidating the CDC. Furthermore, the USPHS concentrated international health activities in Washington through a dedicated office: the Division of International Health.

Until 1958, indirect participation through supply of knowledge by participation in the scientific committees of the WHO, preparation of self-instructional manuals and audio-visual material, establishment of standards for insecticides, training services and laboratory diagnostic services characterized CDC involvement in international health.³⁹ More direct involvement included limited deployment of vector control specialists and EIS officers to assist in the control of foreign epidemics.

Table 2.3: Overseas Missions Involving CDC Personnel for Control of Foreign Epidemics (1951-1957)

Date	Country	Mission
May 1951	Korea	Diarrhoea-dysentery in Korean prisoners of war
December 1952	Greenland	Investigation of polio cases
April-May 1953	Sudan	Outbreak of meningitis
August-Sept. 1954	East Pakistan	Cholera and malaria
March 1955	Bolivia	Acute febrile illness
June 1957	Argentina	Outbreak of botulism
December 1957	Columbia	Encephalitis

Source: Memo to Acting Chief, DIH from Alan W. Donaldson, "Request from Senator Humphrey", July 22, 1960. Records of the CDC, Office of the Chief Files – Personnel (1960), RG 442.63.A789 Box 3, Folder Overseas Missions Involving CDC Personnel, NARA Morrow, Georgia.

Leading figures at the CDC such as Alexander Langmuir, S.W. Simons, an insecticide specialist, and James H. Steele, a veterinarian and regular participant

³⁹ USPHS, *Public Health Resources Available to the International Cooperation Administration*, January 10, 1957, p.10. Records of the USPHS, Office of International Health, RG 90.130.65.41.5 Box 2, Folder: Coordination 2-3 International Cooperation Administration 1955-1958, NARA College Park. These are detailed more thoroughly in the following chapters.

in international meetings and the WHO scientific committees, did have international reputations and personal interests in international health matters.⁴⁰ This type of involvement is best viewed as a natural extension of individual careers and an indication of personal status in public health and medicine rather than as the building blocks for institutional growth of the CDC as a global actor. For EIS officers specifically however, Langmuir encouraged and jumped on occasions to send his recruits abroad to gain experience.⁴¹ But whether EIS officers pursued international health interests during this decade was an individual choice and the CDC dedicated programs specifically geared at tackling health issues in foreign countries. For instance, Harald Fredericksen and Reimert Ravenholt, both of the second cohort of the EIS program, continued their careers in international health. Fredericksen actively assisted the Bolivian smallpox immunization campaign during the 1950s while Ravenholt was attached to the U.S. embassy in Paris in the 1960s to later become director of the USAID Office of Population from 1966 to 1979. These men pursued their internationally-oriented careers outside the walls of the CDC.⁴² Summarizing this period, William Foege described this stage in the CDC's growth as "the establishment of credibility."⁴³

⁴⁰ On James H. Steele, Craig Nash Carter and Cynthia Gregg Hoobler, *One Man, One Medicine, One Health: The James H. Steele Story* (C.N. Carter, 2009). The links between Langmuir and Steele are detailed in chapter 19. Steele and Simons sat on five WHO scientific committees between 1950 and 1966.

⁴¹ Interviews with D.A. Henderson by author, August 18, 2010; Interview with Don Millar by author, November 17, 2010.

⁴² Harald Fredericksen, "Strategy and Tactics for Smallpox Eradication", *Public Health Reports*, Vol. 77, No. 7 (July 1962): 617-622. On Reimert Ravenholt, see <http://www.ravenholt.com/>, accessed September 29, 2011.

⁴³ Interview with William H. Foege by author, September 23, 2011.

2.5 President Dwight Eisenhower and Senator Hubert Humphrey

Outside of the CDC, political actors took an interest in international health. In January 1958, Eisenhower declared his intention to address the health needs of countries in the Middle East in an effort to contain Arab nationalism, curb the influence of Egypt's charismatic President, Gamal Abdel Nasser, and prevent Soviet inroads in the region. This was an extension to his foreign policy doctrine formulated the year before.⁴⁴ Aside from foreign policy considerations, domestic calculations also factored in Eisenhower's decision to attack health problems in the turbulent region. Indeed, the White House worried about Congressional initiatives in international health for good reason as the legislative branch had become the theatre of debates on U.S. involvement in this domain.⁴⁵ In 1956-57, American international public health leaders such as Eugene Campbell, Louis L. William Jr. and Paul Russell testified in Congress to convince elected officials about the urgency of eradicating malaria and the necessity of U.S. funds to ensure the success of the endeavour.⁴⁶ During those hearings, Congress faced arguably one of the most coherent and well orchestrated strategies to devote

⁴⁴ Publicly, the Eisenhower doctrine aimed at preventing Soviet influence and Communist takeovers in the oil-rich Middle East. But as Salim Yakub argues, the doctrine primarily aimed at securing U.S. allies in the region and combat Nasser-inspired Arab nationalism. Salim Yakub, *Containing Arab Nationalism: The Eisenhower Doctrine and the Middle East* (Chapel Hill: North Carolina University Press, 2004).

⁴⁵ Memo from Aims C. McGuinness to The Secretary, "Need for Clarification of the Issues in International Health", not dated, p.3. Records of the USPHS, Office of International Health, RG 90.130.65.41 Box 6, Folder: Organization International Health Planning 1958-1959, NARA College Park. There are good reasons to believe it was written shortly after the State of the Union Address of 9 January 1958.

⁴⁶ Eugene P. Campbell had a long career in international health, serving in Latin America through the Institute for Inter-American Affairs until 1945 when he started a ten year assignment in Brazil. Upon his return in Washington, he received the *Medalha Mérito Médica*, Brazil's highest medical honour. In Washington, Campbell became acting chief, deputy chief, and chief of the Office of Public Health of the International Cooperation Administration. He remained in the U.S. until his transfer to India in 1961. ICA, *Health Summary*, March 1955, p. 7. Records of the USPHS, Office of International Health, RG 90.130.65.41.1-7 Box 8, NARA College Park. Marcos Cueto, *Cold War, Deadly Fevers. Malaria Eradication in Mexico, 1955-1975* (Baltimore: Johns Hopkins University Press, 2007), p. 50 and ref. 146.

foreign aid funds to an international health program.⁴⁷ Furthermore, Eisenhower had referred to malaria and urged Congress to take action, while framing this issue as a matter of collaboration with the Soviet Union.⁴⁸ Other congressional initiatives included the adoption of resolutions for the establishment of an international research year, the creation of an Institute for International Medical Research housed in the NIH and the introduction of bills to facilitate and clarify the role of the USPHS in public health programs abroad.⁴⁹ It is in this context of intense political activity over U.S. involvement in international health that a Senator envisaged a greater role for the CDC.

In 1958, the Senate directed the Committee on Government Operations to study all Federal programs related to international health and submit its report by January 31st, 1959. Chaired by Senator, and future Vice-President, Hubert Humphrey, the Subcommittee on Government Reorganization and International Organizations examined that the organization, objectives and policy concerning international health and was “aggressively moving forward with this project.”⁵⁰ Over the course of its mandate, extended to 1964, the Humphrey Subcommittee published various studies such as *International Medical Research, Cancer - A Worldwide Menace* and *Health in the Americas and the Pan American Health Organization*. During its activities, the Subcommittee solicited the USPHS in

⁴⁷ Negotiations and Congressional Hearings are detailed in Marcos Cueto, *Cold War, Deadly Fevers*, p. 50-67.

⁴⁸ Javed Siddiqi, *World Health and World Politics: The World Health Organization and the UN System* (Columbus, South Carolina: University of South Carolina Press, 1995), p. 143-144.

⁴⁹ Introduced by Senator William Purtell (R-CT), Senate Bill 3727 would have amended the Public Health Service Act to define and clarify specific role for the USPHS in international health. While it was passed in the Senate, the Bill failed in the House. Proposal for an Institute of International Medical Research was a joint resolution of Representative John E. Fogarty (D-RI) and Senator Lister Hill (D-AL). In 1968 the NIH recognized their contribution to medical research with the creation of the John E. Fogarty International Center and the Lister Hill National Center for Biomedical Communications. Memo from Aims C. McGuinness to The Secretary, “Need for Clarification of the Issues in International Health”, not dated, p. 2.

⁵⁰ Memo from Aims C. McGuinness to The Secretary, “Need for Clarification of the Issues in International Health”, not dated, p. 2. Other members of the Subcommittee included: John L. McClellan (D-AR.), Ernest Gruening (D-AK), Edmund S. Muskie (D-ME), Karl E. Mundt, (R-SD), Jacob K. Javits (R- NY)

documenting all the foreign assignments of its personnel⁵¹, the prevalence of various diseases⁵² and sought advice concerning the needs in international health.⁵³ The first purpose of the Subcommittee's publications was to document the international health activities of federal agencies, private institutions and multilateral organizations. This included a review of the programs and sums devoted to this end. Secondly, the Subcommittee adapted technical and medical issues for a nonmedical audience to inform policymaking, legislation and institutional reforms. In the terms of the Subcommittee, the "most important purpose is to develop helpful findings for the Senate[.]"⁵⁴ The activities of the Humphrey Subcommittee were to provide a basis for further involvement of the legislative branch into the conduct of international health activities by the U.S. government.

Of more immediate concern for the CDC was the publication of *The Status of World Health*, a study which compiled epidemiological information on various infectious and chronic diseases, health indices (child mortality, life expectancy) and distribution of health resources (numbers of doctors and nurses, access to medical schools).⁵⁵ For the preparation of this document, Humphrey and his

⁵¹Letter from Hubert H. Humphrey to Leroy E. Burney, July 6, 1960. Records of the CDC, Office of Chief Files, RG 442.63.A783 Box 3, Folder: Overseas Missions involving CDC Personnel, NARA Morrow, Georgia.

⁵² Memo for the record by Aims C. McGuinness, "Preparation of Data for Use by Senate Committee on Government Operations in Its Study of Worldwide Activities", November 14, 1958. Records of the USPHS, Office of International Health, RG 90.130.65.41.1-7 Box 6, Folder: Organization International Health Planning 1958-1959, NARA College Park.

⁵³ Two examples: Letter from Hubert H. Humphrey to Monsieur le Directeur du Service Federal de l'Hygiene Publique, Switzerland, March 25, 1959. Records of the USPHS, Office of International Health, RG 90.130.65.41.1-7 Box 6, Folder: Organization International Health Planning 1958-1959, NARA College Park. Letter from Hubert H. Humphrey to the Ambassador to Japan (Douglas MacArthur), April 6, 1959. Records of the USPHS, Office of International Health, RG 90.130.65.41.5 Box 2, Folder: Communications 2, NARA College Park

⁵⁴United States Senate, *Health in the Americas and the Pan American Health Organization* (Washington D.C.: United States Government Printing Office, 1960), p. vii. Records of the CDC, Office of the Chief Files, RG 442.63.A789 Box 1, Folder: Pan American Sanitary Bureau, NARA Morrow, Georgia.

⁵⁵ United States Senate, *Status of World Health in Outline Text and Charts* (Washington D.C.: United States Government Printing Office, 1959), Hathi Trust Digital Library,

project director, Julius Cahn, approached Alan Donaldson. The CDC's Assistant Chief spent months in Washington collecting, assembling and organizing data into charts and tables. This collaboration resulted in increasing the awareness of political actors about the capabilities and interest on part of the CDC in extending its activities beyond U.S. borders. Following their collaboration in Washington, Cahn met with Donaldson to discuss further means of extending CDC operations overseas. The project director exposed to Donaldson the Subcommittee's future course of action and objectives which went beyond the cataloguing of the overseas accomplishments of the USPHS. These included amending legislation to facilitate and clarify USPHS' international activities. Concerning CDC more specifically, Cahn and Humphrey aimed at presenting U.S. programs in developing nations in which the Atlanta-based institution could play a more active role. Finally, Humphrey's representative probed Donaldson's personal interest in assuming greater responsibilities in overseeing USPHS/CDC's growth in international health.

Response to these inquiries is indicative of existing eagerness in Atlanta and simultaneous discomfort in regards to expanding operations abroad. Donaldson expressed CDC interests and abilities but this had not translated in administrative action on the part of its leaders. "I informed Mr. Cahn that we had not had much opportunity to pursue the matter beyond the point reached during his visit, wrote Donaldson, that he was already aware of our interests and potentialities, but that frankly I was uncertain as to where we went from there."⁵⁶ After initial discussions between CDC officials and Cahn, Donaldson admitted that "no further thought was given to the subject." But moreover, CDC's Assistant Chief worried about the consequences and effects on USPHS

<http://babel.hathitrust.org/cgi/pt?id=coo.31924001290497;q1=status%20of%20world%20health>, accessed September 19, 2011.

⁵⁶ Memo from Alan W. Donaldson, Assistant Chief, CDC to Chief, BSS, "Report of Meeting with Mr. Julius N. Cahn", April 15, 1959, p. 1. Records of the CDC, Office of the Chief Files, CDC (Some 1951 but primarily 1959), RG 442.62.A726 Box 2, Folder: Cooperation – International, NARA Morrow, Georgia.

hierarchy if his institution took an assertive position. Donaldson also feared that openly presenting the CDC as a focal point for international health activities and outlining the programs in which it would play a leading role could lead to problems with the USPSH leadership: “I expressed my feeling that this request could lead to difficulties at a number of echelons. He agreed and indicated no action would be taken at this time in this regard.”⁵⁷

Personal uneasiness accompanied institutional uncertainty as to means and ways to extend overseas activities. If Donaldson expressed inclinations towards greater involvement in international health, such as gathering information from delegates at the World Health Assembly on behalf of the Subcommittee, he remained cautious about further commitments. As Donaldson reported: “At that point, Mr. Cahn began referring specifically to my participation – so I felt advisable to point that I honestly did not know what part I might play in all this – I was not a specialist in international health, I had become involved in the earlier operation somewhat by chance and circumstances, and I didn’t know how [...] Dr. Anderson (CDC Chief) would feel about it.”⁵⁸

Figure 2.1: Mandarins of U.S. International Health



From left to right: Louis L. Williams Jr. (Image courtesy of the National Library of Medicine) and second from the left Henry van Zile Hyde (Image courtesy of the UN Archives)

⁵⁷ Memo from Alan W. Donaldson, Assistant Chief, CDC to Chief, BSS, “Report of Meeting with Mr. Julius N. Cahn”, April 15, 1959, p. 2. Underlined in the original.

⁵⁸ Memo from Alan W. Donaldson, Assistant Chief, CDC to Chief, BSS, “Report of Meeting with Mr. Julius N. Cahn”, April 15, 1959, p. 2.

Indeed, Donaldson was Assistant Chief in an institution located away from Washington. There the international health mandarins, such as Louis L. Williams Jr. and Henry van Zile Hyde, directed the USPHS Division of International Health.⁵⁹ These men had long a experience with international health bureaucracy and were connected with other influential actors such as Fred L. Soper, Director of the Pan American Sanitary Bureau, and Eugene Campbell of the International Cooperation Administration (ICA).

At the end the 1950s, the CDC housed experts and scientists with an eye on international health issues and got involved in discussions at the WHO, but translating this expertise into programs remained problematic. Donaldson remained uncertain about how the CDC could expand its domestic mandate into operations overseas, and more personally he was unsure if his involvement would create tensions with well-established figures in international health. If it has been argued that the activities of the Subcommittee did not lead to any specific legislation, the USPHS would nonetheless use its recommendations to argue for a larger international role.⁶⁰ Contacts between CDC and the Humphrey Subcommittee created links between the public health institution in Atlanta and the Washington political scene regarding international health. Humphrey recognized the expertise of the CDC and viewed favourably its mobilization for public health programs overseas. His conclusions aimed at combating the consolidation of international health under the roof of development agencies, a process dissected below.

⁵⁹ Louis L. Williams Jr. was personally involved with Surgeon General Thomas Parran in the creation of the World Health Organization as U.S. delegates. Jeanne L. Brand, "The United States Public Health Service and International Health, 1945-1950", *Bull. Hist. Med.* Vol. 63 (1989), p. 589-590,594. On Henry van Zile Hyde, Marcos Cueto, *Cold War, Deadly Fevers*, p. 51.

⁶⁰ Mary E. Corning, *A Review of the United States Role in International Biomedical Research and Communications: International Health and Foreign Policy* (Washington: United States Government, 1980), p. 95. Memo from the Surgeon General to the Secretary, "Relationship of the Public Health Service, Department of Health, Education and Welfare, with the proposed Agency for International Development", June 30, 1961. Records of the USPHS, Office of International Health, RG 90.130.65.42.2 Box 15, Folder: Coordination, NARA College Park.

2.6 Public Health, Experts and Foreign Aid

Following World War II, the United States dedicated funds and personnel to assist war-ravaged and developing countries in (re)building their economy, open markets for U.S. goods, fend off Communists and more generally spread U.S. influence across the globe. Interventions affected multiple areas of society (agriculture, education, transportation, public health, etc.) and were applied by various means and through different organizations: loans, grants, training, bilateral agencies, UN technical agencies.⁶¹ Transfer of U.S. technical know-how framed development assistance, as experts in scientific and political fields believed in the virtue of technology and knowledge in removing obstacles to modernization and ameliorating living standards. Thus, technical expertise became intimately linked to how the U.S. related with the world in the postwar era. As Clark Miller pointed out: “Less well appreciated, however, is the extent to which the postwar transformations of world order also derived from the contributions of science and technology to a fundamental shift in the practice and conduct of global diplomacy and in the organization of the state for world affairs. The latter transformation was driven by the rapidly expanding presence of scientific and technical experts in diplomatic affairs.”⁶² Involvement of experts in diplomacy’s high echelons was matched by greater presence in the field for the implementation of technically-oriented programs. For public health in particular, however, this created problems in finding and deploying qualified personnel.

Inclusion of public health projects in development aid dated back to the Truman administration. In 1947, Greece and Turkey received assistance which contained

⁶¹ David Porter, *U.S. Economic Foreign Aid: A Case Study of the United States Agency for International Development* (New York: Garland Publishing, 1990), p. 115.

⁶² Clark Miller, “‘An Effective Instrument of Peace’: Scientific Cooperation as an Instrument of U.S. Foreign Policy, 1938-1950”, *Osiris*, No. 21, (2006), p. 134.

special provisions for health programs.⁶³ Two years later, Truman proclaimed the Point IV program, effectively expanding U.S. aid to countries that would be collectively known as the “Third World.”⁶⁴ Allocation of resources with the stated objective of helping struggling nations overcome poverty, hunger and disease, in addition to the reconstruction of Europe through the Marshall Plan, resulted in the creation of a succession of agencies to administer a growing area of activity. The Eisenhower administration and Congress also sought to capitalize on participation in health programs aimed at Third World countries by pledging U.S. support to malaria eradication and announcing an attack on diseases affecting nations of the Middle East as seen above.

Table 2.4: Bilateral Assistance Agencies, 1942-1961

Institute for Inter-American Affairs	1942
Economic Cooperation Administration	1948
Technical Cooperation Administration	1950
Mutual Security Administration	1951
Foreign Operation Administration	1953
International Cooperation Administration	1955
Development Loan Fund	1957
U.S. Agency for International Development	1961

Actively involved in charting U.S. involvement in international health through these new agencies were the veterans of the USPHS. Mandarins, such as Louis L. Williams Jr. and Henry van Zile Hyde, created in 1945 the International Health Affairs Branch in the Department of State. Simultaneously, the USPHS established its own Office of International Health Relations to coordinate with

⁶³ Mary E. Corning, *A Review of the United States Role in International Biomedical Research and Communications: International Health and Foreign Policy*, p. 95.

⁶⁴ Nils Gilman, *Mandarins of the Future. Modernization Theory in Cold War America*, (Baltimore: Johns Hopkins University Press, 2003), p. 70-71.

the Department of State, development agencies and multilateral organizations.⁶⁵ Reliance by bilateral aid agencies on the technical expertise and knowledge of USPHS officers was felt at the highest levels. During the early years of the postwar era, relations between the two major players were fluid and international health was under what has been qualified an “interlocking directorate” with Williams and Hyde holding cross-appointments in the USPHS and the Department of State, thus able to coordinate and orient U.S. involvement in the health affairs of foreign nations.⁶⁶ Until the creation of the ICA in 1955, USPHS effectively directed all international health initiatives. In their positions, Williams and Hyde allowed and facilitated recourse to public health expertise and its deployment in the field through the staffing and programming of all United States Operation Mission (USOM) involving health aspects. Moreover, they were responsible for determining the health priorities of all technical assistance missions.⁶⁷ Through this arrangement and sharing of power, bilateral aid agencies could draw upon the USPHS’ pool of resources to carry out its missions and objectives while its USPHS officers utilized their knowledge and expertise to carve a role within the international relations apparatus.

Access to public health expertise and the ability to attract such types of resources in the early 1950s was difficult. In the United States, local public health departments struggled in recruiting candidates and staffing positions because of low salaries. Posts remained vacant as candidates were few. These difficulties were further compounded by a general lack of interest in the discipline further difficulties “as enrollments (sic) in schools of public health declined so dramatically that the Johns Hopkins School of Hygiene and Public Health

⁶⁵ Mary E. Corning, *A Review of the United States Role in International Biomedical Research and Communications: International Health and Foreign Policy*, p. 35-36.

⁶⁶ Mary E. Corning, *A Review of the United States Role in International Biomedical Research and Communications: International Health and Foreign Policy*, p. 37.

⁶⁷ Division of International Health, *Annual Report of the Division of International Health, Fiscal Year 1954*, October 20, 1954. Records of the USPHS, Office of International Health, RG 90.130.65.41 Box 6, Folder: Reports 1 – Annual 1946-1959, NARA College Park.

considered eliminating entirely the master of public health degree – the main training program for public health personnel.”⁶⁸ The American Public Health Association even dedicated a major meeting in 1955 to assess the state of public health during which testimonies generally predicted the end of the discipline, when not declared dead already. William Foege recalls how his fellow students were dismayed by his decision to pursue public health rather than focus on clinical medicine.⁶⁹ Brown and Fee point to a variety of possible causes to explain this decline but generally attribute it to a sharp shift to the right in the 1940s and 1950s.⁷⁰ For international health specifically, academic programs dedicated to this specialization were non-existent in the 1950s. The Johns Hopkins School of Public Health and Hygiene created the first department and appointed Carl E. Taylor as its first chairman in 1961 which would later provide a stream of graduates trained in facing health issues in developing nations.⁷¹ In a context of dwindling resources and increasing commitments to a variety of international public health programs, it was perhaps inevitable that the USPHS, CDC’s administrative home, and bilateral aid agencies battled over control on experts and technical know-how.

As the ICA replaced the Foreign Operation Administration (FOA) in 1955 for the coordination and administration of all foreign assistance missions and non-military security programs, tensions flared over access and control of public health human resources. Contrary to its predecessor, the ICA was not an

⁶⁸ Elizabeth M. Fee and Theodore M. Brown, “Preemptive Biopreparedness: Can We Learn Anything From History?”, *American Journal of Public Health*, p. 725.

⁶⁹ Interview with William H. Foege by author, September 23, 2011.

⁷⁰ Fee and Brown are critical of “narrow” public health which de-emphasizes social explanations, large-scale measures (e.g. fluoridation of water supplies), chronic diseases and focuses on infectious diseases and limited interventions. Here, I am less interested in the content of public health training but rather in the declining number of professionals in the discipline regardless of their concerns and approaches. In the same breath, they also point to lack of detailed investigation of this phenomenon of the mid-20th century U.S. public health. Elizabeth M. Fee and Theodore M. Brown, “Preemptive Biopreparedness: Can We Learn Anything From History?”, *American Journal of Public Health*, p. 725.

⁷¹ Theodore M. Brown and Elizabeth Fee, “Carl E. Taylor, (1916-2010): A Beloved Pioneer in International Health”, *American Journal of Public Health*, Vol. 101, No. 7 (July 2011), p. 1216.

independent agency but was directly attached to the Department of State.⁷² To head its Public Health Division, the ICA recalled Eugene Campbell from Brazil. The creation of the ICA upset the balance and ended the “interlocking directorate” which characterized FOA/USPHS relationships, and, as a result, the relationship deteriorated.

Early after the establishment of the ICA and the appointment of Campbell, Hyde expressed his frustrations on the degradation of relations. According to Hyde, “it is the contention of the DIH [Division of International Health] that there has not been a sincere effort to place the implied reliance on PHS or to create and maintain the required team spirit.”⁷³ He listed a variety of sore points ranging from failures of the ICA in transferring field reports to inviting USPHS personnel in planning meetings and the declining place of public health in foreign assistance. More crucially, however, were issues relating to the training and recruiting of public health experts. Hyde suggested ways to improve the situation which included the creation of a unified staff for health related questions and the establishment of a final authority within the ICA to settle the differences.⁷⁴

Campbell’s predecessor, John Hanlon, had also recognized the tensions over staffing and recruiting for field missions and favoured a pooling of resources to meet the growing needs of international development programs: “We in the Public Health Division [ICA], together with our colleagues in the Public Health Service, have been reviewing the interagency relationships and agreement to find ways of economizing without sacrificing efficiency. There is the emerging

⁷² Samuel Hale Butterfield, *U.S. Development Aid – An Historic First: Achievements and Failures in the Twentieth Century* (Westport, Ct., London: Praeger Publishers, 2004), p. 39.

⁷³ Memo from Chief, DIH, to Chief, BSS, “Relations with ICA”, September 29, 1955, p. 2. Records of the USPHS, Office of International Health, RG 90.130.65.41.5 Box 2, Folder: Coordination 2-3 International Cooperation Administration, NARA College Park.

⁷⁴ Memo from Chief, DIH, to Chief, BSS, “Relations with ICA”, September 29, 1955, p. 5.

possibility of a single staff or unit which can do the job of bilateral health technical assistance as all of us would want to see it done.”⁷⁵

It is not clear what provoked the breakdown in the relationship, especially when considering that John Hanlon himself was a USPHS officer detailed to the ICA. One avenue of explanation forwarded by Hyde is the reluctance of the USPHS and the ICA “to have another agency do the thinking for it.”⁷⁶ The deteriorating relationship can be attributed to administrative jealousy over a contested field where responsibilities were not clearly defined. Another explanation rests with the appointment of Campbell who had pursued a career in international public health outside of the USPHS. After teaching epidemiology at the Pennsylvania School of Public Health, Campbell joined the Institute for Inter-American Affairs (IIAA) in 1942 as a way to contribute to the war effort. Through this agency, Campbell gained much field experience, especially in South America. Initially appointed as chief of field party in Guatemala, he rapidly climbed ranks in the IIAA by first becoming field director for Central America and subsequently for all of South America. From 1947 to 1955, Campbell served as Chief of Field Party in Brazil while remaining attached to the foreign assistance agencies before returning to Washington. His professional path was thus a product of his association with international development rather than with the public health apparatus. In short, Campbell was an outsider and an example of a career leading to international health prominence without being a USPHS commissioned officer.⁷⁷

The problematic USPHS/ICA relationship became the focus of negotiations during most of 1956. At that time, the basic objectives of the USPHS was to raise the

⁷⁵ John J. Hanlon, *ICA Health Summary*, August 1955, p. 1. Records of USPHS, Office of International Health, RG 90.130.65.41 Box 8, NARA College Park.

⁷⁶ Memo from Chief, DIH, to Chief, BSS, “Relations with ICA”, September 29, 1955, p. 5.

⁷⁷ Biographic information is available on the National Library of Medicine website. <http://oculus.nlm.nih.gov/cgi/f/findaid/findaid-idx?c=nlmfindaid;cc=nlmfindaid;view=reslist;subview=standard;didno=campbell467;focusrgn=bioghist;byte=5807539>, accessed, October 12, 2011.

status of health within the ICA while at the same time retain its influence on the direction of the international health program. Public health expertise took center stage as the power struggle for the upper hand of international policy formulation and implementation centered on the recruitment and assignment of trained personnel to overseas missions. The USPHS' main advantage was its access to the largest pool of public health experts to meet the staffing needs of ICA programs. Hyde expressed his fear that the ICA would develop its own recruitment system and build up its expertise in public health thus weakening the negotiating position of the USPHS.⁷⁸ Discussions however gave mixed results. In a memorandum of June 1956 summarizing the state of negotiations, Hyde concluded that the relationship remained tense. As it has been argued elsewhere, access to technical experts would become a key issue in the administrative growth of the Federal government as their knowledge increasingly sustained the power of economic and political elites in problem solving and policy formation.⁷⁹ Experts are critical in the ability of administrators to "take on and keep control of projects and events outside their traditional sphere of power, while still maintaining the efficiency and control generated by centralized management."⁸⁰ For the ICA, the public health experts were an essential resource for its various projects, especially when development schemes increasingly relied on a series of technical interventions.⁸¹

In the case of the USPHS, their experts were the key to assert their technical know-how on the international sphere. For example, it frequently supplied some of its personnel to serve on WHO expert committees. Experts were also the means to build-up and maintain the prestige acquired especially after the role it

⁷⁸ Memo from Chief DIH, to Chief, BSS, "Relationships between ICA and PHS", June 14, 1956, p. 1. Records of the USPHS, Office of International Health, RG 90.130.65.41.5 Box 2, Folder: Coordination 2-3 International Cooperation Administration, NARA College Park.

⁷⁹ Frank Fischer, *Technocracy and the Politics of Expertise* (Newbury Park, Calif.: Sage Publications, 1990), p. 28, 43, 90-91.

⁸⁰ Eric H. Ash, *Power, Knowledge, and Expertise in Elizabethan England* (Baltimore: Johns Hopkins University, 2004), p. 9.

⁸¹ Nils Gilman, *Mandarins of the Future*, p. 5.

played in establishing the WHO or as the effective leader of the Pan American Sanitary Bureau in the first decades of the 20th century.⁸² Hyde's negotiation strategy to ensure a place for his agency in the ICA was to make a "strong and positive proposal if it is to play an effective and dignified role in the program."⁸³ His assessment was that the USPHS still had a strong negotiating position but was progressively losing ground. Therefore, it was critical to convince the ICA to delegate or share its authority. The proposition put forward was the appointment of a single individual responsible for technical leadership jointly responsible to both the ICA and the USPHS. To convince his counterpart, Hyde argued that he would support the international health program to the detriment of its domestic program.⁸⁴ From this document, it appears that the stakes of those negotiations were very high for the USPHS. Hyde wrote: "It is believed that the above proposal will enable the Public Health Service to grasp the initiative in the negotiations with ICA; to enhance its leadership; and, to protect itself against increasing involvement in questionable projects over which it has no control and little influence. It provides an opportunity for the PHS to capitalize on its inherent position of strength in its relationship to the bilateral international technical assistance program."⁸⁵

Hyde's objectives changed in late 1956. Instead of the establishment of a final authority within the ICA, he suggested a "clear distribution of authority and responsibility rather than partnership relationship between the health personnel

⁸² From 1902 to 1947, U.S. Surgeon Generals also served as directors of the Pan American Sanitary Bureau, predecessor to the current Pan American Health Organization.

⁸³ Memo from Chief DIH, to Chief, BSS, "Relationships Between ICA and PHS", June 14, 1956, p. 1.

⁸⁴ Memo from Chief DIH, to Chief, BSS, "Relationships Between ICA and PHS", June 14, 1956, p. 1. It is interesting to note that arguments formulated in support of international health endeavours which drew upon the idea interconnectedness of diseases abroad, circulation of goods and people, and safeguarding the health of the U.S. population articulated notably by Justin Andrews is also present in issues of allocation of human resources from domestic duties to international service.

⁸⁵ Memo from Chief DIH, to Chief, BSS, "Relationships Between ICA and PHS", June 14, 1956, p. 3.

of the ICA and the Division of International Health of the Public Health Service.”⁸⁶ However, the change of strategy did not lead to the expected results as notes on the negotiations during 1957 indicate that the USPHS was fighting a losing battle. The ICA was moving forward with the consolidation of recruitment for international health staffing and technical support.⁸⁷ By September 1957, the two agencies reached an agreement to allow the ICA to establish its own recruitment system to attract public health experts into its own ranks. It created a Technical Resource Staff to provide advice for various public health programs (sanitary engineering, health education, malaria eradication, etc.) thus moving technical support from the USPHS to the ICA.⁸⁸ Under this agreement, the ICA would provide the USPHS with field reports and other documentation concerning its international health activities, and would seek USPHS advice only upon request on matters of general policy formulation.⁸⁹ Through this agreement, the ICA secured an administrative victory that marginalized the USPHS in policymaking decisions and effectively monopolized bilateral health programs. However, translating the new authority in technical support and recruitment into self-sufficiency would prove impossible. These difficulties arose as Eisenhower sought to use U.S. health resources in the Middle East.

During Eisenhower’s second term, public health initiatives for the developing world included a plan to combat disease in Middle Eastern nations as part of a

⁸⁶ Memo from Chief DIH, to Chief, BSS, “Relations Between ICA and PHS – Comment on Redraft dated 11/27/56”, December 5, 1956. Records of the USPHS, Office of International Health, RG 90.130.65.41.5 Box 2, Folder: Coordination 2-3 International Cooperation Administration, NARA College Park.

⁸⁷ Memo from Acting Chief, DIH, to Coordinating Officer for International Activities, “International Cooperation Administration Negotiations”, May 17, 1957. Records of the USPHS, Office of International Health, RG 90.130.65.41.5 Box 2, Folder: Coordination 2-3 International Cooperation Administration, NARA College Park.

⁸⁸ Eugene P. Campbell, “Monthly Activities: October and November 1957”, *ICA Health Summary*, October 1957, p. 1. Records of the USPHS, Office of International Health, RG 90.130.65.41 Box 7, NARA College Park.

⁸⁹ Eugene P. Campbell, “Monthly Activities: September and October”, *ICA Health Summary*, September 1957, p. 1-2. Records of the USPHS, Office of International Health, RG 90.130.65.41 Box 7, NARA College Park.

strategy to contain Arab nationalism and prevent Soviet inroads in the region. The significance of this initiative derives not so much from its content or the type of programs considered but rather because it revealed the complicated state of international health policy, coordination, program implementation and the awkward sharing of responsibilities and resources between the main stakeholders at the end of the 1950s. The White House turned to the Department of Health, Education and Welfare (DHEW) to give substance to presidential intentions. Initial review of government initiatives in international health found that there were no: “[...] Government-wide blueprint for future action” but nonetheless there was “an opportunity to capitalize more effectively on the special value of health in building peace.”⁹⁰ With the absence of a coherent plan for international health, the DHEW raised questions about a range of problems and objectives including the issue of expertise. Despite obtaining significant power related to the recruitment of public health personnel, the ICA remained dependent upon its public health counterpart. In its review of resources available to expand and develop a coherent strategy for U.S. international health involvement, the DHEW found that the ICA had access to limited resources and these were located far down in the administrative ladder. Conversely, the same review highlighted USPHS inability to convert its manpower advantage into international health policymaking and lacked the capabilities to handle responsibilities envisaged by the DHEW.⁹¹

⁹⁰ Memo from Aims C. McGuinness to the Secretary, “*Need for Clarification of the Issues in International Health*”, undated, 1958, p. 1. Records of the USPHS, Office of International Health, RG 90.130.65.41.1-7 Box 6, Folder: Organization International Health Planning 1958-1959, NARA College Park. The proposal discussed included a plan for the Middle Eastern countries, but also plans for various programs, diseases and means to finance these initiatives either through dedicated funds or increased contributions to WHO’s budget.

⁹¹ “President's Program for International Health - Document I”, p. 2. Attached to memo from Assistant Secretary for Legislation, DHEW, to Under Secretary for Economic Affairs, Department of State, “International Health Proposal”, October 31, 1958. Records of the USPHS, Office of International Health, RG 90.130.65.41 Box 6, Folder: Organization International Health Planning 1958-1959, NARA College Park.

Despite coming to an agreement with the ICA in 1957, USPHS officials remained unsatisfied as their agency was peripheral to policy formulation and public health remained at a low level in the ICA bureaucracy. Aware of ICA's continued reliance upon their organization, the USPHS turned again to its access to experts to achieve its goals by threatening to remove all of its employees in bilateral programs. Faced with the realities of staff shortage and possible withdrawal of the USPHS from all its programs, John Smith, the ICA Director, admitted the dependency of his agency: "This withdrawal would make it impossible to proceed with plans for the development of planned new health programs which seem very important to U.S. policy objectives."⁹² The ICA recruitment drive to meet its needs failed to achieve the desired results. For instance, malaria eradication necessitated filling over 70 posts in the field and additional personnel for headquarters operations and training.⁹³ Instead, Smith suggested ways for the ICA to offer employment to reserve officers and approach directly officers who did not figure in the long term plan of the USPHS. According to David Sencer and William Foege, international health assignments were ways for organizations to deal with less competent or unwanted employees.⁹⁴ While this interpretation suggests that the ICA relied on less qualified personnel, the bilateral aid agency could also count upon some leading experts, in malaria notably, such as Alan Hinman, and Lee Howard. However, international development agencies continued to call upon the USPHS for top level expertise.

By early 1959, both agencies were working out arrangements to clarify the role of the USPHS and the resources devoted to the ICA international health

⁹² Letter from John H. Smith Jr. to Leroy E. Burney, December 20, 1958, p. 4. Records of the USPHS, Office of International Health, RG 90.130.65.42.2 Box 15, Folder: Coordination, NARA College Park.

⁹³ Letter from Eugene P. Campbell to Horace DeLien, Chief, DIH, September 15, 1959. Records of the CDC, Office of the Chief Files, CDC (Some 1951 but primarily 1959), RG 442.62.A726 Box 2, Folder: Cooperation – International, NARA Morrow, Georgia.

⁹⁴ Interview with David J. Sencer by author, October 26, 2010. Interview with William H. Foege by author, September 23, 2011. In the case of the CDC in particular, Langmuir fired a scientist who subsequently joined an ICA mission in East Pakistan.

programs.⁹⁵ The level of public health assistance in the administrative hierarchy was raised with the creation of the Office of Public Health headed by a Deputy Director reporting to the ICA Director. The formation of an Interdepartmental Committee composed of members of both organizations also improved cooperation. Horace DeLien, new Chief of the DIH, appreciated the improvement of the relationship and pointed to the usefulness of the Committee: “[...] in developing mutual understanding and uniform policies.”⁹⁶ For the CDC, the necessity of collaborating with bilateral aid agencies was the consequence of this three year battle over control of expertise. The possibility of sending personnel abroad through its USPHS channels exclusively was effectively closed with responsibilities for staffing now in the hands of the ICA. The growth of international health activities for Atlanta became tied with bilateral assistance.

Needs for personnel in water sanitation projects, malaria eradication and other public health initiatives on the part of ICA and desires of USPHS officers to maintain its influence in U.S. international health programs made reaching a form of agreement almost unavoidable. While it tried to achieve independence from USPHS officers to carry its mission abroad, the ICA met with difficulties in attracting personnel in a context of scarce resources and a decline of the discipline in U.S. universities and other public health departments. However, the foreign assistance agency would never relinquish its newly acquired powers despite the recommendations of the Humphrey Subcommittee which argued for greater reliance upon domestic agencies to carry out international development. How did the arrival of a new administration and reform of the international development apparatus affect the USPHS’ place in international health?

⁹⁵ Letter from John D. Porterfield to L.J. Saccio, February 18, 1959. Records of the USPHS, Office of International Health, RG 90.130.65.42.2 Box 15, Folder: Coordination, NARA College Park.

⁹⁶ Memo from Chief, DIH, to Surgeon General, “Notes on PHS/ICA Relationships”, August 30, 1960, p. 1. Records of the USPHS, Office of International Health, RG 90.130.65.42.2 Box 15, Folder: Coordination, NARA College Park.

2.7 Barriers, Obstacles and Missed Opportunities

The election of John F. Kennedy heralded the opening of new avenues for international cooperation and the replacement of existing development structures with a new organization. The Kennedy administration created the Peace Corps to harness a young generation's energy and idealism to assist the rapidly multiplying independent nations in Africa and other developing countries, and provide experience of life abroad to a cohort of college graduates.⁹⁷ Eager to rekindle relations with Latin American countries and offer an alternative to the Cuban revolution, the new President announced the Alliance for Progress. The United States Agency for International Development (USAID) replaced the ICA and was officially detached from the Department of State. International development was infused with modernization theories based on the ideas of intellectuals such as Walt Rostow, University of Chicago sociologist Edward Shils, and MIT political scientist Lucian Pye, some of them acting as consultants to, or joining the, Kennedy administration.⁹⁸ These institutional reforms and foreign policy initiatives supported by novel ideas combined to give the impression of a renewal of U.S. relations with developing nations and international cooperation more generally.

In this context of administrative reform, the Surgeon General and his international health experts aimed at taking advantage of the context to reassert the role of the USPHS in overseas programs and redefine its relationship with the ICA's successor. For ten years, Surgeon General Luther Terry lamented, the USPHS had been the "sole agent for staffing and the administrative and technical

⁹⁷ Elizabeth Cobbs Hoffman, *All You Need is Love: The Peace Corps and the Spirit of the 1960s* (Cambridge, Mass: Harvard University Press, 1998)

⁹⁸ On the ideas and careers of these prominent modernization theorists, see Nils Gilman's *Mandarins of the Future: Modernization Theory in Cold War America* for an in-depth intellectual history. On the application of these ideas, see Michael E. Lantham, *The Right Kind of Revolution: Modernization, Development, and U.S. Foreign Policy from the Cold War to the Present* (Ithaca: Cornell University Press, 2011)

backstopping for the Public Health Units for the U.S. Foreign Aid Mission[.]”⁹⁹ As the 1960s began and foreign aid consolidated under the USAID, Terry considered re-acquisition of public health expertise under his aegis. Recuperation of this responsibility would have significantly increased its resources and solidly asserted its place in international health. To regain influence, the USPHS attempted to position itself as a contractor to the USAID and negotiate a contract through which it would supply personnel to fill all professional and technical positions at headquarters and in field staff and obtain responsibility for all ICA/USAID health personnel.¹⁰⁰ By providing employees for all international health position, the USPHS estimated at 500 the number of positions created if able to convince the USAID administrators. In addition to this significant increase in personnel, Terry envisaged forming a new specialist group of career officers, described as a “hard core of career International Health Service Officers”, supplemented by the domestic staff serving assignments overseas on a rotating basis, to affirm the USPHS’ place in development programs.¹⁰¹ The Surgeon General based his optimism on international health veteran Louis L. Williams’ assessment that competent public health personnel “with and without foreign experience is a rare commodity” and that the USPHS remained the “single sizable resource of such personnel.”¹⁰² The Surgeon General aimed at reversing the trend of consolidation of international health under foreign aid by positioning his organization as a service provider handling all aspects of human resources.

⁹⁹ Memo from the Surgeon General to the Secretary, “Relationship of the Public Health Service, Department of Health, Education and Welfare, with the Proposed Agency of International Development”, June 30, 1961. Records of the USPHS, Office of International Health, RG 90.130.65.42.2 Box 15, Folder: Coordination, NARA College Park.

¹⁰⁰ Memo from the Surgeon General to the Secretary, “Relationship of the Public Health Service, Department of Health, Education and Welfare, with the Proposed Agency of International Development”, June 30, 1961.

¹⁰¹ Memo from the Surgeon General to the Secretary, “Relationship of the Public Health Service, Department of Health, Education and Welfare, with the Proposed Agency of International Development”, June 30, 1961.

¹⁰² Memo from the Surgeon General to the Secretary, “Relationship of the Public Health Service, Department of Health, Education and Welfare, with the Proposed Agency of International Development”, June 30, 1961.

Appointment of Philip R. Lee as Director of Health Services in the USAID Office of Technical Cooperation and Research in 1963 gave hope that this objective would come to fruition. Lee essentially aimed at turning the USPHS into the personnel arm for field missions and headquarters positions by creating linkages between both organizations. However, Lee faced resistance and lack of interest, but also “there weren't as many positions available to move people into AID.”¹⁰³ As a consequence, assignment of employees to health-related development programs was only “partially successful.”¹⁰⁴ Finally, the USAID was far from relinquishing powers in recruiting and staffing as it began courting universities and graduates to swell its ranks and build its capabilities in undertaking health programs abroad.¹⁰⁵

The legal context and presidential policy for coordination in development aid also limited international participation of the USPHS. Enacted in 1944, the Public Health Service Act (PHSA) restrained USPHS authority to directly assign personnel overseas except to prevent importation of diseases from abroad under foreign quarantine regulations.¹⁰⁶ The USPHS could also send officers overseas to care for the Peace Corps volunteers because of their American citizenship.¹⁰⁷ Additional legislative authority for international cooperation came with the 1960 amendment to the PHSA. The International Health and Medical

¹⁰³ Interview with Philip Randolph Lee by Fitzhugh Mullan, October 5, 1988. History of Health Services Research Project, National Information Center on Health Services Research and Health Care Technology, National Library of Medicine, <http://www.nlm.nih.gov/hmd/nichsr/lee.html>, accessed October 17, 2011.

¹⁰⁴ Interview with Philip Randolph Lee by Fitzhugh Mullan, October 5, 1988.

¹⁰⁵ Eugene P. Campbell, *The A.I.D. and the University in International Health*, Symposium on the Role of the University in International Health, The Johns Hopkins University, February 23, 1962. Records of the CDC, Laboratory Branch - Manuscripts 1952-1964, RG 442.66.A582 Box 2, Folder: Meetings, NARA Morrow, Georgia. James Watt, Director of Division of International Health also attended the symposium but presented training and medical research programs supported by the USPHS.

¹⁰⁶ Public Health Reports, “Public Health Service Act, 1944”, *Public Health Reports*, Vol. 109, No. 4 (July-August, 1944), p. 468. On the debates surrounding its adoption and importance, Lynne Page Snyder, “Passage and Significance of the 1944 Public Health Service Act”, *Public Health Reports*, Vol. 109, No. 6 (November-December, 1944), p. 721-724.

¹⁰⁷ Interview with Philip Randolph Lee by Fitzhugh Mullan, October 5, 1988.

Research Act allowed the USPHS to “encourage, support, and cooperate in the training for, and the planning and conduct of, research, experiments, and studies, diagnoses, treatment, control, and prevention of physical and mental diseases and impairments to mankind, or relating to the rehabilitation of the physically or mentally handicapped.”¹⁰⁸ However, this piece of legislation appears to meet the needs and ambitions of the rapidly growing and research oriented NIH rather than the service oriented CDC. Also, medical research was clearly outside of the USAID mandate, and thus non-threatening to its prerogatives and spheres of interventions. Finally, legislation blocked allocation of USPHS funds in foreign countries aside from the exception listed above. To circumvent this situation, USPHS leaders utilized Public Law 480 which allowed spending foreign currencies amassed by the U.S. government through the sale of agricultural products. Signed by Eisenhower in 1954, and renamed Food for Peace by Kennedy, Public Law 480 permitted the undertaking of various projects such as factory modernization, hospital building or renovation of embassy buildings.¹⁰⁹ Legislative opportunity to increase USPHS authority occurred in 1966 when Johnson introduced the International Health Act which would have enabled the USPHS to directly assign personnel overseas to participate in technical assistance in developing country without entering in contractual negotiations with USAID. The increasing hostility of Congress towards Great Society programs and a perceived shortage of physicians in the U.S. served as explanation for the failure of the bill.¹¹⁰ Consequently, during the 1960s, the CDC

¹⁰⁸ “Legislative News”, *AJPH*, Vol. 49, No. 6, (June 1959), p. 808-809.

¹⁰⁹ The obvious mix of political implications and humanitarian facets of the Food for Peace program is explored in Kristin L. Ahlberg, *Transplanting the Great Society. Lyndon Johnson and Food for Peace* (Columbia: University of Missouri Press, 2008).

¹¹⁰ Interview with David J. Sencer by author, October 26, 2011. Interview with Philip Randolph Lee by Fitzhugh Mullan, October 5, 1988. Lee states that this piece of legislation was low on Johnson’s list of priorities however. Committee on International Health, “Report of the Committee on International Health to the National Advisory Health Council”, June 15, 1966, p. 4. Records of the USPHS, Office of International Health, RG 90.130.67.30.3-4 Box 44, Folder: Committee National Adv. Health Council (International Health), NARA College Park.

needed to work around these limitations for their involvement abroad in international health programs.

Presidential conceptions of cooperation in foreign assistance also limited the growth of international health activities within the USPHS. Consolidation of all technical and economic aid under the USAID was a key reform following Kennedy's election and the new President entrusted all authority to the development agency on matters which "advance our foreign policy objectives." In this reorganization, domestic agencies were to adapt their international activities to the priorities of agencies concerned with matters overseas. Kennedy stated that "international activities of domestic agencies should be clearly either (1) necessary extensions of their normal domestic missions or (2) undertaken on behalf of and in support of programs and objectives of the appropriate foreign-affairs agencies."¹¹¹ These statements however were subject to interpretation and had not simplified the relations between the USPHS and the new international development agencies.

While the USAID was criticized in regards to its mobilization of domestic resources, federal agencies and departments were not exempt from sharp comments as well. Humphrey pointed to the lack of interest of federal agencies, including the DHEW, in international development. Writing to Secretary Abraham Ribicoff, the Senator deplored that despite challenges and opportunities for health expertise in developing countries, the DHEW remained peripheral and had not concluded an agreement on training, recruitment, technical support, and "other efforts." Furthermore, Humphrey blamed the Department for its passive attitude towards the USAID: "there has been a tendency for H.E.W. to wait upon A.I.D. taking the lead, and for A.I.D. to rely on

¹¹¹ Memo from Hubert H. Humphrey, "Re: Coordination in International Technical Assistance – 'Progress Report' on Subcommittee Study", March 6, 1962, p. 23. Records of the USPHS, Office of International Health, RG 90.130.65.42.2 Box 15, Folder: Coordination, NARA College Park.

H.E.W. in doing so.”¹¹² Humphrey looked at Ribicoff to propose novel areas for U.S. development assistance. “I doubt very much that we can look to A.I.D. to take the initiative in soliciting bold new proposals from H.E.W., wrote the Senator. Leadership on the part of your Department which you personally do so well in other areas, is the indispensable ingredient for A.I.D. action, as I see it.”¹¹³ Proposals did come from the USPHS Office of International Health which led the USAID to move into areas such as nutrition and family planning but these contributed to the expansion of activities for the foreign aid agency rather than those of the public health organization.¹¹⁴

For the USPHS, the 1960s were a time of change and increasing marginalization. Despite the support of Humphrey for greater reliance upon domestic agencies in the staffing and policymaking, the USPHS faced legal and administrative barriers to reassert its leading role in the U.S. international health constellation. If opportunities arose in the mid 1960s with the appointment of Philip Lee at the USAID and the introduction of the International Health Act in Congress, they both failed in stimulating greater involvement for the USPHS on the scale envisaged by the Surgeon General at the turn of the decade. How did CDC leaders perceive their contribution in this context? What ideas emerged in Atlanta to chart and exploit opportunities to assist health programs abroad and construct its own international role? Where did the CDC fall in this context of reorganization at the beginning of the ‘development decade’?¹¹⁵

¹¹² Letter from Hubert H. Humphrey to Abraham Ribicoff, May 2, 1962. Records of the USPHS, Office of International Health, RG 90.130.65.42.2 Box 15, Folder: Coordination, NARA College Park

¹¹³ Letter from Hubert H. Humphrey to Abraham Ribicoff, May 2, 1962.

¹¹⁴ Interview with Philip Randolph Lee by Fitzhugh Mullan, October 5, 1988.

¹¹⁵ John F. Kennedy has declared the 1960s the “development decade”. George D. Woods, “The Development Decade in the Balance”, *Foreign Affairs*, Vol. 44, No. 2 (January 1966), p. 206.

2.8 Ambitions for the Future

The CDC experienced the most important growth of its international health activities during the 1960s despite an unfavourable context. This section explores the ambitions of some influential CDC members and presents a brief overview of international contributions of the agency from 1961 to the 1970s. This decade of expansion began with a survey. Soon after Kennedy officially began his Presidency in January 1961 and in the context of the USPHS trying to redefine its role in relation to the reform of technical assistance, the BSS contacted all divisions under its responsibility to evaluate the overall extent of its role in international matters.¹¹⁶ Types of activities included in this large-scale review were diverse: loan of personnel on short or long term for service abroad, attendance to international conferences or expert committees, distribution of publications or films to foreign countries, field trials abroad, training, etc. for the year 1960.¹¹⁷ What it discovered was a lack of a “core program in international health” and instead these activities were a “congeries of bits and pieces supportive of, and incidental of, its domestic programs.”¹¹⁸ Indeed, CDC Branch Chiefs submitted very diverse activities but training, consulting in environmental sanitation and laboratory procedures, attendance to conferences and on committees, development of insecticide-related material (test kits, packaging, sprayers), and finally distribution of audio-visual material dominated the list.¹¹⁹

¹¹⁶ Memo from Chief, Bureau of State Services to Chief, Division of General Health Services, “Survey of BSS Functions in the International Area”, January 30, 1961. Records of the CDC, Office of Chief Files – 1961, RG 442.64.A809 Box 1, Folder: International Cooperation – International Health Act CDC 1960, NARA Morrow, Georgia.

¹¹⁷ Memo from Howard Kline, International Education and Exchange Branch, Division of Community Health Practices to BSS Division Chiefs, “Survey of BSS International Health Activities, February 17, 1961”, March 14, 1961. Records of the CDC, Office of Chief Files – 1961, RG 442.64.A809 Box 1, Folder: International Cooperation – International Health Act CDC 1960, NARA Morrow, Georgia.

¹¹⁸ Memo from Associate Chief for Community Health, BSS, to Division Chief, Community Health Group, “Follow-Up of Community Health Staff Meeting – August 3, 1961”, August 4, 1961. Records of the CDC, Office of Chief Files – 1961, RG 442.64.A809 Box 1, Folder: International Cooperation – International Health Act CDC 1960, NARA Morrow, Georgia.

¹¹⁹ Memo from Clarence A. Smith, Chief, CDC, to Chief, International Education and Exchange Branch, “International Health Activities – CDC, Calendar Year 1960”, March 29, 1960. Records of

In epidemic assistance, Langmuir pointed to a mission to East Pakistan in 1958 to combat a smallpox and cholera epidemic (see chapter 4). In addition to these objectives, the Chief Epidemiologist noted that this assignment contributed to the maintenance of good U.S.-Pakistan relationship, provided a unique training experience for young CDC epidemiologist and stimulated interest in international health work with “a view to improving future recruitment potential.”¹²⁰ CDC’s limited experience abroad would influence propositions for the opening decade.

The opportunity to define what should be CDC’s role in international health in the 1960s came as the BSS asked its constitutive agencies to comment on proposed areas for expansion. Looking for suggestions that would rejuvenate the place of USPHS role, the BSS solicited proposals which could be conducted under the existing framework defined by the Public Health Service Act and those requiring additional legal authority.

Table 2.5: Areas for International Expansion

Under Existing Authority	Additional Authority Needed
Provision of training	Network of new public health training centers
Attendance at international conferences	Support of existing health training centers
Membership on expert panels	Exchange of health workers in public health
Interchange of information, lab material, etc.	Fellowship program for sponsored fellows
Conduct of research, at home or abroad	Intensive training program for foreign interns
Fellowship for research training	Visiting health missions
	Health science at international trade fairs

Source: Memo to Division Chiefs, Community Health Group from Associate Chief for Community Health, “Follow-up of Community Health Staff Meeting – August 3, 1961”, August 4, 1961.

the CDC, Office of Chief Files – 1961, RG 442.64.A809 Box 1, Folder: International Cooperation – International Health Act CDC 1960, NARA Morrow, Georgia.

¹²⁰ Memo from Chief, BSS, to Chief, Division of General Health Services, “Survey of BSS Functions in the International Area”, January 30, 1961, attached document, “International Health Activities of Communicable Disease Center, FY1959.” Records of the CDC, Office of Chief Files, CDC General Files – 1961, RG 442.64.A809 Box 1, Folder: Cooperation International Report on International Hlth Act. CDC 1960, NARA Morrow, Georgia. This epidemic aid mission will be explored in details in chapter 3.

If expansion of international health operations interested division chiefs in Atlanta, they greeted these proposals with a lack of enthusiasm and criticized them for failing to address some of the more pressing issues hindering overseas involvement of the CDC. William J. Brown of the Venereal Disease Branch considered the proposals “to be rather uninspired” and suggested active involvement in the field through demonstration teams and “on the spot” training adjusted to the local situation.¹²¹ Similarly, U. Pentti Kokko of the Laboratory Branch expressed his belief that “more international good will and understanding could be purchased with the same amount of money if it were invested in services” rather than in expensive exhibits.¹²² Furthermore, CDC officials criticized devoting funds and seeking additional authority for medical research as they believed that was “what is needed the least in the under-developed countries.”¹²³ S.W. Simons raised this fundamental issue limiting the extension of the CDC international activities. For the chief of the Technology Branch, the inability to “spend hard Public Health Service money for research, demonstration, and consultation for here or abroad on communicable diseases whether or not they are indigenous to the United States” needed to be addressed by acquiring additional authority or through budgetary justifications.¹²⁴ The Training Branch also expressed its enthusiasm for an

¹²¹ Memo from Chief, Venereal Disease Branch to Assistant Chief, CDC, “Program proposal in the field of international health”, August 11, 1961. Records of the CDC, Office of Chief Files, CDC General Files – 1961, RG 442.64.A809 Box 1, Folder: Cooperation International Report on International Hlth Act. CDC 1960, NARA Morrow, Georgia.

¹²² Kokko and the staff of the Laboratory Branch also pointed out the possible “Ugly American” issues deriving from increased involvement by the USPHS/CDC. Memo from U. Pentti Kokko, Deputy Chief, Laboratory Branch to Assistant Chief, CDC, “Program Proposals in the Field of International Health”, August 11, 1961. Records of the CDC, Office of Chief Files, CDC General Files – 1961, RG 442.64.A809 Box 1, Folder: Cooperation International Report on International Hlth Act. CDC 1960, NARA Morrow, Georgia.

¹²³ Memo from Alan Donaldson, Acting Chief, CDC, to Chief, Program Officer, BSS, “*Follow-up of Community Health Staff Meeting – August 3, 1961*”, August 15, 1961. Records of the CDC, Office of Chief Files, CDC General Files – 1961, RG 442.64.A809 Box 1, Folder: Cooperation International Report on International Hlth Act. CDC 1960, NARA Morrow, Georgia.

¹²⁴ Memo from S.W. Simons, Chief, Technology Branch to Assistant Chief, CDC, “Program Proposals in the Field of International Health”, August 11, 1961. Records of the CDC, Office of

extension of international activity and additional authority for the CDC but the proposed involvement remained indirect. Its chief, Donald Martin, suggested the translation and adaptation of existing material to meet local needs and circumstances.¹²⁵ In general, these CDC leaders argued for involvement in projects which offered services to developing countries rather than participation in research programs abroad whose benefits were far less certain and their impact on local populations less immediate.

Among the proposals, the most detailed and ambitious response to the BSS request came from Langmuir. During his tenure as Chief Epidemiologist, Langmuir showed a deep interest for international health issues and encouraged some EIS officers to focus on health problems abroad and pursue careers and assignments overseas.¹²⁶ He also cultivated his connections within the U.S. government with influential members of the international health community such as James Watt who served as Assistant Surgeon General at the Office of International Health from 1961 to 1968 and Philip Lee, director of health services at the USAID.¹²⁷ Langmuir took full advantage of this request for proposals to

Chief Files, CDC General Files – 1961, RG 442.64.A809 Box 1, Folder: Cooperation International Report on International Hlth Act. CDC 1960, NARA Morrow, Georgia.

¹²⁵ Memo from Donald S. Martin, Chief, Training Branch, CDC, to Assistant Chief, CDC “Program Proposals in the Field of International Health”, August 14, 1961. Records of the CDC, Office of Chief Files, CDC General Files – 1961, RG 442.64.A809 Box 1, Folder: Cooperation International Report on International Hlth Act. CDC 1960, NARA Morrow, Georgia.

¹²⁶ Almost all participants readily pointed to Langmuir as one of the driving forces behind the increasing presence of CDC in international programs and assignments overseas. Surprisingly, Alan W. Donaldson, who spearheaded some initiatives, was never mentioned. Perhaps, this can be attributed to the people approached from this research who in majority are former EIS officers and thus closer to Langmuir than Donaldson who held more administratively-oriented position. Interview with William H. Foege by author, September 23, 2011. Interview with Don Millar by author, November 17, 2010. Interview with D.A. Henderson by author, August 18, 2010. Interview with Philip S. Brachman by author, October 5, 2010. Interview with David J. Sencer by author, October 26, 2010.

¹²⁷ David Sencer explained that Langmuir and Watt were long time friends and knew each other very well. Prior to his assignment to the Office of International Health, James Watt served as director of the National Health Institute and had conducted epidemiological studies major diarrheal diseases in the U.S. which lead to control measures. Interview with David J. Sencer by author, October 26, 2010. On Lee and Langmuir, Interview with Philip Randolph Lee by Fitzhugh Mullan, October 5, 1988. Henry Fountain, “James Watt, 84, Former Chief of Heart Institute”, *New*

articulate his vision and views on the development of international activities in the Epidemiology Branch. “Epidemiology Branch is warmly sympathetic to a *major* expansion of international health activities”, readily stated the Chief epidemiologist, “CDC should strive to become a world center for the control of communicable diseases.”¹²⁸ Deploing the haphazard and opportunistic character, and the lack of structure and purpose of the Epidemiology Branch’s involvement overseas, Langmuir desired to improve the situation by creating a dedicated “International Epidemiological Service” which would extend the EIS model of investigation applied in the U.S. to respond to foreign calls for assistance. These multi-professional teams of investigators, Langmuir argued, would be tailored to meet the specificities of each situation. In addition, he proposed offering consulting services for disease surveillance and the practical aspects of sampling and surveys applied to health problems such as immunization programs. A crucial aspect of these proposals and requests for additional authority to pursue these objectives was Langmuir’s insistence on keeping this expertise in Atlanta and not delegating these services to other organizations. Furthermore, these suggestions constituted “only part of the expanded international activities visualized for the CDC.”¹²⁹ Unfortunately for us, Langmuir did not define these other areas.

One major obstacle, according to Langmuir, was the lack of personnel to build these capabilities: “The seven proposals for BSS International Activities [...] are all good insofar as they go, but they hardly strike at the root of the problem. [...] Nowhere do we see emphasis either on the present dearth of qualified American

York Times, September 29, 1995, <http://www.nytimes.com/1995/09/29/obituaries/james-watt-84-former-chief-of-heart-institute.html>, accessed October 20, 2011.

¹²⁸ Aside from those of the Training branch, other proposals from CDC were only a paragraph long while Langmuir’s document had 3 pages. Memo from Alexander D. Langmuir, Chief, Epidemiology Branch to Chief, CDC, “Expansion of International Health Activities”, August 14, 1961, p. 1. Records of the CDC, Office of Chief Files, CDC General Files – 1961, RG 442.64.A809 Box 1, Folder: Cooperation International Report on International Hlth Act. CDC 1960, NARA Morrow, Georgia. Emphasis added.

¹²⁹ Memo from Alexander D. Langmuir, Chief, Epidemiology Branch to Chief, CDC, “Expansion of International Health Activities”, August 14, 1961, p.3

personnel interested in international problems, or on the necessity of providing a continuing flow of such professional personnel in the future.”¹³⁰ Accordingly, his plan addressed the need to meet the shortage of qualified staff with “some knowledge of international problems.” To remedy the inexperience of CDC epidemiologists in this area, Langmuir encouraged some of his EIS officers to become more familiar with tropical medicine and diseases in developing countries by further concentrating on these topics. As noted above, academic departments of international health in the U.S. were in their infancy leaving CDC members such as Ron Roberto, Robert Scholtens, Donald Millar and Robert Kaiser to pursue post-graduate studies at the London School of Hygiene and Tropical Medicine, one of the world’s foremost institutions. Training in London, Robert Scholtens explains, gave members of the Epidemiology Branch credentials to participate, and eventually assume leadership roles, in international health programs.¹³¹

Langmuir’s proposal formed the core of the CDC’s comments in response to the BSS survey. It distinguished itself by going beyond training, research and demonstrational activities considered in Washington by favouring direct interventions abroad and build-up of knowledge and expertise in Atlanta.¹³² Judging by the length of the memorandum and the detailed nature of the suggestions, Langmuir attempted to fully exploit this opportunity to position his Epidemiology Branch as a key site and building block within the CDC and the USPHS as whole in the envisioned extension into international health.

¹³⁰ Memo from Alexander D. Langmuir, Chief, Epidemiology Branch to Chief, CDC, “Expansion of International Health Activities”, August 14, 1961.

¹³¹ Interview with Robert G. Scholtens by author, November 11, 2010. Interview with Don Millar by author, November 17, 2010.

¹³² Memo from Alan Donaldson, Acting Chief, CDC, to Chief, Program Officer, BSS, “*Follow-up of Community Health Staff Meeting – August 3, 1961*”, August 15, 1961.

2.9 International Health in Atlanta: the 1960s

The following chapters will explore in more details how the CDC extended its tentacles and became deeply involved in some of the major international health programs of the 1960s and 1970s. However, a brief survey of international health activities overseas provides an indication of the importance given to this field during the decade, and especially during David Sencer's directorship from 1966 to 1977. But what were the aftermaths of the review by the Bureau of States Services?

In the wake of the BSS survey of 1961, the USPHS took few actions to strengthen its international health activities and obtain additional authority until the failed passage of the International Health Act discussed above. A reform raising the level of international health from a Division to an Office in 1963 was essentially a cosmetic measure as responsibilities remained essentially the same. The Office of International Health served as a contact point within the U.S. government for multilateral organizations and foreign governments, advised other federal agencies on health issues and administered fellowships aimed at foreigners.¹³³ For the CDC specifically, the propositions were still caught in the USPHS bureaucracy two years after the BSS's initial request for comments. James Goddard still demanded clarifications and additional authority to operate on an "international basis" and funds for such operations.¹³⁴ Despite Langmuir's desire to move away from haphazard and ad hoc involvement overseas, this pattern would essentially remain the same throughout the decade. As Sencer recalled, "It was a question of seeing an opportunity and latching on to it rather than... We knew we wanted to move in that direction but had to do it by stealth rather than

¹³³ Memo from David E. Price, Acting Surgeon General to Bureau and Division Chiefs, "Establishment of Office of International Health", May 7, 1963. Records of the CDC, Bureau of Tropical Diseases, RG 442.74.A610 Box 52, Folder: Cooperation 2-3, Foreign Governments CY 1963, NARA Morrow, Georgia.

¹³⁴ "Outline of Major Areas of Proposed Participation in International Health" July 2, 1963. Records of the CDC, Bureau of Tropical Diseases, RG 442.74.A610 Box 52, Folder: Cooperation 2-3, Foreign Governments CY 1963, NARA Morrow, Georgia.

true planning.”¹³⁵ Consequently, within the CDC, international health activities were never regrouped under a single administrative unit handling all operations abroad. Rather, the interface with international organizations, programs or the USAID was located at the program level such as the Office of Malaria Eradication, the Surveillance Section or the Technology Branch.¹³⁶

Lack of authority to utilize CDC funds abroad also limited international health activities and made the organization dependant upon other agencies to undertake projects abroad. “We were still limited in undertaking new work other than perhaps outbreak control and training and things like that by the budgetary limitations”, explains Sencer, “We could spend the quarantine money to prevent disease from coming in and to look at outbreaks but if you say you want to undertake working in Africa on malaria, we were dependant on other people for funding.”¹³⁷ During his directorship, Sencer found creative ways to make funds available for spending in international activities. After the CDC acquired the Foreign Quarantine service from the Office of the Surgeon General in 1967 and significantly cut the workforce, Sencer was able to retain control of saved funds to finance the deployment of EIS officers (especially in India) in support of the Indian smallpox eradication campaign. Furthermore, the CDC contributed financially, on a limited scale, by paying the salaries of personnel assigned to the WHO, such as D.A. Henderson as he headed the Smallpox Eradication Program and Rafe Henderson during his assignment to the Expanded Program on Immunization in the mid 1970s.¹³⁸

In the early 1960s, involvement overseas mainly concerned the staff of the Technology Branch which developed and tested equipment and insecticides for

¹³⁵ Interview with David J. Sencer by author, October 26, 2010. In Atlanta, an Office of International Health Activities existed but it handled foreign visitors and trainees rather than overseas activities.

¹³⁶ Interview with William H. Foege by author, September 23, 2011.

¹³⁷ Interview with David J. Sencer by author, October 26, 2010.

¹³⁸ Interview with David J. Sencer by author, October 26, 2010. Interview with William H. Foege by author, September 23, 2011.

vector control/eradication programs (covered in chapters 5 and 6) and EIS officers dispatched on short term missions overseas. This latter service rapidly developed and served as a bridgehead for the CDC's international health activities. Overseas missions of these epidemiologists were generally related to either the investigations of outbreaks or temporary assignments to various Peace Corps operations. Five years after Langmuir's proposal to increase the international involvement of the EIS program, the objective had been reached despite an unchanged legal context and absence of a service specializing in international health issues. For instance, in ten months in 1965, EIS officers had participated in more missions overseas than during the previous decade.

Table 2.6: EIS Officers Overseas (January-October 1965)

EIS officer	Country	Disease/Duty	Dates
Lawrence K. Altman	United Kingdom	Food-born diseases	April 21 - 23
Palmer Beasley	Bolivia-Columbia	Plague	March 4 – April 16
Mathew A. Budd	Togo - Upper Volta	Measles and smallpox	January 31 – April 26
Richard N. Collins	Bolivia	Plague	March 14 - April 16
Pierce Gardner	Togo – Upper Volta	Measles and smallpox	January 1 – April 19
Bernard S. Goffe	Turkey	Peace Corps	June 1 to October 1
Donald W. Helbig	Brazil	Peace Corps	May 31 – August 28
George Miller	Honduras	Measles	February 15 – April 15
George Miller	Cameroon	Measles	June 1 - 30
Alan J. Ominsky	Malawi	Peace Corps	May 31 – October 5

Source: *Communicable Disease Center International Activities, April-May-June 1965*, Records of the CDC, Bureau of Tropical Diseases, RG 442.74.A610, Box 52, Folder: Cooperation 1 – Consultant Services

In addition to disease investigations and Peace Corps duties, CDC members assisted countries such as Jamaica or the USAID with immunization campaigns for measles, polio or smallpox. This would pave the way for CDC management and implementation of the West African Measles Control and Smallpox

Immunization programs from 1967 to 1971, and later participation in the WHO's campaign against smallpox in South America, Asia and Africa.¹³⁹

Development of international health activities in Atlanta also unfolded through the participation on committees and domestic programs involving a bilateral cooperation element or foreign policy implications. From 1964 to 1968, CDC administered the *Aedes Aegypti* eradication program in the U.S. after pressures from Latin American countries, which had eliminated the vector of yellow fever, and lobbying from Fred L. Soper, PAHO's former director. The Nixon administration finally curtailed the program as it came into office.¹⁴⁰ The Atlanta-based agency was involved in discussions in 1965, albeit on very moderate scale, for the creation of a Disease Eradication Authority which would have managed domestic and international efforts of the U.S. government for the eradication of various diseases: malaria, smallpox, syphilis, cholera, measles, gonorrhoea, etc.¹⁴¹ Other collaborations included the CDC taking over the NIH at the SEATO Cholera Research Laboratories in Dacca where it assigned personnel to a

¹³⁹ This involvement will be further discussed in Chapter 4. On CDC and the West African Campaign, Horace G. Ogden, *CDC and the Smallpox Crusade* (Atlanta: Centers for Disease Control, 1987). D.A. Henderson. *Smallpox. The Death of a Disease* (Amherst, New York: Prometheus Book, 2009), chapter 2 and 5. William H. Foegen, *House on Fire: The Fight to Eradicate Smallpox*. Frank Fenner et al., *Smallpox and its Eradication* (Geneva: World Health Organization, 1988), chapter 17. Later involvement in Bangladesh is documented in Paul Greenough, "Intimidation, Coercion and Resistance in the Final Stages of the South Asian Smallpox Eradication Campaign, 1973-1975", *Social Science and Medicine*, Vol. 41, No. 5 (1995), p. 633-645.

¹⁴⁰ According to Ethridge and Sencer, the CDC was reluctant in accepting responsibility for the program. In an interview, David Sencer maintained that Soper was causing problems for CDC and did not realize that the 1960s U.S. was not 1950s Brazil. CDC's former director was physically hit by Soper over divergences on the pertinence of the *Aedes Aegypti* eradication campaign. Elizabeth Etheridge, *Sentinel for Health*, p. 122-124. Interview with David J. Sencer by author, October 26, 2011. David J. Sencer, email to author, October 26, 2011.

¹⁴¹ Memo from James Watt, Director, OIH, to Wilbur J. Cohen, Under Secretary, "Disease Eradication", August 12, 1965 and enclosure, Records of the USPHS, Office of International Health, RG 90.130.67.29.5 Box 24, Folder: Disease Eradication, NARA College Park. The Office of International Health consulted Alexander Langmuir on the feasibility and costs of eradicating cholera.

multinational staff to investigate a variety of diarrheal diseases and a similar collaboration with the Middle America Research Unit in Panama.¹⁴²

Increasing international involvement of CDC personnel brought the agency in contact with emerging diseases. These exotic viruses were added to the more classical communicable diseases which had, until then, concerned epidemiologists and laboratory personnel. Investigation of these new pathologies started with the investigation of Marburg disease in West Germany and Bolivian hemorrhagic fever in 1967 followed by Lassa fever from 1969 onward. Consolidation of the field of emerging viruses, however, would take place starting in the mid-1970s as new laboratories were built in Atlanta and a field station for the study of Lassa fever was established in Sierra Leone, and after the first outbreaks of Ebola fever in 1976.¹⁴³

2.10 Conclusion

This chapter is a short review of the growing international activities in Atlanta and the political economy of expertise in the emerging field of international health in the U.S. government in the 1950s and 1960s. The context in which the CDC expended its overseas operations starting in the 1950s was never favourable in terms of legal authority and policy for international development. With the rising importance of foreign assistance from the mid-1950, and in full stride following the Kennedy election, the USPHS lost its quasi-monopoly of international health public expertise recruitment and staffing responsibilities for field missions in favour of technical assistance agencies. Therefore to better

¹⁴² Philip Brachman has described this collaboration as one of the most beautiful international health endeavour of the CDC, which continues to this day. Interview with Philip S. Brachman by author, October 5, 2010. *International Health Activities of the Public Health Service*, January 18, 1966, p. 10. Records of the CDC, Office of Director Files 1965-1966, RG 442.69.A338 Box 2, Folder: Cooperation 2-2 1965-1965, NARA Morrow, Georgia.

¹⁴³ Elizabeth Etheridge, *Sentinel for Health*, p. 179, 211, 213, 215, 218-219. On the emerging diseases as a growing of concern with the U.S., see Nicholas B. King, *Infectious Disease in a World of Goods*, Thesis (Ph.D.), Harvard University, 2001.

understand how the CDC grew as an international actor, we must look at individual ambitions and interest in taking part in assisting foreign nations, development agencies or multilateral organizations. CDC leading figures such as S.W. Simons, Alexander Langmuir, Alan Donaldson and David Sencer, preceded by Justin Andrews, shared a vision of an organization providing services to various states coupled with resources unique to the Atlanta-based institution such as the EIS program. The Epidemiology Branch emerged as one of the key sites within the CDC which viewed international health endeavours in the most favourable light. These assets positioned the CDC advantageously to expand its international activities despite a difficult context and the inability to utilize its funds overseas except under very specific circumstances. If during the period, international health activities were never structured, planned or expanded in an orderly way, CDC leaders compensated by recognizing opportunities to project its personnel and expertise from Atlanta to lands overseas. Taking advantage of these opportunities was associated with the ability to forge alliances with different types of actors through various types of strategies. Let us now turn to a first pathway and alliance: technology in the fight against smallpox.

Chapter 3: Technological Pathways – The Case of Jet Injectors (1962-1970)

3.1 Introduction

Reminiscing on his experience as head of the World Health Organization's Smallpox Unit, Donald A. Henderson wrote on the problems faced by the eradication program in the early 1960s. Pointing to the limits of traditional methods, he noted: "There were many vaccination failures, and the procedure itself was time-consuming. We needed a technological innovation."¹ More than 40 years before, Lyndon Johnson made an argument along similar lines when pledging U.S. support to the Global Smallpox Eradication Program: "A highly efficient vaccine is available, and the recent development of jet injection equipment makes it possible to vaccinate entire communities with relative ease."² The development of gun-shaped devices which administered vaccines using air pressure forced through a narrow hole is signalled as one factor leading to WHO's Intensified Smallpox Eradication Program announced in 1967.³ New immunization technology, it was thus maintained, would be one condition for successful of smallpox eradication.

During the 1960s, the CDC became intimately associated with jet injection technology in international health operations. From 1962 to 1970, the CDC Surveillance Branch and Smallpox Unit actively participated in testing, assessing, improving, deploying and using jet injectors on four continents to fight smallpox and, to a lesser extent, measles. It worked with engineers during the inception of the jet injectors to improve and adapt them to overseas, i.e. tropical vaccination operations. My objective in this chapter is to follow how the CDC associated with

¹ Donald A. Henderson, *Smallpox: The Death of a Disease* (Amherst, NY: Prometheus Book, 2009), p. 68.

² White House Press Release, May 18, 1965, Records of the OASH, Office of International Health, RG 514.130.71.3.3, Box 6, Folder: Diseases – Smallpox Eradication, NARA College Park.

³ Frank Fenner *et al.* *Smallpox and its Eradication* (Geneva: World Health Organization, 1988), p. 577.

jet injectors and subsequently utilized them to expand its international health activities. As will be demonstrated, jet injectors opened pathways for participation in international health. A second aim of this chapter is to illustrate how CDC planners integrated this technology in policy proposals and campaign planning.

Through their various field trials and assessment activities, CDC epidemiologists gradually appropriated the technology, established their expertise and ultimately defined how and where it could be best used. It also specified what skills were required by its operators to make best use of the equipment. In this chapter, I show that those activities of testing, measuring and deploying opened pathways for CDC participation in international health activities. Far from contending that it is simply technology, in the sense of technological determinism, which opened opportunities for overseas operations, I rather maintain that CDC epidemiologists gradually, through a series of steps, realized the potential of jet injectors for the global smallpox eradication program and proceeded to carve a role for their agency by associating jet injectors with the CDC. It was understood by Henderson, Millar and other CDC members involved in jet injector field studies that the technology was to be supplemented by additional elements such as disease surveillance, prompt reporting and political commitment in order to achieve total eradication. However, as demonstrated by the above quotations, initial attention crystallized around the injectors, rather than abstract concepts of surveillance, as they became embodiments of technology pitted against an age-old scourge.

I begin this chapter by situating the jet injector among the various methods utilized for smallpox vaccination during the twentieth century and trace back the invention of this new immunization technology and its early applications. I then describe how the CDC got involved in the technology by collaborating with Army engineers to apply it to smallpox vaccination specifically and subsequently

carried out field studies concerning vaccine potency when administered by jet injectors. The next section of this chapter explores how the Smallpox Unit deployed the devices in the first jet injector-based campaign carried out on the Tonga Islands in the South Pacific and why the CDC initially failed in testing its technology in an endemic country, namely India. Being unable to send its epidemiologists and equipment in South Asia, the CDC finally conducted the first trials of jet injectors specifically in Brazil. As I illustrate, it was those trials which framed jet injectors as technological breakthroughs and provided an opportunity to propose a regional eradication campaign in which the CDC would have played a primary role. Assessment activities thus meshed with program planning as jet injectors were embedded in eradication schemes for the Americas.

Table 3.1: A Short Chronology of Smallpox Eradication

1950 – Pan American Sanitary Conference adopts smallpox eradication resolution
1959 – Russian proposal to eradicate smallpox adopted by the World Health Assembly
1965 (May) – US Commitment to smallpox eradication at World Health Assembly
1965 (Nov.) – US announces West African Smallpox Eradication and Measles Control Program
1967 – WHO launches Intensified Smallpox Eradication Program
1968 – Introduction of bifurcated needles
1980 – Declaration of smallpox eradication at World Health Assembly

Even if those plans were thwarted, another window opened in West Africa when the United States Agency for International Development (USAID) campaign against measles encountered several difficulties, including failing to make full use of the jet injectors' capabilities. After examining how Henderson kept a potential rival at bay, I review vaccination practices during colonial days and describe how CDC planners envisioned the deployment of jet injectors in West Africa and sought to align diverse elements to capitalize on the rapid vaccination pace thought possible with their technology. My focus, therefore, is not so much on

how the campaign was carried out as it was the subject of distinct monographs and a website.⁴ Rather, I concentrate on strategies originally devised prior to the beginning of the campaign and on how different vaccination techniques entailed different skills as emphasized in training material elaborated by the CDC. I then return to India and how jet injectors, Cold War strategy and attitudes towards technology in the Johnson administration intermeshed and laid the basis for future, albeit indirect, CDC participation. After addressing issues of reliability and the effect of the introduction of the bifurcated needle, I conclude this chapter by discussing the CDC's strategic position regarding the technology and prevailing international health ideology to explain the concurrent rise of jet injectors and Atlanta-based agency in international health.

3.2 Immunization Techniques Old and New

Several methods of vaccinations coexisted prior to and during the Global Smallpox Eradication Program. Here, I briefly present a number of vaccination techniques commonly used from the 1950s until the end of the WHO's eradication program.⁵ Dermal scarification or single scratch technique, the process by which the vaccine was introduced by rubbing it in a scratch made with a needle, a knife or a lancet had been in use since the late 18th century. Despite being the oldest technique, dermal scarification remained in favour throughout the 20th century and was widely practiced in developing countries because of its simplicity in use and because it could be performed with a wide

⁴ Horace G. Ogden, *CDC and the Smallpox Crusade* (Atlanta and Washington D.C.: U.S. Dept. of Health and Human Services, Public Health Service, Centers for Disease Control, 1987). William H. Foege, *House on Fire: The Fight to Eradicate Smallpox* (Berkeley: University of California Press, 2011). Donald A. Henderson, *Smallpox: The Death of a Disease*. Bob H. Reinhardt, "The Global Great Society and the US Commitment to Smallpox Eradication", *Endeavour*, Vol. 34, No. 4 (2010), p. 164-172. The Global Health Chronicles, www.globalhealthchronicles.org

⁵ For a complete overview see Derrick Baxby, "Smallpox Vaccination Techniques; From Knives and Forks to Needles and Pins", *Vaccine*, No. 20 (2002), p. 2140-2149.

variety of instruments.⁶ In the early 20th century, the multiple-pressure method was developed in the United States. Vaccinators placed a drop of vaccine on the skin and inserted it utilizing a straight surgical needle held parallel to the skin and pressed 10 times for primary vaccination and 30 times for revaccination.⁷ This technique required a fair amount of skill as it was thought necessary not to draw blood by pressing too deep into the skin, and vaccinators had to ensure that enough vaccine was entered into the epidermis.⁸

Aside from vaccination techniques, instruments adapted specifically to smallpox vaccination were also developed. One of the best-known is the rotary lancet. Originally invented in England, rotary lancets were used mostly in India during the smallpox eradication campaign but this painful procedure often led to resistance or refusal of vaccination. Furthermore, sterilization procedures were time consuming and the instrument led to vaccine wastage.⁹ In 1964, the WHO recommended stopping its use but rotary lancets remained prevalent mostly in India and adjacent countries.¹⁰ It was in this context that jet injectors were developed and deployed for smallpox immunization.

Although the technology of jet injection was first patented in the 1930s, its application to smallpox immunization did not start until the beginning of the 1960s.¹¹ During the 20th century, jet injectors underwent several modifications and improvements but it was after World War II that considerable interest in the technology became apparent. Pioneered by Robert Andrew Hingson and others in the 1940s, clinicians first used the gun-shaped device to inject under high

⁶ Harald Fredericksen, "Strategy and Tactics for Smallpox Eradication", *Public Health Reports*, Vol. 77, No. 7 (July 1962), p. 619. Derrick Baxby, "Smallpox Vaccination Techniques", p. 2144-2145.

⁷ Frank Fenner *et al.*, *Smallpox and its Eradication*, p. 292

⁸ Derrick Baxby, "Smallpox Vaccination Techniques" p. 2146

⁹ Henry M. Gelfand, "A Critical Examination of the Indian Smallpox Eradication Program", *American Journal of Public Health*, Vol. 56, No. 10 (October 1966), p. 1648.

¹⁰ Frank Fenner *et al.* *Smallpox and its Eradication*, p. 293.

¹¹ M.L. Lockhart, "U.S. Patent Application no. 69, 119, March 16, 1936" quoted in J. Warren *et al.*, "Large-scale Administration of Vaccines by Means of an Automatic Jet Injection Syringe", *JAMA*, Feb. 19, Vol. 158, No. 8 (1955), p. 633-637.

pressure and through a narrow orifice a single dose of local anaesthetics, insulin and other antibiotics.¹² Those early models were powered by electrical generators and used in clinical settings. Additionally, their inventors were mainly concerned with reducing pain associated with syringes and needles and preventing contamination rather than accelerating the pace of mass vaccination campaigns.¹³ Thus, their initial inventors considered jet injectors as tools of clinical revolution.

Public health experts recognized the potential of jet injectors for mass vaccination programs first in the United States and subsequently abroad. During the 1950s, the military and foreign assistance agencies deployed injectors in the U.S. and abroad. Improving on earlier design, the U.S. military developed a device which allowed multi-dose semiautomatic operation and subsequently adopted the technology for use on recruits in 1954.¹⁴ Usage on civilian populations, however still needed to be validated. In the late 1950s, the International Cooperation Administration (ICA) began experimenting with the injectors by mounting the heavy electrical generators on trucks and cars to create mobile vaccination stations to immunize against cholera and typhoid in East Pakistan (now Bangladesh) during an epidemic in 1958.¹⁵ According to the report from this demonstration, jet injectors opened a “new horizon in mass inoculation.”¹⁶ While coverage rates varied greatly, the effect of these factors could be attenuated with proper education and propaganda to encourage

¹² R.A. Hingson and J.G. Hughes, “Clinical Studies with Jet Injection: New Method of Drug Administration”, *Anesth. & Analg.*, Vol. 26, No. 221, (1947), p. 221-230. H.L. Hirsh *et al.*

“Administration of Penicillin and Streptomycin by Means of the Hypospray Apparatus (Jet Injection): Absorption, Toxicity, and Stability”, *J. Lab. & Clin. Med.*, Vol. 33, (1948), p. 805–810.

¹³ Robert A. Hingson and Winifred M. Pitkin, “Hypodermic Injection Device”, *JAMA*, Vol. 184, No. 4 (April 27, 1963), p. 147. F.H. Figge and D.J. Barnett, “Anatomic Evaluation of a Jet Injection Instrument Designed to Minimize Pain and Inconvenience of Parental Therapy”, *Am. Practitioner*, Vol. 197, No. 3, (1948), p. 197.

¹⁴ J. Warren *et al.*, “Large-scale Administration of Vaccines by Means of an Automatic Jet Injection Syringe”, p. 634. Frank Fenner *et al.*, *Smallpox and its Eradication*, p. 574.

¹⁵ Richard L. Towle “New Horizon in Mass Inoculation”, *Public Health Reports*, Vol. 75, No. 6, (June 1960), p. 471-476.

¹⁶ Richard L. Towle, “New Horizon in Mass Inoculation”, p. 476.

people to congregate around vaccination sites.¹⁷ Following this demonstration, international development agencies and humanitarian organizations used jet injectors during the 1960s in mass vaccination programs against cholera and other diseases in Central and South America.¹⁸

In the mid-1950s, the U.S. military conducted experiments combining smallpox vaccines with jet injectors. Despite administering the vaccine subcutaneously rather than intradermally as was the case with older vaccination techniques described above, Army researchers found that enough vaccine was left in the skin to confer immunity in both children and adults.¹⁹ Despite this, intradermal injections remained preferable. Established during the 1910s, the advantages of intradermal vaccinations for a range of diseases (BCG, smallpox) in terms of reduction of doses and post-immunization immune response were known to the scientific and medical community.²⁰ Interest in this technique renewed during the 1930s but technical difficulties in preventing infections and designing clinical trials, despite showing notable improvement over traditional methods, led to a decline in its popularity.²¹ The development of a special nozzle attached to the jet injectors offered the means to circumvent obstacles while retaining the advantages of intradermal vaccination. Invented by Aaron Ismach, an Army engineer, in 1962, this nozzle maximized the amount of vaccine deposited intradermally, ensuring higher take rates.²² It was following this development that the CDC actively participated in experiments and field operations involving jet injectors.

¹⁷ Richard L. Towle, "New Horizon in Mass Inoculation", p. 475.

¹⁸ Frank Fenner *et al.*, *Smallpox and its Eradication*, p. 574.

¹⁹ Bennett L. Elisberg *et al.* "Vaccination against Smallpox. II. Jet Injection of Chorio-Allantoic Membrane Vaccine", *Journal of Immunology*, Vol. 76 (1956), p. 340-351.

²⁰ Paul Henri Lambert and Philippe E. Laurent, "Intradermal Vaccine Delivery: Will New Delivery Systems Transform Vaccine Administration?", *Vaccine*, Vol. 26 (2008), p. 3198

²¹ J. Donald Millar *et al.* "Smallpox Vaccination by Intradermal Jet Injection. 1. Introduction, Background and Results of Pilots Studies", *Bull Wld Hlth Org*, Vol. 41 (1969), p. 750.

²² Horace G. Ogden, *CDC and the Smallpox Crusade*, p. 16.

Aside from the development of the intradermal nozzle, another critical decision made jet injectors suited for smallpox vaccination, especially overseas: their compatibility with freeze-dried vaccines. If industrialized countries were able to eliminate smallpox using wet vaccine, it was due to well developed health services, extensive transportation networks and the existence of a “cold chain” which preserved vaccine potency.²³ Attempts to utilize fresh vaccine met with failure as travel distance and high temperatures combined to render it useless in tropical settings. Colonial powers soon recognized the problem of vaccines losing their potency in the late 19th century and early 20th century when trying to immunize their possessions. One of the strategies adopted was installing wet vaccine production facilities in their colonies to minimize travel distance. France however took another road and developed methods to produce dry smallpox vaccines. Robert Wurtz working at the French Vaccine Institute in Paris invented a technique at the end of the 19th century to produce dried vaccines.²⁴ This new type of vaccine was conceived with the Tropics in mind as it was used in an expedition in Ethiopia in 1894 and resulted in 250,000 vaccinations.²⁵ Improving on this breakthrough, Lucien Camus, a student of Wurtz, started producing a heat stable vaccine using a freeze-drying technique which enabled large scale production. Scientists in other countries began to work on producing such dried-vaccine and improved production methods during the 1930s and 1940s.²⁶

Freeze-dried vaccines received the endorsement of international health organizations at the end of the 1940s which stimulated their production and adoption in regions not under colonial rule. In 1948, a study group on smallpox vaccine set up by the nascent WHO noted that freeze-dried vaccines were especially well-adapted for tropical environments. In the Americas, the Director

²³ Frank Fenner *et al.*, *Smallpox and its Eradication*, p. 285.

²⁴ William H. Schneider, “Smallpox in Africa during Colonial Rule”, *Medical History*, Vol. 53, No. 2 (2009), p. 212.

²⁵ William H. Schneider, “Smallpox in Africa during Colonial Rule”, p. 212.

²⁶ Frank Fenner *et al.*, *Smallpox and its Eradication*, p. 286.

of the Pan American Health Organization (PAHO) suggested to the National Institutes of Health (NIH) to study “appropriate methods for production of freeze-dried smallpox vaccines [.]”²⁷ The Division of Laboratories in Lansing Michigan devised processes for the production of freeze-dried vaccines dispensed in small tubes and first used commercially in the Americas by Peru in 1953.²⁸

While freeze-dried vaccine proved better adapted to tropical environments where smallpox was still prevalent, if not endemic, they did not displace completely wet vaccines. In India, for example, public health authorities continued resorting to fresh vaccine to carry their campaign against smallpox. Reluctance on their part to adopt freeze-dried vaccines until the 1960s and 1970s derived from nationalist concerns, vested industrial interests and the policy of technology autonomy pursued by the government.²⁹ Despite this, all trials and campaigns done using jet injectors were carried out with freeze-dried vaccine.

The association of the CDC with jet injectors began in 1963 when its epidemiologists collaborated with Army medical personnel in a series of trials in the United States. While these studies were generally confirmatory of earlier experiments concerning vaccine dosage and take rates, they were nonetheless a fundamental first step in establishing CDC credibility in smallpox immunization and expertise with jet injectors. Carried out in State and Federal prisons from 1963 onward and extended to Jamaica from July to September of the same year³⁰, these field trials were designed to determine a series of factors such as the maximum dilutions possible to trigger immune response, the amount of vaccine necessary in revaccinations and direct comparison of multiple-puncture

²⁷ Frank Fenner *et al.*, *Smallpox and its Eradication*, p. 286.

²⁸ Frank Fenner *et al.*, *Smallpox and its Eradication*, p. 286.

²⁹ Sanjoy Bhattacharya, *Expunging Variola: The Control and Eradication of Smallpox in India, 1947-1977* (New Delhi: Orient Longman, 2006), p. 91-96.

³⁰ Horace G. Ogden, *CDC and the Smallpox Crusade*, p. 17.

with jet injection.³¹ Those studies concluded that intradermal jet injection produced responses indistinguishable both clinically and serologically from the multiple-pressure technique at higher dilutions of vaccine.³² Higher dilutions of vaccine, Millar and his colleagues suggested, meant significant vaccine economy.³³

Figure 3.1: A Jet Injection Device

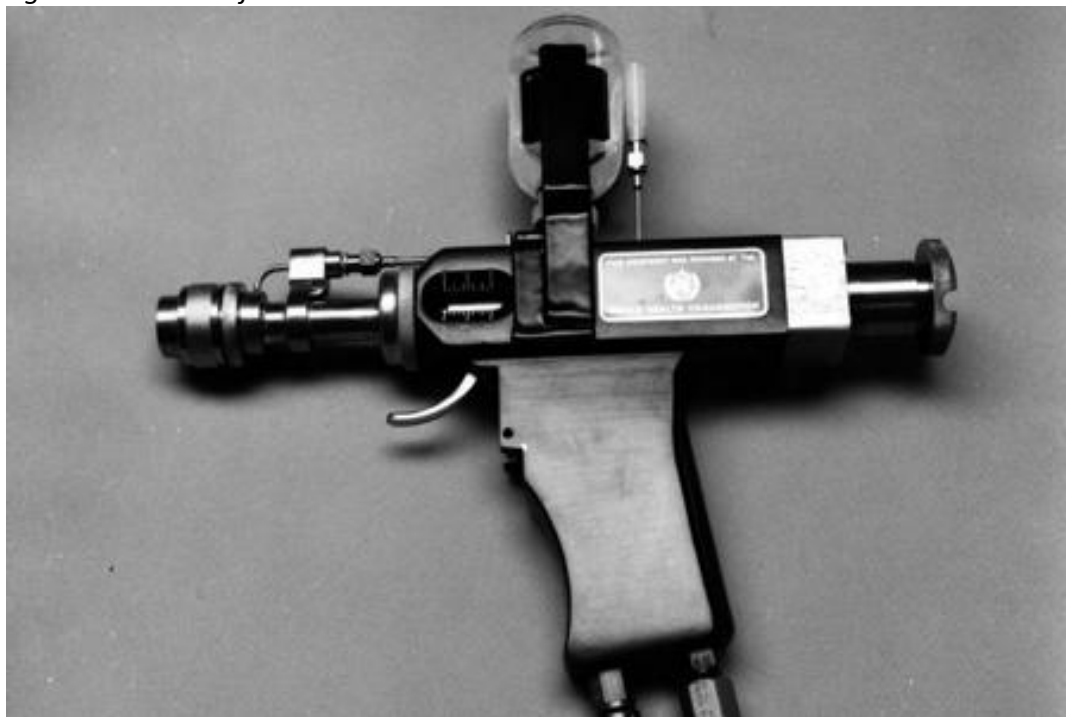


Image courtesy of the WHO. ©WHO. www.who.int.

CDC involvement took a new turn when it directly collaborated with Ismach to modify the design of the equipment. Finding that the original Army-developed

³¹ J. Donald Millar *et al.*, "Smallpox Vaccination by Intradermal Jet Injection. 1. Introduction, Background and Results of Pilots Studies", p. 749-760. Ronald R. Roberto *et al.*, "Smallpox Vaccination by Intradermal Jet Injection. 2. Cutaneous and Serological Responses to Primary Vaccination in Children", *Bull Wld Hlth Org*, Vol. 41 (1969): 761-769. John M. Neff *et al.*, "Smallpox Vaccination by Intradermal Jet Injection. 3. Evaluation in a Well-vaccinated Population", *Bull. Wld Hlth Org*. Vol. 41 (1969), p. 771-778.

³² J. Donald Millar *et al.*, "Smallpox Vaccination by Intradermal Jet Injection. 1. Introduction, Background and Results of Pilots Studies", p. 758.

³³ Ronald R. Roberto *et al.*, "Smallpox Vaccination by Intradermal Jet Injection. 2. Cutaneous and Serological Responses to Primary Vaccination in Children", p. 767.

injectors were ill-suited for overseas deployment, CDC personnel suggested making jet injectors lighter and independent from electrical generators and the local power grids. Ismach came up with a suitcase-size device powered by pushing on a pedal to generate current. Contrary to the equipment utilized by American development agencies until the mid-1960s, the CDC relied on the so-called “Ped-o-jets” for its first full-fledged campaign against smallpox in the South Pacific.

3.3 Tonga and India: Success at the Periphery – Failure at the Center

The first large scale smallpox immunization campaign carried out overseas by the CDC took place in the Kingdom of Tonga in the South Pacific in early 1964. It was the first time jet injectors would be the sole vaccination method. Opportunity for this operation occurred when Prince Tongi of Tonga visited the CDC in 1963 and offered to epidemiologists to test the equipment and vaccine and organize an immunization campaign in his country.³⁴ In March 1964, a team composed of five epidemiologists³⁵ traveled to the Islands with the aim of further evaluating the technology, testing dilutions and at the same time vaccinating the whole population. While the Tonga trials took place overseas and were the largest smallpox immunization campaign by the CDC, they were an extension of concerns about aligning vaccines with vaccination technology. As was the case in Jamaica and the United States, dilution was the central question being addressed. What differed, however, was the type of population being vaccinated. This was the main impetus, explained Sencer, as no cases of smallpox had ever occurred on the Islands and health authorities had never conducted an immunization campaign against the disease, it provided a virgin territory to CDC

³⁴ Horace G. Ogden, *CDC and the Smallpox Crusade*, p. 17. Elizabeth Etheridge, *Sentinel for Health: a History of the Centers for Disease Control* (Berkeley: University of California Press, 1992), p. 190.

³⁵ They were: Ronald R. Roberto, William H. Foege, William Higgins, Pierce Gardner and Peter Greenwald.

epidemiologists to test their equipment and vaccines.³⁶ Also, with a total population of about 60,000, the campaign in Tonga was of much smaller scale than those planned and carried out in the more crowded endemic countries. Nevertheless, studies carried out there provided interesting data and attracted the attention of international health organizations. CDC epidemiologists elaborated comparative studies of different dilutions ranging from 1:50 to 1:100 on school children and adults.³⁷ Blood samples were collected to assess take rates and co-related with data on age to establish whether vaccine potency varied along age lines. As was the case in Jamaica and in the United States, take rates were found to be more than satisfactory ranging from 98% in children with 1:50 dilution to 90% in adults with 1:100 dilution.³⁸ With these studies concluded, the concerns of CDC epidemiologists shifted from vaccine to the performance of the jet injector itself and their inclusion in national eradication campaigns. As such, the Tongan campaign was a showroom for the technology. It fascinated local health authorities and the WHO expressed interest in obtaining one of the Ped-o-Jets for further experimentation.

While the Tonga trials provided data on vaccine dilution, served as a first for a large scale mass program for the CDC, and attracted attention on jet injector technology, they were of limited value because of the same characteristics which made the site an ideal testing ground.³⁹ Vaccination in Tonga meant acting on

³⁶ Interview with David J. Sencer by Victoria Harden, July 7, 2006.

<http://globalhealthchronicles.org/smallpox/record/view/pid/emory:15nbq>, accessed June 4, 2009.

³⁷ Letter from Ronald R. Roberto to D.A. Henderson and Don Millar, March 25, 1964. Letter from Peter Greenwald to D.A. Henderson, May 24, 1964. Records of the CDC, Epidemiology Branch - Bacterial Diseases Section Correspondence (1961-1965), RG 442.67.A730, Box 4, Folder: Correspondence - Foreign Correspondence - Tonga 1964, NARA Morrow, Georgia.

³⁸ Telegram from Ronald R. Roberto to Don Millar, April 15, 1964. Records of the CDC, Epidemiology Branch - Bacterial Diseases Section Correspondence (1961-1965), RG 442.67.A730, Box 4, Folder: Correspondence - Foreign Correspondence - Tonga 1964, NARA Morrow, Georgia. Letter from Ronald R. Roberto to Don Millar, May 20, 1964.

³⁹ Letter from W. Charles Cockburn to D.A. Henderson, November 6, 1964. Records of the CDC, Epidemiology Branch - Bacterial Diseases Section Correspondence (1961-1965), RG 442.67.A730, Box 4, Folder: Correspondence - Foreign Correspondence - WHO 1964-65, NARA Morrow, Georgia. Letter from Ronald R. Roberto to D.A. Henderson and Don Millar, March 25, 1964.

the periphery of the global distribution of smallpox. In order to make an impact, establish jet injectors and play a bigger role in smallpox eradication, the CDC attempted to strike at the heart of variola in early 1964.

India stood as the bastion of smallpox being the largest endemic country. From 1950 to 1965, reported cases from India represented nearly or above half of diagnosed smallpox cases globally making it the biggest challenge for eradication. The Smallpox Unit thus looked to that country to further evaluate jet injectors.

Table 3.2: Smallpox Cases In India and Worldwide, 1950-1965

Year	India	World	Ratio
1950	157,487	332,224	47.4
1951	253,332	485,942	52.1
1952	74,836	155,609	48.1
1953	37,311	90,768	41.1
1954	46,619	97,731	47.7
1955	41,887	87,743	47.7
1956	45,109	92,164	48.9
1957	78,666	156,404	50.3
1958	168,216	278,922	60.3
1959	47,109	94,603	50.4
1960	31,091	65,737	47.3
1961	45,380	88,730	51.3
1962	55,595	98,700	56.3
1963	83,423	133,003	62.7
1964	41,160	75,910	54.2
1965	33,402	112,703	29.8

Source: R.N. Basu, Z. Jezek and N.A. Ward, *The Eradication of Smallpox from India* (WHO/SEARO: New Delhi, 1979), p. 36

As head of the Smallpox Unit, Millar traveled to India to conduct an evaluation of the National Smallpox Eradication Program and participated in a major conference with representatives from all Indian states to standardize vaccination procedures and establish case reporting mechanisms. Aside from these discussions, Millar brought up the topic of jet injectors. Despite his efforts, he was unable to convince his Indian counterparts to organize jet injector tests. It became clear to Millar that smallpox authorities in India remained attached to

traditional methods of immunization and a house-to-house approach to vaccinate its population. Also, Millar faced recalcitrant attitudes toward field trials in general. As Henry Gelfand, a fellow member of the CDC, wrote to Millar: “I was sorry to learn that you had no success in arranging for jet injector trials in India, but not surprised. It’s a new idea. And, short-term studies with limited objectives are not popular here. I agree that you would do better to look elsewhere for that sort of studies at the present time.”⁴⁰ Even though these trials did not take place, six injectors were provided to India’s National Institute of Communicable Disease through the USAID and some states showed interests in using jet injectors. The CDC was thus denied, for a time, in deploying its technology in India and proceeded to look for other opportunities to test it in an endemic country, a crucial element in establishing credibility in smallpox eradication. Opportunity would come from Brazil.

3.4 Creating a Technological Breakthrough: Assessing Jet Injectors in Brazil

In Brazil, as Gilberto Hochman recently described, smallpox as a public health priority waxed and waned from the 19th century until it was declared eradicated in 1973 in that country.⁴¹ From a visible target for governmental action at the end of the nineteenth and beginning of the twentieth century, smallpox was replaced by malaria and yellow fever as priorities on the sanitary agenda. Smallpox eradication returned as a public health concern in the mid-1960s when a series of changes created favourable conditions. At the international level, the WHO adopted a resolution in 1959 calling for global smallpox eradication. Regionally, the United States reassessed its foreign policy towards South America leading to JFK’s Alliance for Progress in 1961 which included provisions for the

⁴⁰ Letter from Henry M. Gelfand to Don Millar, March 5, 1964. Records of the CDC, RG 442.67.A730, Epidemiology Branch - Bacterial Diseases Section Correspondence (1961-1965), Box 4, Folder: Foreign Correspondence - General 1964-65, NARA Morrow, Georgia.

⁴¹ Gilberto Hochman, “Priority, Invisibility and Eradication: The History of Smallpox and the Brazilian Public Health Agenda”, *Medical History*, Vol. 53, No. 2 (2009), p. 229-252.

improvement of public health under broader commitments to social reforms.⁴² Nationally, after a period of attempted autonomous foreign policy and political and economic instability, Brazil returned to closer alignment with the United State after the military coup of March 31st 1964 supported by Washington.⁴³ This change in posture prompted lavish funding of various development programs by the USAID.⁴⁴ These forces coalesced and led to the creation of the Smallpox Eradication Campaign in August 1966.

CDC leadership learned informally about interest at the PAHO for jet injectors. Since 1950, this organization had passed several resolutions calling for smallpox eradication, and despite the limited sums allocated to eradication the disease, constantly regressed to occasional occurrences in South America and was limited to Brazil as an endemic country. In late March 1964, CDC Chief James Goddard received word that the PAHO was considering organizing field trials probably in Brazil through Fred L. Soper. Soper had served as Director of PAHO and subsequently acted as a special consultant to the Office of International Health of USPHS. Several factors, explained Soper, made Brazil an ideal site to conduct field testing. First, Brazilian laboratories were recently established to produce freeze-dried vaccines and were eager to test their potency, an activity in which CDC was experienced. Second, there were populations available to test vaccines and equipment. Finally, collaboration with several Brazilian agencies was possible through the PAHO or the local NIH officer in Brazil.⁴⁵ It is not clear if Soper acted as a transmission belt of CDC's ambitions in testing jet injection in an endemic country or served as a well-connected informant with access to PAHO's

⁴² Ruth Leacock, *Requiem for Revolution: the United States and Brazil, 1961-1969* (Kent, Ohio: Kent University Press: 1990), p. 70-71. Mônica Hirst, *The United States and Brazil: A Long Road of Unmet Expectations* (New York: Routledge, 2005), p. 73.

⁴³ Mônica Hirst, *The United States and Brazil: A Long Road of Unmet Expectations*, p. 7

⁴⁴ In fact, Brazil was the highest recipient of USAID funds prior to the Vietnam War. See W. Michael Weis, *Cold Warriors & Coups d'État: Brazilian-American Relations, 1945-1964*, (Albuquerque: University of New Mexico Press, 1993), p. 168.

⁴⁵ Letter from Fred L. Soper to James L. Goddard, March 26, 1964. Records of the OASH, Office of International Health, RG 514.130.71.3.3, Box 6, Folder: Diseases – Smallpox Eradication, NARA College Park.

upper echelons and Brazilian health authorities. Formal invitation came a month later in late April 1964 from Director of PAHO Abraham Horwitz. While soliciting help from the CDC, this first exchange of letters did not single out jet injectors but rather pointed at the need to: “study and develop methods [that] will make it possible to maintain the level in the population that was reached during the intensive phase of the campaign.”⁴⁶ It was an offer the CDC could not refuse.

Don Millar planned the mission during the summer of 1964. He conceived a two step program to first learn about the pattern of smallpox in Brazil and adjacent countries and then demonstrate jet injectors.⁴⁷ This initial mission lasted about a month, from September 20th to October 25th during which Millar and his colleague John Neff utilized jet injectors on various sites, got a sense of the state of the immunization campaign and observed the epidemiological patterns of smallpox. The second step of the study was to prepare a larger scale trial in the Amapà territory in Northern Brazil to explore possible ways of integrating Brazilian multiple puncture door-to-door approach with a mass vaccination approach by jet injection. For this second trip, a team of five epidemiologists from the CDC, including Millar, travelled across Brazil from January 16th to March 3rd 1965.

More than simple survey and demonstration missions, these would frame jet injectors as technological breakthroughs for mass smallpox immunization. In the case of smallpox eradication, major concerns revolved around coverage rates, or the percentage of vaccinated population. In 1959, an expert committee appointed by the WHO concluded that transmission of smallpox could be halted by vaccinating 80% of the population within four to five years. Despite the

⁴⁶ Letter from Abraham Horwitz to James L. Goddard, April 21, 1964. Records of the OASH, Office of International Health, RG 514.130.71.3.3, Box 6, Folder: Diseases – Smallpox Eradication in the Americas, NARA College Park.

⁴⁷ Letter from Don Millar to Dr. Huerta, August 20, 1964. Records of the OASH, Office of International Health, RG 514.130.71.4.1, Box 16, Folder: Diseases Measles-Smallpox (Brazil), NARA College Park.

scientific ambiguousness of its origin, 80% coverage rates were an indication of a properly conducted vaccination campaign.⁴⁸ D.A. Henderson recalls that this level coverage rate was an arbitrary figure based upon the experience of veteran international staff to achieve herd immunity by reducing the number of 'susceptibles' within a given country.⁴⁹

In their assessment of jet injectors, CDC epidemiologists mobilized other performance categories to underline the value of the technology to eradication programs. As it did not outperform traditional approaches in Brazil in coverage rates, measurements of speed, costs and take rates were crucial in framing jet injectors as a key technology. Furthermore, engaging in health technology assessment in an actual territory-wide campaign in an endemic country established the credibility of the CDC in designing and carrying out these sorts of operations in tropical settings. As opposed to Tonga and Jamaica, Brazil mattered in the global distribution of smallpox.⁵⁰ Any efforts to eradicate the disease in the Americas and worldwide signified that the South American giant would be a frontline in the fight against smallpox.

3.4.1 First trip: 1964

For their first trip, Millar and Neff traveled to Brazil and Peru to establish the epidemiological portrait of smallpox, make recommendations on the general conduct of eradication programs and demonstrate jet injection technology. If the CDC epidemiologists had high hopes for jet injectors upon arriving in Brazil, they were dashed shortly after they got there. In his first report to D.A. Henderson,

⁴⁸ Frank Fenner *et al.*, *Smallpox and its Eradication*, p. 484.

⁴⁹ Donald A. Henderson, *Smallpox: The Death of a Disease*, p. 89.

⁵⁰ On the history of health technology assessment, see R.N. Battista, "The "Natural History" of Health Technology Assessment", *Int J Technol Assess Health Care* 25 (2009), p. 281-4. D. Banta, "History of HTA: Introduction", *Int J Technol Assess Health Care* 25 (2009), p. 1-6. Andrew Stevens, "Health Technology Assessment: History and Demand", *Journal of Public Health Medicine*, Vol. 25, No. 2 (2003), p. 98-101.

Millar quickly realized the difficulties that would lie ahead in organizing a mass vaccination campaign and introducing new immunization technology: “The gun is viewed as an adjunct for special groups easily massed. [...] Getting people massed may be a problem much greater than in Jamaica or Tonga.”⁵¹ Furthermore, he was disappointed with the performance of the equipment in sites where it was supposed to function relatively well: “Even the factory situation of Thursday was less impressive in this regard and mostly the people came in dribbles. An imaginative approach will be essential in pre-conditioning the target group if anything like the Belem campaign is to be seen with a gun.”⁵² “The hard core problems will be great” Millar concluded.⁵³ As we will see below, a vaccination campaign in the city of Belem became the point of comparison for a jet injector-based campaign. The problem was thus defined: gathering enough people to achieve higher levels of coverage than those obtained in Brazilian campaigns conducted in the 1950s and 1960s. In this sense, the Belem vaccination campaign just mentioned would be of crucial importance in Millar’s assessment and opinion of the jet injectors.

Located in the State of Para in Northern Brazil, the city of Belem, with a population of 450,000, conducted a major vaccination campaign in September 1964. It served as a benchmark with which the performance of the jet injector would be compared. Health authorities carried the campaign with traditional multiple puncture in conjunction with a door-to-door approach. Additionally, it had been surrounded with aggressive publicity and had solicited the participation of the community and that of the various agencies active in smallpox eradication. It was considered a success as it had achieved a coverage rate well over the 80% prescribed by the WHO.

⁵¹ Letter from Don Millar to D.A Henderson, September 26, 1964. Records of the OASH, Office of International Health, RG 514.130.71.4.1, Box 16, Folder: Diseases Measles-Smallpox (Brazil), NARA College Park.

⁵² Letter from Don Millar to D.A Henderson, September 26, 1964

⁵³ Letter from Don Millar to D.A Henderson, September 26, 1964.

Millar was also impressed by the Belem campaign. “I must say that in some instances the effectiveness of the campaign in Belem surpasses all expectations”⁵⁴ wrote Millar to Henderson “The efforts there on a house-to-house basis was incredibly well done with all sorts of promotional techniques, inter-organizational cooperation and community involvement. One could stand on any street corner in Belem and watch the people go by with living evidence of still major takes on their arms. It was sophisticated effort managed by very bright and aggressive people.”⁵⁵ To his superior at CDC’s Epidemiology Branch he further confided that “Community resources are great and been put into the effort with varying success in many areas – but the Belem campaign which reached over 90% of the population by a door to door method points clearly to the fact that the capacity is there.”⁵⁶ Millar’s appreciation for the Belem campaign leads him to conclude that “It makes our own SOS business look pale in comparison.”⁵⁷ Despite this, the CDC team met with some success on this initial trip.

Millar and John Neff traveled with their Brazilian counterparts to the small town of Moju located on the Amazon River. The team reached the town unannounced, with the aim of vaccinating most of the population. “The show was enthusiastically received by the population who provided us with all sorts of help in identifying who had or hadn’t showed up at the square where we set up the gun” related Millar.⁵⁸ It became clear that any hope for a jet injection-based campaign in Brazil would have to involve the community and adequate publicity

⁵⁴ Letter from Don Millar to D.A. Henderson, October 11, 1964. Records of the OASH, Office of International Health, RG 514.130.71.4.1, Box 16, Folder: Diseases Measles-Smallpox (Brazil), NARA College Park.

⁵⁵ Letter from Don Millar to D.A. Henderson, October 11, 1964.

⁵⁶ Letter from Don Millar to Alex Langmuir, October 11, 1964. Records of the OASH, Office of International Health, RG 514.130.71.4.1, Box 16, Folder: Diseases Measles-Smallpox (Brazil), NARA College Park.

⁵⁷ Letter from Don Millar to D.A. Henderson, October 11, 1964. SOS refers to “Sabin on Sunday” of the polio immunization program conducted in the United States. Interview with Don Millar by author, December 16, 2010.

⁵⁸ Letter from Don Millar to Alex Langmuir, October 11, 1964

in order to achieve the required coverage dictated by international organizations. But then again, high coverage rates had been achieved in Belem without the use of mass vaccination technology, only by relying on community involvement, efficient use of publicity and most importantly the traditional multiple-puncture door-to-door methods. Furthermore, Millar's assessment of the capacity of the Brazilian campaigns to reach a high percentage of the population made him question whether jet injection was the key for eradication.⁵⁹

In his final letters from Brazil, Millar clearly underlined the limits of the technology in fundamentally changing the tide of eradication campaigns. As he bluntly pointed out to Henderson: "The gun is not a magic solution to eradication. It is best considered an implement to be integrated into what is a potentially fine approach."⁶⁰ His field experience made him argue that the door-to-door approach could well be the best method to achieve high coverage rates. Reliance on this approach was, however, a less than optimal use of jet injectors argued Millar. Moreover, the number of devices required to attain results similar to those of the Belem campaign (400,000 vaccinations in 5 days) would offset any advantages. In fact, he explained to his superior that in the long run, a jet injector based campaign might be disadvantageous.⁶¹ The device, he further maintained, should be treated as a tool which needs to be deployed only in specific situations. Millar concluded that the key for smallpox eradication in Brazil might lie less on the technology than on disease surveillance and "good shoe leather epidemiology."⁶²

In his report to the PAHO, Millar refrained from such candour. Quite the contrary, he remained cautious and pointed out to the need for further tests and additional studies to find ways to integrate jet injectors into the Brazilian

⁵⁹ Letter from Don Millar to Alex Langmuir, October 11, 1964

⁶⁰ Letter from Don Millar to Alex Langmuir, October 11, 1964.

⁶¹ Letter from Don Millar to Alex Langmuir, October 11, 1964

⁶² Letter from Don Millar to Alex Langmuir, October 11, 1964

national eradication campaign. While acknowledging the capacity of accelerating the pace of vaccination, he concluded that a switch from multiple puncture to jet injection, and from house-to-house to mass vaccination at this stage of the Brazilian campaign may be premature.⁶³ Among the advantages of the technology, Millar noted, were its simplicity in use, the uniformity in vaccination, the possible output by a single vaccinator and finally its usefulness in sites where people congregate en masse. However, the benefits of the jet injector had certain limits: “If people are not formed in large groups and do not move rapidly, the gun is no more effective than one using the multiple pressure technique” wrote Millar, further adding that a well-trained vaccinator using the latter method could reach an output of about 150 persons per hour.⁶⁴

Conversely, Millar underlined the limits of the house-to-house multiple puncture approach deployed in Belem. While he noted the spectacular success of the campaign, Millar reported that: “It should be fully appreciated, however, that only with full municipal cooperation with volunteer participation from civic organizations can such an approach be utilized because it is unrealistic to consider that the Federal Government will be able to hire the large numbers of individuals and supply the transport necessary to cover major population centers.”⁶⁵ On their second trip, the CDC epidemiologists proceeded to mobilize the evaluation categories necessary to support their claims that jet injectors, while not a perfect tool, could outperform traditional approaches. Thus, Millar and his colleagues traveled back to Brazil to further assess the technology.

⁶³ J.D. Millar and J.M. Neff, *Report to the Pan American Health Organization of Consultation on Smallpox Eradication with Brazil and Peru, September 20 – October 25, 1964*, p. 33. Records of the OASH, Office of International Health, RG 514.130.71.4.1, Box 16, Folder Diseases Measles-Smallpox (Brazil), NARA College Park.

⁶⁴ J.D. Millar and J.M. Neff, *Report to the Pan American Health Organization of Consultation on Smallpox Eradication with Brazil and Peru, September 20 – October 25, 1964*, p. 33.

⁶⁵ J.D. Millar and J.M. Neff, *Report to the Pan American Health Organization of Consultation on Smallpox Eradication with Brazil and Peru, September 20 – October 25, 1964*, p. 32.

3.4.2 Second Trip: 1965

For this second trip, a larger team, composed of medical and statistical epidemiologists, travelled to Brazil to field test different types of jet injectors and to run comparative studies with the multiple-pressure technique.⁶⁶ They spent a month crisscrossing the country but worked extensively in the State of Amapà in Northern Brazil with the goal of achieving an 80% coverage rate. Contrary to previous studies, CDC epidemiologists numerically measured the performance of the injectors. If Millar and others could see that injectors were faster than traditional immunization methods, prior to 1965, no data actually expressed “objectively” the impact of the technology on campaigns.⁶⁷ This played an important role in establishing the credibility of the CDC versus other organizations, as we will see below. Furthermore, the CDC team and their Brazilian counterparts designed a series of tests to evaluate the performance of the jet injection versus multiple puncture, the potency of American and Brazilian vaccines, and various dilutions of freeze-dried vaccines.⁶⁸

The team visited all localities with populations of 300 or more: rural areas, small villages and small cities.⁶⁹ Various strategies were deployed to ensure maximum coverage: contacting village headmen, publicity campaigns, and setting up makeshift vaccination centers in public buildings, sawmills and even under trees; elsewhere vaccination took place in medical or other public buildings. Mass vaccination campaigns were completed by house-to-house vaccinations to ensure maximum coverage.

⁶⁶ The medical epidemiologists were Don Millar, Thomas Mack and Antone A. Medeiros and the statistical epidemiologists Leo Morris and William Dyal.

⁶⁷ On this, see Theodore M. Porter, *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life* (Princeton, N.J.: Princeton University Press, 1995)

⁶⁸ Letter from Don Millar to Allyrio Macedo Filho, December 8, 1964. Records of the OASH, Office of International Health, RG 514.130.71.4.1, Box 16, Folder: Diseases Measles-Smallpox (Brazil), NARA College Park.

⁶⁹ J.D. Millar *et al.*, “The Introduction of Jet Injection Mass Vaccination into the National Smallpox Eradication Program of Brazil”, *Trop. Georg. Med.*, Vol. 23 (1971), p. 89-101.

Data concerning mass vaccination by jet injectors did not demonstrate the advantages of the technology when compared with the door-to-door by multiple puncture method when it came to coverage rate. In rural and urban areas, the coverage rate was shown to be almost identical to vaccination by conventional techniques in Belem. Millar conceded that this could be an issue for successful eradication. “[...] It seems safe to conclude that a mass approach alone is not sufficient to insure vaccination of most people in an area well distributed by age” he reported to CDC headquarters.⁷⁰ Moreover, the CDC team did not reach the 80% coverage rate dictated by the WHO. However, other categories emerged as particularly relevant in the eyes of the American epidemiologists.

Table 3.3: Comparison of House-to-House Campaign Using Multiple Puncture Technique with Jet Injector Campaign in Two Small Interior Cities

	Mazagao	Amapà
Urban population	974	1638
Campaign Method	House-to-House	Central Medical Post Street by Street mop-up
Method of Inoculation	Multiple Puncture	Jet Injector
No. of Personnel Utilized	38	5
Vaccination per Man Hour	8.0	40.5
Per cent of Total Population Vaccinated	89.6	78.6
Take Rates Overall (%)	80.8	90.1
Primaries (%)	84.6	95.3
Revaccinees (%)	76.1	86.7
Per cent Effective Vaccination of Available Pop.	72.4	70.8

Source: David J. Sencer CDC Museum – Folder 2008.23.1-3

Comparative studies in the towns of Mazagao and Amapà City to evaluate the respective coverage rates achieved by both techniques made the speed advantage evident. Even though coverage rates were lower in the jet injection arm of this trial, the team calculated that five times more vaccination per man hour was possible with the new technology. Millar noted in his final report that

⁷⁰ Letter from Smallpox Team – Amapà Territory to Chief, Surveillance Section (D.A. Henderson), *Weekly Report No. 3*, undated, (probably February 1965), p. 2. Records of the OASH, Office of International Health, RG 514.130.71.4.1, Box 16, Folder: Diseases Measles-Smallpox (Brazil), NARA College Park.

“The response of the people of Macapa, [the State Capital] to the campaign was striking. The ability to vaccinate 85.5% of the population with only six injectors during a two-day period has significant implications for the conduct of urban campaigns in Brazil.”⁷¹ To which he further added: “As shown in all areas in which the jet injectors were used, including small town and village situations in the interior of Amapà, the number of vaccinations performed per hour of gun operation exceeds that presently accepted as the daily goal for one vaccinator.”⁷² Local data was extrapolated to the whole national campaign. Brazilian Federal health authorities had set the objective of 15,000,000 vaccinations for 1965 and were falling short of this goal. Aside from administrative obstacles noted by the CDC, jet injection was conceived as a tool to accelerate the pace of vaccination and possibly salvage an ailing campaign. The output of jet injection was presented as a palliative to the manpower shortage in the smallpox program and an answer to the variability of the disease on the public health agenda. “Everything is fluid, subject to momentary and drastic change both politically and otherwise. Even the key people in the smallpox program could be replaced or removed at any time and shuffled elsewhere,” Millar reported to Henderson.⁷³ As seen above, smallpox as a public health concern had waxed and waned from the 19th century onward depending on the political climate or when severe outbreaks forced public health action. A

⁷¹ J.D. Millar *et al.*, *Report to the Pan American Health Organization of Evaluation of Use of Jet Injection in Smallpox Vaccination in Brazil, January 16 – March 3, 1965*, p. 33. Records of the CDC, Laboratory Branch - Laboratory Program General Files - 1961-1966, RG 442.69.A0124, , Box 1, Folder Reports - Report to the Pan American Health Organization on Jet Injection in Smallpox Vaccination in Brazil, 1965, NARA Morrow, Georgia.

⁷² J.D. Millar *et al.*, *Report to the Pan American Health Organization of Evaluation of Use of Jet Injection in Smallpox Vaccination in Brazil, January 16 – March 3, 1965*, p. 2.

⁷³ Letter from Don Millar to D.A. Henderson, January 29, 1965. Records of the OASH, Office of International Health, RG 514.130.71.4.1, Box 16, Folder: Diseases Measles-Smallpox (Brazil), NARA College Park.

rapidly conducted campaign could prevent changes in the overall priorities of public health and safeguard personnel allocation to the smallpox eradication.⁷⁴

Cost was another area where significant improvements were demonstrated by the CDC trials. Adding to the concerns about coverage, the economic performance was measured in various ways: transportation, vaccine economy, manpower, etc. Comparison between the operations in Macapa by jet injection and the “successful” Belem campaign revealed substantial savings. If Millar was impressed by the community involvement in Belem and its ability in achieving considerable high levels of vaccinations, when recast in economic terms of “local man days”, “vehicle days” and the number of vaccine tubes expended, the Belem campaign now appeared expensive. When all was calculated, Millar and his colleagues found that Macapa was vaccinated for a third of the cost. To a Brazil facing financial difficulties and to a PAHO which allowed minimum funding to smallpox eradication, these advantages were susceptible to find attentive ears.⁷⁵

Table 3.4: Cost Analysis Two Urban Vaccination Programs in Northern Brazil

	Macapa		Belem	
	No.	Cost (\$)	No.	Cost (\$)
Population	35,700		450,000	
Vaccinations	32,700		411,000	
Professional Man Days	6	72.00	10	120.00
Local Man Days	120	480.00	6,000	24,000.00
Vehicle Days	6	60.00	250	2,500.00
Jet Injectors	7	70.00	0	
TOTAL COST		691.00		27,520.00
Cost per Vaccination		0.021		0.067

Source: David J. Sencer CDC Museum – Folder 2008.23.1-3

Additionally, cost was associated with take rates, or successful vaccinations. Previous campaigns had relied on surveys to ascertain the coverage rates and take rates. Jet injectors, the CDC found, were consistent in their capacity to

⁷⁴ J.D. Millar *et al.*, *Report to the Pan American Health Organization of Evaluation of Use of Jet Injection in Smallpox Vaccination in Brazil, January 16 – March 3, 1965*, p. 2.

⁷⁵ On the financial difficulties of Brazil in the 1960s, see Mônica Hirst, *The United States and Brazil: A Long Road of Unmet Expectations*, p. 160.

successfully immunize against smallpox.⁷⁶ Substantial savings were possible as it was recommended that post-immunization follow-ups be abandoned.⁷⁷ Additionally, it was expected that jet injectors produce better take rates by as much as 10%. Millar also noticed an augmentation of successful take rates when using jet injection which can in part be explained by the removal of the emotional aspect of immunization. “Many of the failures of vaccination occurred in previously unvaccinated children indicated perhaps hesitancy on the part of the vaccinators to be sufficiently heartless with younger children”, Millar explained to his superior, “the gun makes no such discrimination.”⁷⁸

Jet injector performance was not confined to measurable categories of efficiency and efficacy, but it included a qualitative aspect thought to be crucial to the success of eradication in Brazil. While they could not quantify it, the appeal of technology figured nonetheless in correspondence and in the final report to the PAHO. Millar noted the impact that the novelty of the technology could have on the program and eventually its success, especially when compared with traditional methods. Contrary to what had happened in India, new ideas about immunization were welcome in Brazil, as the CDC found out. Indeed, the American epidemiologists understood the potential of novelty in making the trials a success. During their first trip and despite the difficulties in setting up jet injector vaccination posts, Millar wrote that problems encountered in the field could be overcome if “[...] the gun captures the imagination of the people.”⁷⁹ Fascination with technology was used during the vaccination campaign in Macapa city in 1965. Jet injectors were part of the publicity campaign surrounding the arrival of the CDC team. “As the truck moved street by street

⁷⁶ J.D. Millar *et al.* “The Introduction of Jet Injection Mass Vaccination into the National Smallpox Eradication Program of Brazil”, p. 100.

⁷⁷ J.D. Millar *et al.*, *Report to the Pan American Health Organization of Evaluation of Use of Jet Injection in Smallpox Vaccination in Brazil, January 16 – March 3, 1965*, p. 2.

⁷⁸ Letter from Smallpox Team – Amapá Territory to Chief, Surveillance Section (D.A. Henderson), *Weekly Report No. 3*, undated, (probably February 1965), p. 2.

⁷⁹ Letter from Don Millar to D.A. Henderson, September 26, 1964.

through the town, with band blaring and dancers swaying, team members with jet injections “fired” saline “shots” into the air. [...] Between the appearance of samba bands, team members demonstrated the jet injector and announced the locations of vaccinations posts” described Millar and his colleagues.⁸⁰ This even became a selling point to the PAHO as: “Jet injection is a novel means of immunization and possesses even greater potential for capturing the interest of the public.”⁸¹ CDC epidemiologists thus attributed to jet injectors an aura of novelty which traditional vaccination methods could never match. Used correctly, this aspect of the technology could be mobilized to create interest in eradication and stimulate Brazilians to gather at vaccination posts, thus putting jet injectors in situations where they could be used the most efficiently.⁸² While the CDC was involved early on in testing jet injectors for smallpox immunization, others attempted and used the technology in international health programs. In Brazil, Millar had come head to head with a possible rival in smallpox eradication by jet injection.

3.5 Hingson and Henderson

One of the inventors of jet injector, Andrew Hingson and his organization, the Brother’s Brother Foundation, were especially active in trying to integrate rapid vaccination technology in immunization campaigns in the Third World. Founded in 1958, the Brother’s Brother Foundation is a volunteer organization which focused on immunization missions but shifted its activities towards humanitarian and relief operations when the WHO instituted large-scale immunization programs. Hingson looked repeatedly to the USPHS and subsequently to the CDC

⁸⁰ J.D. Millar *et al.* “The Introduction of Jet Injection Mass Vaccination into the National Smallpox Eradication Program of Brazil”, p. 100.

⁸¹ J.D. Millar *et al.*, *Report to the Pan American Health Organization of Evaluation of Use of Jet Injection in Smallpox Vaccination in Brazil, January 16 – March 3, 1965*, p. 48.

⁸² J.D. Millar *et al.*, *Report to the Pan American Health Organization of Evaluation of Use of Jet Injection in Smallpox Vaccination in Brazil, January 16 – March 3, 1965*, p. 47-48.

for support and possible collaboration. However, both organizations did not respond to these invitations and even marginalized Hingson's specific jet injection device for smallpox eradication programs in which the technology was embedded.

The first contact between Hingson and the USPHS concerning smallpox vaccination took place in 1962. At the USPHS, Harald Fredericksen commented Hingson's plans for "Global Eradication of Pestilential Diseases" which was to first take place in Liberia by primarily vaccinating children living in urban centers.⁸³ Having successfully directed a campaign to eradicate smallpox in Bolivia in the 1950s, Fredericksen was the USPHS specialist. His report on this campaign would eventually serve as a blueprint for CDC's Smallpox Eradication and Measles Control Program in West Africa.⁸⁴ In an internal memorandum to the Chief of the USPHS Division of International Health, Fredericksen expressed doubts on the general approach of Brother's Brother Foundation and its technology.⁸⁵ He argued that highly trained volunteers on short-term assignment countries could not be counted upon to carry out large-scale immunization programs in developing countries. Best results were achieved by mobilizing local auxiliary personnel directed by a cadre of professional experts patterned after malaria eradication programs according to the USHPH specialist. Jet injectors elicited similar reservations. Acknowledging some of their advantages in terms of speed, Fredericksen noted the need for further trials. He also warned against possible problems of accidental inoculations, high cost of the machine, mechanical failures, and the overall challenge of integrating the injectors in mass programs. New immunization technology was not a necessary condition for

⁸³ Memo from Harald Fredericksen to Chief, Division of International Health, "Smallpox Vaccination By Operation Brother's Brother II", April 26, 1962. Records of the USPHS, Office of International Health, RG 90.130.65.42.2 Box 15, Folder: Diseases, NARA College Park.

⁸⁴ Harald Fredericksen, "Strategy and Tactics for Smallpox Eradication", *Public Health Reports*, Vol. 77, No. 7 (July 1962), p. 617-622.

⁸⁵ Memo from Harald Fredericksen to Chief, Division of International Health, "Smallpox Vaccination By Operation Brother's Brother II", April 26, 1962.

success finally reasoned Fredericksen. Based on his experience in Bolivia, he argued that one could readily launch and conduct a campaign using common sterilized pins with a satisfactory rate of vaccination of 500 to 1000 per man/day.⁸⁶ Pins were better adapted for house-to-house vaccinations which had ensured high coverage rates in Bolivia. Switching to a vaccination post strategy, as put forward by Hingson, was a leap into the unknown as Fredericksen felt unsure of how far mothers and children, a crucial segment to reach in any immunization campaign, were willing or able to travel to get vaccinated.⁸⁷ Vaccination post strategies consisted in attracting population to fixed sites where immunization would take place. Despite Fredericksen's sceptic reaction to his technology and approach, Hingson remained undeterred in applying his invention to immunize the developing world's populations. The Brother's Brother Foundation did carry out its Liberian campaign almost eradicating smallpox prior to the launch of CDC's campaign in the mid-1960s.⁸⁸

A second African operation planned by the Brother's Brother Foundation in early 1964 brought the CDC into direct contact with Hingson's organization. The latter initiated steps to conduct an immunization against smallpox in Nigeria and had contacted the Ministry of Health and Wyeth Laboratories to obtain support and vaccines for jet injectors respectively.⁸⁹ In his preparation for this campaign Hingson also communicated with Henderson to enlist the CDC into his Nigerian project. These first contacts put Henderson at odds with Hingson almost immediately. Henderson had investigated Hingson's plans for Nigeria with the

⁸⁶ Memo from Harald Fredericksen to Chief, Division of International Health, "Smallpox Vaccination By Operation Brother's Brother II", April 26, 1962.

⁸⁷ Memo from Harald Fredericksen to Chief, Division of International Health, "Smallpox Vaccination By Operation Brother's Brother II", April 26, 1962.

⁸⁸ Interview with Dennis Olsen by Diane Drew, July 14, 2006.

<http://globalhealthchronicles.org/smallpox/record/view/pid/emory:158xx>, accessed, May 27, 2009.

⁸⁹ Letter from D.A. Henderson to W. Charles Cockburn, April 14, 1964. Records of the CDC, Epidemiology Branch - Bacterial Diseases Section Correspondence (1961-1965), RG 442.67.A730 Box 4, Folder: Correspondence - Foreign Correspondence - WHO 1964-65, NARA Morrow, Georgia.

Department of State and the WHO and discovered that Hingson was claiming that he was undertaking this vaccination campaign with the blessing of the CDC for both dilutions and immunization technology. Writing to Charles Cockburn, a British epidemiologist working in the WHO Division of Communicable Diseases, Henderson confided that he had not endorsed nor considered collaboration with the Brother's Brother Foundation in Nigeria. He further accused Hingson of ignoring facts on smallpox vaccination in order to achieve his goals. To which he further added: "Certainly we [Henderson and Cockburn] have grave reservations regarding the efficacy of the Hingson apparatus and approach."⁹⁰ Henderson suggested to Cockburn to keep an eye on Hingson's endeavour in Nigeria. While the WHO as an organization could not actively intervene to stop Hingson, Cockburn did act by contacting an influential member of the public health milieu in Nigeria to express WHO reservations concerning smallpox vaccination by jet injector.⁹¹ Having not heard from Hingson's proposal by mid-May 1964, it seems that Henderson's contact within the WHO allowed him to prevent the Brother's Brother Foundation from conducting a second jet injector campaign in Africa.⁹² Hingson, however, remained dedicated to enlist the CDC as an ally.

Encounters with Hingson continued during 1964, this time in Brazil. On their initial trip to South America in September-October, CDC epidemiologists Millar and Neff met with the founder of the Brother's Brother Foundation. Hingson was determined to locate the CDC assessment team dispatch in South America as he had contacted high level personnel in both the Office of the Surgeon General and the Brazilian Ministry of Health. Millar was far from thrilled about this surprise

⁹⁰ Letter from D.A. Henderson to W. Charles Cockburn, April 14, 1964.

⁹¹ Letter from W. Charles Cockburn to D.A. Henderson, May 5, 1964. Records of the CDC, Epidemiology Branch - Bacterial Diseases Section Correspondence (1961-1965), RG 442.67.A730 Box 4, Folder: Correspondence - Foreign Correspondence - WHO 1964-65, NARA Morrow, Georgia.

⁹² Letter from D.A. Henderson to W. Charles Cockburn, May 12, 1964. Records of the CDC, Epidemiology Branch - Bacterial Diseases Section Correspondence (1961-1965), RG 442.67.A730 Box 4, Folder: Correspondence - Foreign Correspondence - WHO 1964-65, NARA Morrow, Georgia.

visit: “The coincidence of his appearance with ours is not only startling but somewhat problematical. The destiny of man is to endure as Faulkner put it.”⁹³ Eager to obtain CDC’s blessing for his technology, Hingson reiterated his offer to collaborate with Millar to carry out jet injector trials in Brazil. He finally obtained that his technology be assessed with other jet injectors, including CDC’s own Ped-o-Jet.

During their trials in Amapà territory in February-March 1965, Millar and his colleagues designed a study to compare the performance of three jet injector models; among these figured Hingson’s Press-O-Jet (or Peace Gun). If Hingson relied on those Brazilian trials to validate his particular technology, disappointment was soon to follow. Shortly after the beginning of the trial, Millar excluded the Press-O-Jet arguing that its complexity made it difficult to operate under field conditions. Not assessing Hingson’s technology, its technical deficiencies notwithstanding, had consequences for the CDC and the future deployment of jet injectors in smallpox eradication programs. First, the lack of data on his specific model would prevent Hingson from mobilizing scientific evidence to support the integration of his technology into mass programs; he therefore could not count on the CDC to endorse its large-scale use. Second, extensive data gathering on CDC/US Army-developed instrument effectively established the Ped-O-Jet as the standard device in eradication programs in countries where they were utilized. Third, when considering the strained relationship between the CDC and the Brother’s Brother Foundation, it cannot be ruled out that deferring to Hingson either for his expertise or by using his technology did not appeal to the CDC and to Henderson in particular. CDC personnel in the Smallpox Unit were gradually positioning themselves as the foremost experts on jet injector technology from the prison and Jamaican trials to the Brazilian assessment mission. Hingson did organize a vaccination

⁹³ Letter from Don Millar to D.A. Henderson, September 29, 1964. Records of the OASH, Office of International Health, RG 514.130.71.4.1, Box 16, Folder: Diseases Measles-Smallpox (Brazil), NARA College Park.

campaign in the summer of 1965 in Honduras, sponsored by his organization and the Baptist World Alliance to compare three types of jet injection devices.⁹⁴ However, there was no significant outcome from those trials as CDC technology was firmly established by then. Thus when designing jet injector-based smallpox programs, CDC and other organizations such as USAID, PAHO and WHO turned to Ped-O-Jets to conduct vaccinations.⁹⁵

3.6 Embedding the Technology: Program Proposal and CDC Ambitions

While the CDC's credibility and reputation did benefit from its participation in the improvement of basic jet injection devices, its field trials of vaccines and its activities in healthcare technology assessment, this did not necessarily entail extending into international health programs. Even if almost all those activities took place overseas, Henderson explained to Charles Cockburn in mid-April 1964 that the CDC "had no plans for a campaign in an endemic area."⁹⁶ This changed with the mission to Brazil described above. The two missions to Brazil went beyond the evaluation of technology, but are intrinsically linked to it. In 1964 and 1965, Millar and his colleagues were looking for ways and partners which would enable direct CDC participation in smallpox eradication. Contrary to their evaluation of jet injection, Millar was initially enthusiastic at the prospect of collaborating with Brazilian health authorities and the PAHO. Despite some reservations about the latter organization (chapter 4), Millar was impressed by the effectiveness of some of Brazil's agencies involved in the eradication effort.⁹⁷

⁹⁴ CDC received Hingson's field reports. See Records of the CDC, Epidemiology Branch - Bacterial Diseases Section Correspondence (1961-1965), RG 442.67.A730, Box 4, Folder: Foreign Correspondence - General 1964-65, NARA Morrow, Georgia.

⁹⁵ It should be mentioned that France and the United Kingdom also developed and experimented other types of injectors during the 1960s. See Frank Fenner *et al.*, *Smallpox and its Eradication*, p. 580.

⁹⁶ Letter from D.A. Henderson to W. Charles Cockburn, April 14, 1964.

⁹⁷ Letter from Don Millar to D.A. Henderson, September 26, 1964. Letter from Don Millar to D.A. Henderson, October 11, 1964.

Based upon these findings and on a belief in the effectiveness of jet injectors, ambitious plans were laid out at and for the CDC by Henderson.

Indeed, soon after the return of Neff and Millar in October 1964, Henderson began drafting plans for smallpox eradication in the Americas in which jet injection and the CDC would play a significant role. Based on the findings of the first mission, Henderson estimated that eradication was feasible within a relatively short period of 3 to 5 years, if technical and financial assistance to boost national and international efforts was provided.⁹⁸ According to the draft proposal, the CDC would serve as a coordinating agency, thus implying direct intervention in international health programs: a first for both the CDC and the USPHS.⁹⁹ Additionally, Henderson specified the necessity of carrying out regional smallpox eradication without the participation of the USAID effectively trying to carve administrative space for the CDC to occupy when it came to technical assistance in matters of health.¹⁰⁰

The CDC, and Henderson in particular, aimed at actively participating in smallpox eradication, and Brazil offered opportunities for the agency to deploy its technology and epidemiologists. Specifically, the Henderson plan called for the assignment of three CDC epidemiologists to the PAHO to develop a continental disease surveillance system as well as a mechanism for field investigations of smallpox outbreaks and training in field epidemiology and jet injection at the CDC.¹⁰¹ Despite the discouraging reports from Millar during the first trip in the fall of 1964 concerning the limited performance of the technology, Henderson

⁹⁸ *Summary Proposal – Program for Smallpox Eradication in the Americas*, p. 2 attached to memo to Surgeon General from Deputy Chief, Bureau of State Services, “Smallpox Eradication in the Americas”, January 14, 1965. Records of the OASH, Office of International Health, RG 514.130.71.3.3, Box 6, Folder: Diseases Smallpox Eradication in the Americas, NARA College Park.

⁹⁹ Memo from Deputy Chief, Bureau of State Services to Surgeon General, “Smallpox Eradication in the Americas”, January 14, 1965.

¹⁰⁰ Memo from Deputy Chief, Bureau of State Services to Surgeon General, “Smallpox Eradication in the Americas”, January 14, 1965.

¹⁰¹ *Background and Rationale for Program of Smallpox Eradication in Americas*, undated, p.2, Records of the OASH, Office of International Health, RG 514.130.71.3.3, Box 6, Folder: Diseases Smallpox Eradication in the Americas, NARA College Park.

duly pointed out at the development of jet injections as a key innovation for smallpox eradication. So central they were to his plan that Henderson estimated that 250 jet injectors were required for the Brazilian eradication program.¹⁰² What is surprising, however, is that Henderson drafted and circulated his plan before more extensive jet injector trials were carried out. Therefore, it became crucial to demonstrate how and why jet injection outperformed multiple puncture. On this hinged the prospects of CDC expansion in smallpox eradication.

Despite the ambitious nature of his plan, Henderson was positive that it would be accepted by the upper echelons of the public health establishment. Writing to a colleague in early 1965, Henderson explained that “Progress is being made in setting up a South American smallpox program although it will be sometime before all the pieces fall into place. The odds are that [Millar] and Tom Mack, as minimum, will begin operation in Rio between July and September. A great deal of water must go over the dam before this is final but we are all most hopeful and enthusiastic.”¹⁰³ Obviously, the second mission to Brazil of January 1965 was as much about evaluating performance as it was about evaluating the prospects of CDC’s operations in Brazil.

In promoting its plan, the Surveillance Section adopted a two prong strategy of which Brasilia and Washington were the targets. Among the first task in January 1965 figured informing and selling the Henderson plan to key Brazilian public health officials. While it was warmly received by the mid-level personnel who collaborated with the CDC team, top level officials remained cautious in the absence of some form of firm commitment on the part of the American government. In light of this lukewarm reaction from Brazilian public health leaders, Millar changed his strategy: he would use the results of the Amapà

¹⁰² *Background and Rationale for Program of Smallpox Eradication in Americas*, undated, p. 2.

¹⁰³ Letter from D.A. Henderson to Ronald R. Roberto, January 19, 1965. Records of the CDC, Epidemiology Branch - Bacterial Diseases Section Correspondence (1961-1965), RG 442.67.A730, Box 4, Folder: Foreign Correspondence - General 1964-65, NARA Morrow, Georgia.

campaign and trials of jet injectors as leverage to press for discussions at the highest echelons.¹⁰⁴ The idea, as Millar wrote to Henderson, was to stimulate interest in Brazil to have the country seek assistance from the United States. Furthermore, Millar and Henderson also targeted the PAHO in order to promote jet injection and CDC participation as the *Final Report* is essentially the same document as Henderson's insofar as mechanisms for disease surveillance, assistance from foreign (i.e. American) organizations for training and reliance on jet injection technology. As the only civilian Federal agency with expertise of jet injection, the CDC would be ideally situated to answer the call. It is not clear if these discussions ever took place, but in this context Amapà became more than a testing ground: it became a central argument in the case for national and hemispheric smallpox eradication.

From Atlanta, Henderson set out to convince the upper echelons of the USPHS of the necessity of, first, eradicating smallpox in the Americas, and second committing the United States to support efforts of South American countries in this matter. As it was the case in Brazil, the performance of jet injectors was mobilized to garner support for the plan. Aside from the various economies of vaccine, manpower¹⁰⁵ and transportation mentioned before, the output of jet injectors was underlined with the impressive possibility of vaccinating between 700 and 1000 persons per hour in ideal situations.¹⁰⁶ Based on this data, Henderson concluded that "It is increasingly clear that the technique of vaccination by jet injection represents a significant breakthrough in immunization and thus holds great promise for possible eradication of

¹⁰⁴ Letter from Don Millar to D.A. Henderson, January 22, 1965. Records of the OASH, Office of International Health, RG 514.130.71.4.1 Box 16, Folder: Diseases Measles-Smallpox (Brazil), NARA College Park.

¹⁰⁵ Memo from D.A. Henderson to Delmar Ruthig, "Report on Brazilian jet injection smallpox program", February 26, 1965. Records of the OASH, Office of International Health, RG 514.130.71.3.3, Box 6, Folder: Diseases Smallpox Eradication in the Americas, NARA College Park.

¹⁰⁶ *Background and Rationale for Program of Smallpox Eradication in Americas*, undated, p. 2.

smallpox.”¹⁰⁷ USPHS memorandums suggest that Henderson was successful in influencing his colleagues into carrying out smallpox eradication in the Americas.¹⁰⁸ Technological arguments however did not prevail over administrative and foreign policy issues. In early April 1965, CDC’s Brazilian ambitions were dashed on the basis of “authority and consistency” with the United States posture in other international health activities.¹⁰⁹ Only in 1967 did a single CDC epidemiologist return to Brazil.

3.7 West and Central Africa

While the ambitions of the CDC to lead a campaign for smallpox eradication in the Americas were postponed and scaled back, other opportunities for international activities revolving around immunization by jet injectors opened up. From 1966 to 1972, CDC personnel using jet injectors conducted a mass measles control and smallpox eradication campaign spanning 20 countries in West and Central Africa.¹¹⁰ Contrary to the experience in Tonga and in Brazil where beliefs about jet injectors as solutions to eradication opened pathways for CDC participation in international health, it was problems in deploying the technology which provided Henderson and the Smallpox Unit a second window

¹⁰⁷ Memo from D.A. Henderson to Delmar Ruthig, “Report on Brazilian jet injection smallpox program”, February 26, 1965.

¹⁰⁸ Memo from Chief, CDC (James L. Goddard) to Deputy Chief, Bureau of States Services, “Proposed Program for Smallpox Surveillance and Eradication in the Americas”, February 26, 1965. Memo from Delmar Ruthig to James Watt, “Review of the CDC Summary Proposal – Program for Smallpox Eradication in the Americas”, March 8, 1965. Records of the OASH, Office of International Health, RG 514.130.71.3.3, Box 6, Folder: Diseases Smallpox Eradication in the Americas, NARA College Park.

¹⁰⁹ Memo from Associate Chief for Community Health (Alan W. Donaldson for Paul Q. Peterson, Assistant Surgeon General) to Director, Office of International Health, “Smallpox Eradication – Brazil”, April 7, 1965. Records of the OASH, Office of International Health, RG 514.130.71.4.1, Box 16, Folder: Diseases Measles-Smallpox (Brazil), NARA College Park. See Chapter 1 as well on the limits of CDC authority and mandate.

¹¹⁰ For more complete narratives of the West and Central African campaign see Horace G. Ogden, *CDC and the Smallpox Crusade*, Elizabeth Etheridge, *A Sentinel for Health*, chapter 14, and Frank Fenner *et al.*, *Smallpox and its Eradication*, chapter 17.

of opportunity to embed the technology in conjunction with CDC leadership in major programs beyond U.S. borders.

In West and Central Africa, CDC personnel worked in an environment where smallpox had been the target of colonial administration since the late 19th century and vaccination strategies were well entrenched. Indeed, the extension of colonial empires to Africa coincided with the establishment of tropical medicine as distinct fields in public health and clinical medicine.¹¹¹ Colonial powers, especially France, made interventions against smallpox a priority. France pioneered systematic vaccination in 1905 and was followed by the United Kingdom in the 1920s for the Gold Coast.¹¹² Public health authorities resorted to various means to prevent and contain outbreaks: reporting and isolation of cases, vaccination of infants by either mobile teams or at vaccination centers, and periodic revaccination. These programs were supplemented by special campaigns after serious epidemics. In addition to public health measures against smallpox, France and the United Kingdom set up laboratories in Africa to produce calf lymph vaccines in order to circumvent the problem of the limited lifespan of these fresh vaccines in tropical environments. In 1909, the Pasteur Institute in Kindia (Guinea) started producing dried smallpox vaccines which were especially well suited for the harsh African climate. By 1931, West and Central African territories under French colonial rule utilized almost exclusively dry vaccines either from local laboratories or supplied from the Paris Vaccine Institute, and fresh vaccine was administered when appropriate storage was possible.¹¹³ Despite these innovations and well-established procedures, smallpox remained a problem for colonial health authorities. Assessing earlier efforts during the 1950s, administrators began admitting that neither population growth and movement, nor vaccine potency, were responsible for recurring smallpox

¹¹¹ William H. Schneider. "Smallpox in Africa during Colonial Rule", p. 198-199.

¹¹² William H. Schneider. "Smallpox in Africa during Colonial Rule", p. 199.

¹¹³ William H. Schneider. "Smallpox in Africa during Colonial Rule", p. 212.

outbreaks and failure to eliminate the disease on the continent.¹¹⁴ The problem lied in achieving high coverage rates and ensuring that vaccines were properly administered. A 1951 medical report on Nigeria concluded that: “Real control lies in increasing the reliability and output of provincial and district staff, mostly Native Administration employees who alone are in a position to vaccinate with sufficient frequency and regularity the population in their care.”¹¹⁵ Similarly, French authorities underlined the necessity to reach a greater proportion of the population and decrease absenteeism. In 1953, the Director-General of the Public Health Service for French West Africa stated the importance, among other considerations, of creating favourable conditions, for example by “giving better consideration to those vaccinated by following such practices as making sure they could wait in the shade both before vaccination and for ten minutes thereafter to check for reaction.”¹¹⁶ Despite the end of colonial rule in West and Central Africa in the late 1950s, public health practices inherited from the United Kingdom and France continued. Furthermore, the newly independent countries, especially those formerly under French rule, still felt the influence of their former colonizers through various regional organizations and agreements, such as the *Communauté Française*, proposed by de Gaulle in 1958, and the British Commonwealth. Thus, the conclusions reached at the beginning of the 1950s were still considered relevant when the CDC started negotiating agreements in the mid-1960s.

The West African Measles Control and Smallpox Program (SMP) did not originate from the CDC and, additionally, smallpox was not the primary concern of its initial sponsor. Measles was the focus of a vaccine study in Africa conducted by the NIH and the USAID. What had started out as a joint program field trial of a new measles vaccine between the NIH and the Ministry of Health of Upper Volta (now Burkina Faso) on a study group of 600 children gradually evolved into a

¹¹⁴ William H. Schneider. “Smallpox in Africa during Colonial Rule”, p. 214.

¹¹⁵ *Nigeria Annual report*, 1951, p. 17 quoted in William Schneider, p. 216.

¹¹⁶ William H. Schneider. “Smallpox in Africa during Colonial Rule”, p. 215.

mass program targeting over 700,000 children.¹¹⁷ During 1962 and 1963, Harry Meyer of the NIH also carried out other studies on the safety and efficacy of vaccines administered simultaneously by jet injectors.¹¹⁸ Vaccinations were carried out by NIH personnel using a modified nozzle to augment the quantity of intradermally deposited vaccine. Primarily concerned with measles, Meyer concluded that children could be economically immunized by the mobile health teams found in francophone West African countries. As he pointed out: “Measles vaccination with syringe and needle would pose several technical and financial problems for large field programmes. Many of these difficulties could be overcome by the use of jet injectors which [...] can be successfully employed to deliver any of these vaccines, either alone or in combination.”¹¹⁹

Based on the results of sharply declining cases of measles in Upper Volta, the Organisation de coordination et de coopération pour la lutte contre les grandes endémies (OCCGE) regrouping French-speaking countries of West Africa approached the USAID to finance a regional measles control program using jet injectors. Following Meyer’s conclusions, the USAID and its African partners relied on jet injection technology to replace syringes to administer measles vaccines. By purchasing and distributing the device to national health ministries participating in the program, the USAID effectively populated West Africa with the technology. When the measles campaigns began in six countries in late 1964, the NIH disengaged from the program, as mass immunization laid outside its mandate which focused on basic science. The USAID turned to the CDC for technical and advisory help: it was one of the few organizations with field experience using jet injectors in a mass campaign in tropical environments.

¹¹⁷ Horace G. Ogden, *CDC and the Smallpox Crusade*, p. 21-22.

¹¹⁸ Harry M. Meyer Jr. *et al*, “Response of Volta Children to Jet Inoculation of Combined Live Measles, Smallpox and Yellow Fever Vaccines”, *Bull Wld Hlth Org*, Vol. 30 (1964), p. 783-794.

¹¹⁹ Harry M. Meyer Jr. *et al*, “Response of Volta Children to Jet Inoculation of Combined Live Measles, Smallpox and Yellow Fever Vaccines”, p. 793.

In December 1964, three CDC epidemiologists (Lawrence Altman, Michael Lane and Ralph 'Rafe' Henderson) travelled to West Africa to review the USAID sponsored measles campaign. What they found was a disorganized program plagued with numerous failures. Problems included inadequate vehicles, lack of administrative support, training issues and failing refrigerators to store heat sensitive measles vaccines. Altman and his colleagues also found that jet injectors were breaking down and that their operators were unable to perform minor field repairs. The USAID relied on earlier truck-mounted, electrically powered injectors developed by the military. While sturdier than the CDC Ped-O-Jets, USAID equipment was not as easily deployed in remote areas.¹²⁰ Despite these setbacks, USAID eventually extended its measles immunization program to neighbouring West African countries, bringing the total to eleven and concurrently requested from the CDC additional epidemiologists for assistance. USAID difficulties became a CDC opportunity. With the CDC South American smallpox eradication program proposal facing legal and political obstacles in April 1965; in August 1965, Henderson proposed a combined measles-smallpox vaccination campaign, merging USAID and African desires with CDC ambitions. The White House approved the proposal and announced it on November 23rd 1965. By the time the program officially began on January 1st 1966, almost all West and Central African countries had ratified program agreements with the USAID to conduct a joint measles-smallpox vaccination campaign.

With its proposal for smallpox and measles vaccination accepted, the CDC proceeded to define the conditions which would maximize the output of jet injectors in the field. Its *Manual of Operation*, which eventually served as a basis for the WHO's own guide to smallpox eradication, explained various elements to take into account during operations, ranging from relations with foreign governments, USAID and other actors to how to conduct surveillance operations

¹²⁰ Interview with Jay Friedman (Mali) by Diane Drew, July 13, 2006.

<http://globalhealthchronicles.org/smallpox/record/view/pid/emory:158h8>, accessed May 27, 2009.

and store vaccines. The *Manual of Operation* made explicit how to deploy the equipment in order to capitalize on what had made it a breakthrough, namely high vaccination speed and low costs per shot. To this end, a number of actors needed to be aligned. It should be noted that the *Manual of Operation* emphasized flexibility rather than a region-wide single approach to conduct vaccination. Therefore, its recommendations represented ideal-type scenarios which were constantly modified and adapted to local conditions. Nonetheless, the manual of operation elaborated by the CDC specified the parameters for jet injector utilization.

Using this technology required that CDC epidemiologists and their collaborators engage in heterogeneous engineering¹²¹ to set up and operate a smoothly functioning vaccination system. Beyond simply operating jet injectors, humans, supplies and sites were the aspects the *Manual of Operations* identified as necessitating the attention of the vaccination teams. These various elements needed to be arranged in a way which permitted jet injectors to function up to their theoretical capability of 700 to 1000 shots per hour per vaccinator. To maximize output of these “vaccination factories”, attention was given to four elements: site selection and preparation, post design, disciplining of humans and finally supply of raw material, i.e. unvaccinated bodies.

Adding to novel immunization technology, the vaccination post approach elaborated by the CDC departed from the approach of the other large-scale international health program, namely the Malaria Eradication Program. That program relied on house-to-house visits by teams of sprayers to coat walls with residual insecticides in order to halt malaria transmission. Even with smallpox vaccination, house-to-house remained in favour in the USPHS (see Fredericksen above) and in many areas of the world. Thus, what the CDC proposed was a

¹²¹ On this concept, see John Law, “Technology and Heterogeneous Engineering: The Case of Portuguese Expansion” in Wiebe E. Bijker, Thomas Parke Hughes and Trevor J. Pinch (eds.), *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology* (Cambridge, Mass.: MIT Press, 1990), p. 111-134.

change from what had been the traditional approach in large scale vertical international health programs.¹²²

The first step elaborated by the CDC was properly training vaccination teams and establishing vaccinating posts. This process needed to become second nature: “Prior to initiating field activities, the team should be drilled in regular coordinated routine for setting up vaccination station, including [...] flushing guns and preparing them for use, placing records in order, and arranging the whole in such a way that there can be a smooth flow of vaccinees.”¹²³ Based on its experience in Jamaica in 1963, the CDC instructed teams to choose buildings with two distinct access points: one for unvaccinated persons and the other serving as an exit, ideally removed from the entry point: “So far as possible, all efforts should be made to have the vaccinees enter at one end of a vaccination “production line” and leave at the other end, with a clear separation of those vaccinated and those waiting to be vaccinated.”¹²⁴

Inside the post, elements were arranged to streamline the vaccination process. From the location of vaccinators to tally sheets, planners conceived a basic set up which revolved around the high speed capabilities of jet injectors, with the intent of minimizing interference in the production process. Contrary to the Jamaican field trials where extensive records were used and a large number of clerical personnel mobilized, CDC experts proposed a simplified tally mechanism. In Jamaica, CDC estimated that only 700 to 1000 shots per day were given and attributed this somewhat disappointing performance to lengthy record keeping

¹²² During the colonial era, some countries did resort to a collecting point approach to vaccinate against smallpox. So while new to postwar international health programs, vaccination posts were not as novel to African public health officials. William H. Schneider. “Smallpox in Africa during Colonial Rule”, p. 205-208.

¹²³ CDC, *West and Central Manual Smallpox Eradication/Measles Control Program. Manual of Operations, October 1, 1966.* <http://globalhealthchronicles.org/smallpox/record/view/pid/emory:15j4k>, accessed May 17, 2009, p. III – 22.

¹²⁴ CDC, *West and Central Manual Smallpox Eradication/Measles Control Program. Manual of Operations, October 1, 1966*, p. III – 22.

of the vaccination production line. Thus, tally sheets were adapted to provide data only on age and the number of vaccinations in order to measure coverage rates by comparing them with official census numbers. Post design centered on setting up vaccination corridors with jet injectors on each side of the line: “This should be constituted as a sort of corridor with the measles injector on one side and the smallpox vaccine injector on the other.”¹²⁵ Swabbing stations and recorders were to be placed away from vaccination stations so that they would not interfere with the rhythm of the jet injectors. Thus, vaccination posts were conceived with immunization technology as the central organizing principle in mind.

Above all concerns, the main elements necessitating disciplining by the vaccination teams were human bodies. When proceeding with vaccination, teams had to be able to keep crowds clear of jet injector stations because: “if not, the efficiency of the vaccinating teams will be markedly diminished.”¹²⁶ This point was further emphasized by stressing: “the need for keeping the vaccinators free of the crowds cannot be underestimated. A certain rhythm is established in a rapid, orderly completion of the job. A curious, noisy, pushing multitude is guaranteed to reduce efficiency.”¹²⁷ What the CDC suggested in its manual were various strategies to align humans so that machines could perform to their expected capabilities. Aside from the recourse to military personnel or local law enforcement, low technology such as balls of twine could, if properly used, be valuable in disciplining bodies.¹²⁸ As noted in the *Manual*: “Even devices such as

¹²⁵ CDC, *West and Central Manual Smallpox Eradication/Measles Control Program. Manual of Operations, October 1, 1966*, p. III – 25.

¹²⁶ CDC, *West and Central Manual Smallpox Eradication/Measles Control Program. Manual of Operations, October 1, 1966*, p. III – 22.

¹²⁷ CDC, *West and Central Manual Smallpox Eradication/Measles Control Program. Manual of Operations, October 1, 1966*, p. III-26

¹²⁸ Recounting his experience in Cameroon, Bob Baldwin said: “I do remember being out there and immunizing kids with a ped-o-jet in each hand, smallpox in this gun and measles vaccine in this gun, and I’m pushing down on the foot pedal for this gun, to charge it and give the kid an immunization, and the other one with the other hand. And they’re crowding around, and crowding to the point where you couldn’t work. The Africans were so afraid that you were going

twine tend to exert a psychological effect encouraging people to line up.”¹²⁹ These crowd control strategies coupled with vaccination post design, CDC program planners thought, would create the conditions for optimum use of jet injection equipment. One final element remained in order to make these vaccination factories an effective strategy: raw material procurement.

As the Brazilian experience had made clear, jet injectors were most useful when deployed in situations where populations are concentrated. Contrary to the public relations and tactics utilized in the later stages of the smallpox eradication campaign, and notably in India, where cash rewards were incentives and public health officials aggressively tracked down remaining cases, the approach advocated in West Africa was geared toward mass mobilization.¹³⁰ It was important to convince populations to assemble at designated areas to receive their shots against smallpox and measles. Consequently, when drafting operations guidelines for West Africa, the authors of the *Manual* underlined the importance of publicity and public relations for the success of a jet injection-based campaign. As specified: “This is particularly key in a campaign which depends upon persons coming to vaccination centers instead of the more traditional door-to-door program with vaccinators going to the vaccinees.”¹³¹ The West African context offered ample opportunity to adopt non-traditional propaganda strategies to reach the bulk of the population. To ensure success, the CDC encouraged its medical and operations officers to go farther than the

to run out of vaccine, that their children weren’t going to get immunized, that they would just... And so I had to, a number of times I had to stop and just say to the headman or to the chief, you’ve got to get the people lined up, in a line. I can’t work here. I mean, if I can’t work, I can’t immunize them.” Interview of Bob Baldwin by Melissa McSwegin-Diallo, 13 July, 2006. <http://globalhealthchronicles.org/smallpox/record/view/pid/emory:156mg>, accessed June 1, 2009.

¹²⁹ CDC, *West and Central Manual Smallpox Eradication/Measles Control Program. Manual of Operations, October 1, 1966*, p. III – 24.

¹³⁰ See Paul Greenough, “Intimidation, Coercion and Resistance in the Final Stages of the South Asian Smallpox Eradication Campaign, 1973-1975”, *Social Science & Medicine*, Vol. 41, No. 5 (1995), p. 633-645.

¹³¹ CDC, *West and Central Manual Smallpox Eradication/Measles Control Program. Manual of Operations, October 1, 1966*, p. III – 28.

rather tame American public health campaigns: “Many feel, therefore, that public health propaganda methods require re-examination and imaginative adaptation to the accepted norms of the society that is to be influenced within the limits of professional dignity.”¹³² The *Manual* suggested mobilizing as many communication channels as possible, from mass media to bush telegraph. Additionally, teams carried, along with vaccines and injectors, sound equipment. It was argued that: “This device, if used with the team trucks, can produce fairly broad local impact in a short time.”¹³³ Appeal to national pride, use of motorized floats and military parades and organization of raffles were cited, among other examples. While unproven tactics to attract public attention, they were nonetheless presented as valid ways to make the campaign a success.

Another important if not crucial aspect underlined was the enrolment of community leaders to gain acceptance where vaccination took place. CDC’s Smallpox Unit had experienced in Tonga how authority figures could induce population in participation in vaccination campaign. Indeed, Ronald Roberto had made extensive use of films depicting the Prince being vaccinated by jet injectors to encourage Tongans to gather at vaccination sites. Similarly in the West African context, CDC program planners accentuated the need to not only identify influential persons and organizations but also earn their support. Failure to obtain their approval might, the *Manual* specified, result in opposition and resistance to vaccination from the local population. The CDC taught their teams to look at a variety of organizations and individuals: business leaders, party representatives, school teachers, churches, emirs (in the case of Northern Nigeria), and even practitioners of non-western medicine such as “fétisheurs” in some regions of francophone West Africa.

¹³² CDC, *West and Central Manual Smallpox Eradication/Measles Control Program. Manual of Operations, October 1, 1966*, p. III – 28.

¹³³ CDC, *West and Central Manual Smallpox Eradication/Measles Control Program. Manual of Operations, October 1, 1966*, p. III-32.

Adding to a novel way of carrying out an international health program in a developing world context by opting for a new vaccination strategy, the design of the smallpox eradication and measles control program implied learning new skills. As noted earlier in this chapter, traditional smallpox vaccination methods required a specific set of skills in order to successfully confer immunity to populations. In the case of multiple-pressure technique, vaccinators needed certain dexterity in order to use straight surgical needles, deposit the vaccine intradermally and minimize wastage. Furthermore, because this procedure could be painful, it meant learning relational skills to assuage maternal concerns over child vaccination. On the part of the vaccinator, emotional detachment could also be a desirable attitude since it could affect vaccination outcomes, especially in infants. Training in using this technique represented a challenge of its own.¹³⁴ As exemplified during the Amapà trials when preparing for comparative studies, CDC epidemiologists noticed a variability of skill resulting in a wide gap in takes, with some vaccinators achieving only 30% successful takes and others reaching 100%. The introduction of jet injectors into smallpox vaccination programmes entailed a different set of skills made explicit in training material.

As the CDC appropriated and built its expertise in jet injectors for smallpox immunization, it also took over training activities in using the technology. This position allowed the agency to define and emphasize which skills were necessary to operate jet injectors and who should employ the devices. These skills were not necessarily difficult to acquire as the CDC estimated that one could learn to operate jet injectors within one hour. The requirement of having basic mechanical skills was the most obvious difference when comparing to older vaccination methods. Vaccinators were trained to recognize all mechanical components of the jet injector; they were also trained to perform mechanical diagnostics and for troubleshooting in case of breakdowns. Furthermore, this

¹³⁴ Donald A. Henderson, "The Saga of Smallpox Eradication: An End and a Beginning", *Canadian Journal of Public Health*, Vol. 70 (January/February, 1979), p. 24.

technology mobilized the sense of hearing, which was not the case with the multiple-pressure technique. Instructional booklets taught vaccinators to recognize hollow sounds indicating an incomplete vaccination and sounds of a ready injector: “The sound you now hear is the normal idling sound. The injector is not under strain. The sound you must become familiar with is the change from this idle to the lower pitch when you turn the cocking lever to “INJ.””¹³⁵ Just as CDC medical and operations officers got smallpox eradication underway on the African continent, a call for help and equipment unlocked a door which had been closed just a few years earlier.

3.8 Operation Elephant

A year after the CDC had started sending personnel and equipment to West Africa, another window of opportunity opened that would allow it to play a role in the fight against smallpox in the world’s largest endemic country. This occasion occurred in a context of severe epidemic in the Indian subcontinent, international concerns about the future of India’s National Smallpox Eradication Program (NSEP) and particular foreign policy orientations of the Johnson Administration. During this episode dubbed “Operation Elephant”, CDC officials not only needed to decide whether the deployment of jet injectors would make a difference in containing the epidemic, but also had to take into account diplomatic considerations.¹³⁶

In 1967, severe outbreaks of smallpox in the states of Maharashtra and Bihar confirmed that India remained a “major reservoir of variola” despite commitments to eradicate the disease on the part of Indian authorities.¹³⁷ These

¹³⁵ Communicable Disease Center, *Jet Injector Operation (1964)*, p. 4, 9. Records of the CDC, Office of Director - Information Office, Editorial Unit, Files, RG 442.68.A1665, Box 6, Folder: Training Program, 1962-1968, NARA Morrow, Georgia.

¹³⁶ Ilze Henderson, personal journal notes, May 13, 2008, personal papers of David J. Sencer.

¹³⁷ Sanjoy Bhattacharya, *Expunging Variola*, p. 139.

outbreaks indicated that the NSEP failed in preventing serious explosions in the number of cases. An initial reaction from the Indian Ministry of Health was to request millions of vaccines doses from foreign countries, including the United States. Indeed, vaccines stockpiles were fast diminishing and became cause for concern as national production was not able to meet exploding demand.

On April 22 1967, the USAID New Delhi office received an official request for ten million doses of freeze-dried vaccine to “combat [a] developing epidemic”.¹³⁸ If the Indian public health authorities singled out vaccines as the most pressing need to fight outbreaks, it also considered jet injectors. This first cable from India illustrates that the public authorities were initially uncertain about asking the United States for its immunization devices. This uncertainty was quickly replaced by a sense of urgency. Three days later, another cable from New Delhi specified that the “MOH [Ministry of Health] would like as many Ped-o-Jet injectors as NCDC can spare”, accompanied by one or two technicians and “perhaps one medical epidemiologist knowledgeable in smallpox[.]”¹³⁹ The CDC responded favourably to this request by sending Ralph (Rafe) Henderson, Lyle Conrad and Gordon Reid along with only two injectors to the Indian National Institute of Communicable Disease (NICD) to help fight the epidemic.¹⁴⁰ When compared to the number of jet injectors deployed in West Africa, it certainly was a disappointment for Indian public health officials.¹⁴¹ Expectations were very high

¹³⁸ Telegram from Bowles to SECSTATE, Washington D.C, “Smallpox Vaccine for Emergency Relief”, April 22, 1967. Records of the OASH, Office of International Health, RG 514.130.71.3.3, Box 6, Folder: Diseases Measles-Smallpox (India), NARA College Park. In comparison, the Indian Government had looked to the USSR to provide 100 million doses in November 1966. This demand was unanswered by April 1967 when the Ministry of Health turned to the United States.

¹³⁹ Telegram from Bowles to SECSTATE, Washington D.C, “Smallpox Vaccine”, April 25, 1967. Records of the OASH, Office of International Health, RG 514.130.71.3.3, Box 6, Folder: Diseases Measles-Smallpox (India), NARA College Park. Interestingly, the Ministry of Health also sought to take advantage of the smallpox epidemics to secure jet injectors to vaccinate against other diseases such as cholera and typhoid.

¹⁴⁰ Telegram from Don Millar to Ralph Henderson, April 26, 1967, Folder 2008.1.1, Records of the David J. Sencer CDC Museum, Centers for Disease Control and Prevention, Atlanta, Georgia.

¹⁴¹ In comparison, Brazil received from PAHO/WHO 350 jet injectors to conduct its eradication campaign. Gilberto Hochman, personal communication, April 13, 2010.

as Ralph Henderson related that it was thought that smallpox could be eradicated in a few months.¹⁴²

If the technology facilitated the presence of CDC, it did little to smooth out relations between the American epidemiologists and local health authorities. While the Indian Ministry of Health resorted to requesting U.S. assistance, the head of the NSEP (Dr. Singh) was hostile to the American presence and made it clear he was at the helm of “Operation Elephant”. As head of this emergency mission, Rafe Henderson and Ernest Tierkel (a CDC veterinarian assigned to USAID/NICD) engaged in lengthy negotiations with NSEP officials in planning the deployment of jet injectors and CDC personnel. Furthermore, expertise with the technology did not translate for the Indian health official into knowledge about smallpox. Lyle Conrad recalls: “We did not have it [smallpox] in the US--so how could we be experts in it? They had it all the time, by the thousands of cases, and that’s why they were experts in how to handle it.”¹⁴³ Acceptance of Ped-o-jets varied however. As Conrad travelled away from Delhi to epidemic areas, he found demands for vaccination with the device by local health officials and army officers eager to be immunized with the new technology.¹⁴⁴ In addition to political obstacles, a fast depleting stock of vaccines compatible with the jet injector and lack of saline diluents to prepare doses from dried vaccines complicated the deployment of the technology and the continued presence of CDC personnel in the short-term. Resorting to sterile water produced a stinging injection which left NSEP officials skeptical about switching to jet injection for its

¹⁴² Interview of Ralph H. Henderson by Victoria Harden, 7 July 2006.
<http://globalhealthchronicles.org/smallpox/record/view/pid/emory:15ncv>, accessed June 2, 2009.

¹⁴³ Lyle Conrad in Ilze Henderson, personal journal notes, May 13, 2008, personal papers of David J. Sencer. D.A. Henderson is more understanding about Dr. Singh feelings towards the mission. He has a high opinion of him as he fought to keep the NSEP from folding as smallpox persisted despite renewed attempt to eliminate the disease. Henderson hypothesizes that Singh was probably informed about the USAID initiative as the CDC team arrived in India. By this interpretation, failure to give advance notice would have contributed in making cooperation difficult between the CDC and the NSEP.

¹⁴⁴ Lyle Conrad in Ilze Henderson, personal journal notes, May 13, 2008, personal papers of David J. Sencer.

campaign.¹⁴⁵ Nonetheless, the impact of those injectors would go beyond their immediate impact on the number of vaccinations and the month-long presence of Rafe Henderson, Lyle Conrad, and their colleagues.

By June 1967, the USAID started considering withdrawing jet injectors from operation. The reasons behind this are unclear but reports from the field illustrate that Ped-O-Jets had become more than tools of vaccinations. While it was acknowledged by American consultants that jet injectors had only a minimum effect on the overall efforts despite being useful in circumstances where people congregated, their impact was stymied by the fact that the NSEP conducted a house-to-house vaccination campaign. On the political front, however, the value of jet injectors was much higher. Reporting the situation in the field, Dr. Franz Rosa (Chief of USOM health and family planning in India) stated that: "The abrupt withdrawal of Ped-O-Jets would be diplomatically and technically disrupting."¹⁴⁶ Assessing the broader implications of following this course of action on U.S. commitment to eradicate smallpox, Rosa maintained that: "Abrupt termination of the Ped-O-Jet demonstration would hurt long-term prospect for U.S. impact on smallpox."¹⁴⁷ Instead, Rosa pushed for the assignment of CDC personnel to the NSEP. USOM personnel were impressed by the good relations initiated by CDC people with the smallpox authorities within Indian government. This was no small feat as the public health officials of the federal, state and local levels were generally reluctant to accept foreign smallpox consultants.¹⁴⁸ Eager to capitalize on this, USOM pushed for "assignment of a full

¹⁴⁵ William H. Foege, *House on Fire*, p. 204, note 29.

¹⁴⁶ Telegram from Bowles to AID/Washington, "Smallpox and NICD", June 9, 1967. Records of the OASH, Office of International Health, RG 514.130.71.3.3, Box 6, Folder: Diseases Measles-Smallpox (India), NARA College Park.

¹⁴⁷ Telegram from Bowles to AID/Washington, "Smallpox and NICD", June 9, 1967.

¹⁴⁸ Sanjoy Bhattacharya, *Expunging Variola*, p. 161-162. This was not the case with every disease however. The CDC had collaborated early on with the NICD after its creation in 1963. It regularly assigned personnel to the malaria eradication branch, and Ernest Tierkel served as a foreign consultant on zoonoses. David Sencer pushed to create a joint training program on tropical diseases in 1967. D.A. Henderson tried to initiate a joint WHO/NICD/NCDC in smallpox project in December 1966 which seems to never have materialized. It is fair to say that NICD was a key

tour smallpox consultant under NICD project” for it was a “high priority (despite past and present difficulties) to establish U.S. entrée in India for international smallpox control.”¹⁴⁹ Rosa also requested from the CDC to purchase the jet injectors on loan to assign them to the NICD. Taking into account wider considerations than epidemiological factors, the CDC finally sold 16 injectors to the NSEP.¹⁵⁰ The epidemic and jet injectors thus opened doors which had been closed for the CDC only 3 years earlier, but the CDC was not ensured a continued presence until the 1970s, this time under WHO auspices.

The assignment of CDC personnel and jet injection equipment took place in the particular context of U.S. foreign policy toward India. Pulling India towards Western powers and establishing it as a shield against communist expansion was the main goal of American foreign policy during the Cold War. What differed during the Johnson presidency was the importance accorded to science and technology and a tendency to take advantage of India’s woes to achieve this objective. The work of historians Richard E. Doel and Kristine C. Harper reveals how Lyndon Johnson sought to make “dramatic uses of modern technology to attack India’s basic problems of food, overpopulation, health and education.”¹⁵¹ Johnson’s main focus was on agricultural production. In 1965-66, India faced serious crop failures when rain levels fell below expectations and threatened rice production, which are heavily dependent on water. As would be the case during the smallpox epidemic of 1967, one of the states most affected by falling crop production was, incidentally, Bihar. While the Johnson administration did

access point to India for CDC personnel. See memo from Ernest S. Tierkel (NCDC/NICD Project) to Henry M. Gelfand (Chief, West African Operations, Smallpox Eradication Program, NCDC), March 16, 1967, Records of the CDC, Office of the Director Files 1967-1968, RG 442.71.A831, Box 3, Folder: Cooperation General 2-3 India Foreign Governments, NARA Morrow, Georgia.

¹⁴⁹ Telegram from Bowles to AID/Washington, “Smallpox and NICD”, June 9, 1967.

¹⁵⁰ Telegram from AID/Washington to AID/New Delhi, August 4, 1967, Records of the OASH, Office of International Health, RG 514.130.71.3.3, Box 6, Folder: Diseases Measles-Smallpox (India), NARA College Park.

¹⁵¹ Richard A. Hare quoted in Richard E. Doel and Kristine C. Harper, “Prometheus Unleashed: Science as Diplomatic Weapon in the Lyndon B. Johnson Administration”, *Osiris*, Vol. 21, (2006), p. 73.

provide food aid to India, it also sought to “force the government to reform its agricultural program by making it a higher economic priority.”¹⁵² Johnson also looked at science and technology to achieve his foreign policy goals. Concretely, the State Department and Johnson resorted to nascent weather control technology developed by the military to modify rainfall patterns.¹⁵³ Even if the United States failed produce rain to save the crops, this illustrates the faith put into applied science during the Johnson administration and must serve as a key element in understanding the context in which shipment of jet injection technology took place.¹⁵⁴

As was the case with agriculture, American foreign policy sought to take advantage of the smallpox epidemic to achieve two distinct goals. First, as mentioned above, Lyndon Johnson had put the weight of the U.S. behind the WHO to eradicate smallpox and had taken steps in fulfilling this pledge by authorizing the CDC-initiated West African program. Attacking smallpox at its heart was thus in line with U.S. policy concerning international health. Furthermore, it was understood by backers of WHO’s Intensified Smallpox Eradication Program launched in 1967, including the United States, that if India pulled out, the campaign was destined to fail.¹⁵⁵ Second, it is entirely possible

¹⁵² Richard E. Doel and Kristine C. Harper, “Prometheus Unleashed: Science as Diplomatic Weapon in the Lyndon B. Johnson Administration”, p. 76

¹⁵³ Richard E. Doel and Kristine C. Harper, “Prometheus Unleashed: Science as Diplomatic Weapon in the Lyndon B. Johnson Administration”, p. 78

¹⁵⁴ Ilze Henderson’s personal journal contains the comments of Lyle Conrad, Rafe Henderson, D.A. Henderson and William Foege about Operation Elephant. Aside from Rafe Henderson and Lyle Conrad, D.A. Henderson, then head of the WHO Smallpox Unit was in the dark as to this ‘caper’ by the CDC and USAID. He is not surprised that the USAID decided to undertake this on its own without referring to the WHO or SEARO but is dismayed that such an operation took place in the context of intense negotiations to keep India committed to smallpox eradication. More intriguingly however, William Foege remarked: “This is getting most interesting. If we do this right, the amended history will be even more exciting than the actual events. My suggestion: Rafe, could you do a series of trip reports extending over a 10 year period following up on your original trip, each report showing copies sent to Geneva? In the reports you can demonstrate how you followed up on the specific suggestions provided by Geneva on the prior report.” As the Geneva-based WHO knew nothing about this mission, it is puzzling that Foege suggests linking Operation Elephant with later phases of eradication in India.

¹⁵⁵ Sanjoy Bhattacharya, *Expunging Variola*, p. 161.

that behind the commitment to smallpox eradication were political considerations. It was no secret that most smallpox cases reported globally were located in the politically sensitive Indian subcontinent, where China, Pakistan and India engaged in a series of military clashes.¹⁵⁶ Helping India during a severe smallpox epidemic was coherent with other U.S assistance missions such as food aid and testing weather control technology and followed similar techno-political reasoning on a reduced scale. Johnson and the State Department could certainly hope reaping the diplomatic dividends by providing vaccine and sophisticated immunization equipment during a time of public health crisis.

With most of its manpower deployed in West Africa, the Smallpox Unit did not exploit this window of opportunity until the final stages of global eradication program in the mid to late 1970s when William Foege and other CDC epidemiologists worked under WHO auspices. Henry Gelfand did travel to India later in 1967 to report on the NSEP, but worked as a consultant for the WHO. By the 1970s, bifurcated needles had become the tool of choice and surveillance and containment replaced mass vaccination as the organizing strategy to locate and jugulate outbreaks. Nonetheless, the assistance mission to India made USAID and CDC realize the strategic importance of jet injectors. In June 1968, both agencies reached an agreement to establish a reserve of twenty million vaccines and jet injectors to be deployed outside of West Africa.¹⁵⁷

3.9 Reliability and Bifurcated Needles

To explain the discontinuation of jet injectors for smallpox eradication and the adoption of the bifurcated needles, it is argued that reliability issues,

¹⁵⁶ The Sino-Indian War took place in October-November 1962. India and Pakistan engaged in a series of clashes between April and September 1965.

¹⁵⁷ USAID, *Epidemic Reserve, Smallpox Vaccine for Jet Injection Use*, February and August, 1968, Records of the CDC, Office of the Director Files 1967-1968, RG 442.71.A831, Box 6, Folder Programs and Projects - Smallpox Eradication Program, NARA Morrow, Georgia.

maintenance and difficulties in gathering large crowds made the technology less advantageous.¹⁵⁸ Surprisingly, one hardly finds any mention of reliability problems in letters and reports prior to their deployment in Africa by the USAID and subsequently the CDC. In his report on jet injectors to the PAHO, Millar even concluded that the devices had functioned with minimum problems and only suggested minor adjustments to make their maintenance and use more efficient.¹⁵⁹ Prior to the West African program, only one letter refers to the failings of jet injectors. Writing about the Jamaican vaccine trials, Ronald R. Roberto suggested that vaccination teams always bring an additional injector in case of a breakdown. To which he further added: “One almost has to follow the principle of guerrilla warfare as laid down by Uncle Mao. I suppose that the two groups going off to Togo and Brazil left Mike hi and dri with just one pistol. Is our army getting too big, or are the munitions makers letting us down?”¹⁶⁰ More references to problems with jet injectors however are found in oral interviews conducted to commemorate the West African program. For instance, Denis Olsen who was dispatched in Liberia explains: “I spent a lot of time in training programs because we were using Ped-O-Jet equipment, and so we spent a lot of classroom time in operations maintenance of it. And, of course, we had to wait for supplies to come in. There was always something in the early days that was keeping us from going up-country.”¹⁶¹ Working in Mali, Jay Friedman faced similar difficulties:

“Unfortunately, the Ped-O-Jets were not made for the military. They were made for CDC by a firm in New York, and I don’t think they were up to the same quality level. The guns would break—not so much break, as

¹⁵⁸ Frank Fenner *et al.* *Smallpox and its Eradication*, p. 579

¹⁵⁹ J.D. Millar *et al.*, *Report to the Pan American Health Organization of Evaluation of Use of Jet Injection in Smallpox Vaccination in Brazil, January 16 – March 3, 1965*, p. 35-36.

¹⁶⁰ Letter from Ronald R. Roberto to D.A. Henderson, February 20, 1965. Records of the CDC, Epidemiology Branch - Bacterial Diseases Section Correspondence (1961-1965), RG 442.67.A730, Box 4, Folder: Foreign Correspondence - General 1964-65, NARA Morrow, Georgia.

¹⁶¹ Interview of Dennis Olsen by Diane Drew, July 14, 2006.

their internal valves and springs would wear out or get stuck. The nozzles would clog, for which we had special wires to ream them out. And especially the pedal, the pedal pump. I think they were made of aluminum with Teflon O-rings acting as piston rings. And this aluminum, being a soft metal, would wear out very quickly. Being an ex-mechanic, I had to fix them all the time, although I trained Malians to work on them, which is not very difficult. And we spent a lot of time fixing these Ped-O-Jets. In fact, in Mali, we had 1 guy, a vaccinator, assigned full-time to work on Ped-O-Jets that were being used out in the field. So we had to transport them back to the capital to have this guy work on them. The simple repairs could be done in the field. But any time the pedal pump broke, you had to send it in. You had to re-machine the whole piston when that happened.”¹⁶²

Despite reliability issues and the introduction of the cheaper bifurcated needle, jet injectors remained in operation in smallpox eradication in Brazil, Zaire and in West and Central Africa.¹⁶³ In this later campaign, injectors remained the instrument of choice for the CDC because it allowed simultaneous administering of measles and smallpox vaccines.

The introduction of the bifurcated needles in the global smallpox campaign changed the perception of jet injectors. If in 1964-1965, Ped-o-Jets were a technological breakthrough putting complete eradication within the realm of possibility, by 1968 they had become heavy, expensive and difficult to maintain in working order. These problems were compounded by challenges in assembling large crowds to realize their high output and justify their deployment. One cannot help but wonder how it would have affected CDC endeavours in playing a

¹⁶² Interview of Jay Friedman by Diane Drew, 13 July, 2006.

¹⁶³ Frank Fenner *et al.*, *Smallpox and its Eradication*, p. 579. On Zaire, see R. Leike. “La campagne d’éradication de la variole en République du Zaire”, *Bulletin de la Société de la pathologie exotique et de ses filiales*, Vol. 65, No. 4 (Sept-Oct 1971), p. 761-775.

primary role in smallpox eradication if these issues with the technology had occurred earlier during vaccine trials or jet injector trials in Brazil. As presented in this chapter, the devices played such an important role in permitting overseas deployment of CDC epidemiologists that if public health and political leaders were not convinced that injectors could be a solution enabling fast and cheap immunization of populations, Henderson, Millar and other CDC members would not have been successful in having their agency emerge as a key actor in global eradication.

3.10 Conclusion: Technological Determinism and Ideology

By following jet injectors and the involvement of the CDC in global smallpox eradication, I am not contending that it was technological determinism which favoured the agency's extension overseas. Rather, the CDC-jet injector relationship represents a particular case in the history of postwar international health: a mixture of expertise with a particular technology and a desire to expand activities overseas. Some governments and organizations were sceptic about the technology and even American legislation mitigated early CDC ambitions to take on smallpox eradication overseas. The main difference was the CDC's strategic position at the crossroads of technology production, evaluation and promotion. In this sense, sociologists Hughie Mackay and Gareth Gillespie proposed studying technology "not solely as a process of design, but as a product of three distinct spheres: 1. conception, invention, development and design; 2. marketing; and appropriation by users".¹⁶⁴ To those three elements, I add a fourth aspect: assessment. As I argued in this chapter, the Smallpox Unit's involvement in all four spheres helped it extend its tentacles on four continents. First, the CDC collaborated with Army engineers to improve the design of jet

¹⁶⁴ Hughie Mackay and Gareth Gillespie, "Extending the Social Shaping of Technology Approach: Ideology and Appropriation", *Social Studies of Science*, Vol. 22, No. 4, (1992), p. 691.

injectors to make them easier to operate in developing countries. Associating with designers allowed the CDC to shape jet injectors in such a way that they became a viable solution to the needs of mass vaccination in tropical areas where electrical power sources were unreliable or non-existent, or road networks difficult to travel with jeeps equipped with electrical generators. When USAID truck-mounted injectors proved ill-adapted to difficult terrain, the CDC/Army-developed Ped-O-Jets seemed to offer a solution to program planners and opened a window into international health for the CDC (reliability issues notwithstanding). Additionally, while some design decisions did not implicate the CDC directly, they nonetheless contributed to the extension of its international activities. For instance, jet injector compatibility with freeze-dried vaccines made the technology credible as a solution since all endemic countries were characterized by their hot climate.

Second, even if Mackay and Gillespie are more concerned with *consumer* appropriation, I contend that the CDC epidemiologists through their field studies appropriated jet injectors for smallpox immunization *scientifically*. The Pubmed database lists 242 articles published between 1947 and 1979 when using “jet injection” as a search word, and among these results, 20 articles are related to smallpox vaccination. CDC members wrote six of those articles published from 1964 to 1973. Interestingly, there is a shift in the provenance of the articles concerning smallpox immunization with jet injectors: ten were published in the Communist Bloc from 1970 to 1978.¹⁶⁵ Thus during the period just prior and after the launch of the Intensified Smallpox Eradication Program in 1967, development agencies, foreign governments and international health organizations looked at the CDC when it came to jet injectors.

The CDC associated itself with the technology by conducting trials of the potency of vaccines administered with jet injectors and their potential use in smallpox

¹⁶⁵ The breakdown is eight articles in Russian and two in Romanian. When those articles were published, most smallpox vaccinations were done using bifurcated needles introduced in 1968.

eradication programs. Even if some of those trials took place overseas, they did not initially entail a bigger international role for the CDC. The CDC case differs from other organizations engaged in evaluation activities because it actively sought to translate healthcare technology assessment into concrete and applicable eradication programs based on the technology it measured. In other words, it extended assessment into operational activities. In vying to play an international role, Henderson mobilized the results of the Brazilian trials to sell both jet injectors and his agency to public health leaders in the United States. When promoting an enlarged role for the CDC, Henderson did not frame jet injectors as the panacea for smallpox eradication as he also pointed out the need to establish surveillance mechanisms to locate and control outbreaks. However, while CDC participants in smallpox eradication programs are keen to emphasize surveillance to explain the success of campaigns, jet injectors opened more doors just prior to the launch of the WHO Intensified Smallpox Eradication Campaign in 1967. Expertise with surveillance and disease reporting systems became more and more relevant after vaccinations began, a fact acknowledged in the WHO's history of smallpox eradication.¹⁶⁶ What Henderson did however was single out the CDC as the most apt to train vaccinators and serve as a coordinating agency for the Americas. As we have seen in this chapter, Henderson failed in having the CDC play the lead role in eradicating smallpox in Central and South America because of overriding concerns about foreign policy and lack of legal authority on the part of the PHS to operate overseas. His efforts, however, were not lost.

Henderson's marketing of the CDC and jet injectors came to fruition when technology started failing in West Africa. The USAID had relied on truck-mounted injectors for its measles immunization program which encountered a number of

¹⁶⁶ Frank Fenner *et al.*, *Smallpox and its Eradication*, p. 603. Mentioning Millar's report to PAHO, the authors wrote: "It was also recommended that state personnel should immediately be selected and trained in the organization of surveillance programmes, a recommendation that was sound in principle but *destined to be ignored*." (Emphasis added)

problems. The development agency turned to the CDC to salvage the program and even accepted to finance smallpox eradication activities in addition to measles vaccination. Taking over operation activities allowed the CDC to assume the role of designer as it devised strategies to maximize jet injector output by aligning various elements entailed by mass vaccination and even emphasize new skills as reflected in the training material and the manual of operation. Furthermore, the West African program became a showroom for the CDC and jet injection technology and opened areas of the world that had been closed to both only a few years earlier. As demonstrated in this chapter, when Indian health authorities faced a severe epidemic in 1968, they turned to the United States for vaccines, injectors and CDC assistance. CDC's engagement with innovation, marketing, assessment and appropriation all contributed to open pathways in a major international health campaign, still heralded as a major success, and ensured the presence of CDC personnel in diverse areas of the world.

In explaining the concurrent rise of jet injectors for smallpox vaccination and the CDC as a key actor, one must also look at prevailing ideology in international health in the three decades following the Second World War. As others have accurately pointed out, much faith was placed in the power of technology to eliminate disease in the developing world as illustrated by large-scale disease eradication programs launched in the 1950s and 1960s.¹⁶⁷ Injectors and the way they were assessed, marketed and deployed are reflections of the technical orientations of international health, and smallpox eradication especially.¹⁶⁸ Firstly, belief that smallpox eradication could only be one technological breakthrough away certainly made injectors attractive to public health experts

¹⁶⁷ See Randall M. Packard, "Visions of Postwar Health and Development and Their Impact on Public Health Interventions in the Developing World", in Frederick Cooper and Randall Packard (eds.), *International Development and the Social Sciences: Essays on the History and Politics of Knowledge* (Berkeley: University of California Press, 1992). Andre Luiz Vieira De Campos, "Politiques internationales (et réponses locales) de santé au Brésil : le Service Spécial de Santé Publique, 1942-1960", *CBHM/BCHM*, Vol. 25, No. 1 (2008), p. 122.

¹⁶⁸ Anne-Emanuelle Birn, *Marriage of Convenience: Rockefeller International Health and Revolutionary Mexico*, (Rochester: University of Rochester Press, 2006), p. 277.

looking to give new life to a stagnating campaign prior to the launch of the ISEP in 1967 and to political leaders seeking ways to reach their foreign policy objectives. CDC epidemiologists and leaders capitalized on this positive bias and prevalent attitude towards technological innovations to push its agenda. Secondly, a fundamental shift in the ideology behind the design of jet injectors made them leave the clinic and set foot in the hinterland of Africa.¹⁶⁹ As presented above, initial concerns driving the invention of injectors revolved around pain and patient discomfort. When Army engineers designed a multi-dose injector geared towards rapid vaccination of large numbers of people, it signalled a change in focus: maximizing output. If the CDC was not implicated during this shift in ideological orientation, it decidedly sought to actualize the potential by designing vaccination posts around the characteristics of the technology. While vaccination at collecting points did represent a novel approach in some parts of the world, it did not entail a drastic change in the overall strategy of mass vaccination to achieve eradication. Therefore, it is precisely because jet injectors represented ideological and strategic continuities that they were a key for CDC engagement in international health.

¹⁶⁹ On ideology and product design see Hughie Mackay and Gareth Gillespie, "Extending the Social Shaping of Technology Approach: Ideology and Appropriation", p. 691-694.

Chapter 4: Regime Change: Surveillance, the CDC and the WHO

4.1 Introduction

A central actor in international health is the World Health Organization (WHO). Its creation at the end of World War II resulted from the fusion of previous multilateral organizations: the Paris-based *Office International d'Hygiène Publique* and the Geneva-based League of Nations Health Organization. In the two decades following the Second World War, the WHO enjoyed almost exclusive reign over international health with sometimes difficult relations with other United Nations specialized agencies such as UNICEF and the Food and Agriculture Organization (FAO) whose respective mandates touched health issues. Despite frictions with rival organizations and tensions over Eastern Bloc membership during the 1950s, the WHO symbolized common efforts to improve health conditions across the globe and especially in newly independent Third World nations. With its predominance unparalleled during this period, the WHO almost dictated, with strong influence of the United States, the direction and forms of international health.

In this chapter, I examine how the CDC engaged with the WHO. Establishing relations with this multilateral organization was crucial to establish the CDC as an international actor and a relevant agency in the implementation of global health programs. On the other hand, CDC members largely contributed to alter WHO practices in infectious disease control. Therefore, I will analyze this evolving relationship from the first steps in the 1950s to the end of the 1960s when key CDC members contributed to a major shift in the international control of communicable diseases. Although CDC-WHO relationships covered multiple areas and fields of activities such as development and testing of insecticides, veterinary public health and training, my focus will be on disease surveillance. As others have argued, surveillance is a cornerstone in today's global health,

especially in times of feared epidemics and threats of bioterrorism.¹ While not a new health practice², surveillance underwent modifications in 1950s and eventually became the underlying principle in locating outbreaks, limiting epidemics and preventing pandemics.

The focus on surveillance is motivated by two additional reasons. First, it still figures prominently in CDC's institutional cosmology and activities. In addition to national surveillance of infectious and chronic diseases, its Center for Global Health houses the Division of Global Disease Detection and Emergency Response.³ Second, modern disease surveillance principles derive from Alexander D. Langmuir's work, Chief Epidemiologist and arguably one of the best known CDC figures.

Woven into this chapter are references to disease surveillance as understood and promoted by Langmuir and his disciples both at the highest levels of the WHO and in the field in overseas settings. The chapter starts with a brief review of early participation of CDC members in expert committees as the earliest form of collaboration with the WHO during the 1950s. From this limited inclusion into world health affairs, I turn to the establishment of the International Influenza Center for the Americas which signalled formal entry of the CDC in a global laboratory-based disease surveillance network at the end of the 1950s. In the next section, I explore another epidemic in East Pakistan where Langmuir headed a team of epidemiologists to assist in controlling smallpox. There he attempted

¹ Lorna Weir and Eric Mykhalovskiy, "The Geopolitics of Global Public Health Surveillance in the Twenty-First Century", in Alison Bashford (ed.), *Medicine at the Border. Disease, Globalization and Security, 1850 to the Present* (New York: Palgrave MacMillan, 2006): 240-263. D.L. Heyman and G.R. Rodier, "Hot Spots in a Wired World: WHO Surveillance of Emerging and Re-emerging Infectious Diseases", *The Lancet Infectious Diseases*, Vol. 1, No. 5 (2001), p. 345-353. Jeremy R. Younde, *Biopolitical Surveillance and Public Health in International Politics* (New York: Palgrave MacMillan, 2010) D.L. Heyman and G.R. Rodier, "Global Surveillance of Communicable Diseases", *Emerging Infectious Diseases*, Vol. 4, No. 3 (July-September 1998), p. 362-365.

² See Lenore Manderson, "Wireless Wars in the Eastern Arena: Epidemiological Surveillance, Disease Prevention and the Work of the Eastern Bureau of the League of Nations Health Organization, 1925-1942", in Paul Weindling (ed.), *International Health Organizations and Movements, 1918-1939* (New York: Cambridge University Press, 1995), p. 109-133.

³ <http://www.cdc.gov/globalhealth/gdd/>, accessed 15 April, 2011.

to apply field-based surveillance measures in an overseas context but to no avail. Nevertheless, this mission exerted a strong influence as the Chief Epidemiologist formulated propositions for expansion of the CDC's international health activities, in which surveillance figured prominently. Then I turn to the publication of a key article in 1963 which not only exposed surveillance practices in the U.S. but ushered closer collaboration between Langmuir, D.A. Henderson and WHO officials such as Karel Raskà, Charles Cockburn and Martin Kaplan. After exploring these relationships at a high level, I return to the field when CDC epidemiologists evaluated the prospects of cooperating with another multilateral organization, the Pan American Health Organization (PAHO), to institute smallpox surveillance on a continental scale. This section highlights that during this period, CDC leaders and lower level members involved in international health were undergoing a learning experience about the respective roles and limits of different organizations. In the final part of this chapter, I return to the relationship between Raskà and Langmuir as they worked in tandem to profoundly modify the guiding principles of disease reporting and control by substituting quarantine for surveillance.

4.2 WHO and CDC: the 1950s

Collaboration between Atlanta and Geneva during the 1950s, aside from influenza surveillance at the end of the decade, fell under two categories: participation in technical consultations in expert meetings relationships and indirect relationships through the USPHS. From 1949 onwards, CDC personnel participated in meetings organized by the WHO to elaborate recommendations published in technical reports. During the first decade of technical meetings (from 1949 to 1959), the majority of personnel involved in these discussions were either insecticide specialists or were related to the field of veterinary public health. Out of 16 meetings during this ten year period in which CDC personnel

are participants, nine are related to insecticides and vector control and four concerned veterinary public health. Dr. S.W. Simmons, Chief of the Technical Development Laboratories in Savannah, attended five meetings while Dr. James H. Steele participated in four expert panels on animal diseases. The second avenue of interaction, albeit indirect, between the CDC and the WHO was through the USPHS Division of International Health (DIH). During the late 1950s, DIH officials invited the CDC to comment on WHO budget decisions for specific programs such as venereal disease control, malaria eradication or immunization.⁴ These interventions were meant to inform the positions of the U.S. delegates either at the World Health Assembly or in technical discussions. Despite being called upon to comment various aspects of WHO activities, there is little indication that CDC experts had any bearing on these programs or budgetary decisions. Finally, a third type of collaboration between Atlanta and Geneva (still related to malaria and insecticides) was direct assignment of personnel to WHO headquarters. From the late 1950s to the early 1960s, three experts in pesticides and vectors spent from six months to two years assisting the malaria eradication program.⁵ Related to these assignments, CDC's Technical Development Laboratories received contracts from the WHO to develop and test

⁴ Memo from Henry van Zile Hyde, Chief, Division of International Health to Chief, Bureau of State Services, Attention : Chief, CDC, "Technical Discussions for Thirteenth World Health Assembly", November 24, 1959. Records of the CDC, Office of the Chief (Associations, Committees, etc.) -1960, RG 442.63.A789 Box 1, Folder: World Health Organization, NARA, Morrow Georgia. Memo from Alan W. Donaldson, Assistant Chief, CDC to A. S. Osborne, International Health Representative, DIH, "Annual Report of the Director-General, WHO, and Proposed Program and Budget Estimates for WHO, 1961", April 8, 1960. Records of the CDC, Office of the Chief (Associations, Committees, etc.) -1960, RG 442.63.A789 Box 1, Folder: World Health Organization. Memo from K.D. Quarterman to S.W. Simmons, "Excerpts from Proposed Program and Budget Estimates for WHO, 1962", December 20, 1960. Records of the CDC, Office of the Chief (Associations, Committees, etc.) -1960, RG 442.63.A789 Box 1, Folder: World Health Organization, NARA, Morrow Georgia. Memo from Arthur S. Osborne, International Health Representative, DIH to George H. Bradley, Assistant Chief, CDC, "Communicable Disease program of the Western Pacific Regional Office, WHO, 1956", August 7, 1957. Records of the CDC, Office of the Chief Files - 1959, RG 442.60.A0140 Box 2, Folder: Associations and Committees - World Health Organization, NARA Morrow, Georgia.

⁵ The three CDC pesticide experts were L.B. Hall (6 months in 1956), R.W. Fay (24 months from 1959-1961) and J.W. Miles (18 months from 1962-1963). *International Activities of the Public Health Service Related to Pesticides*, June 1963.

insecticides and spraying equipment.⁶ Despite these long term assignments and contracts, they remained marginal in the functioning of international health.

In the early 1960s, CDC leadership acknowledged that relationships with the WHO remained at a relatively low level: “The working relationship between the CDC and WHO goes back over a number of years, as you know – and yet there has been relatively little direct contact between individuals at policymaking levels.”⁷ As underlined above, in the opinion of Alan Donaldson, the CDC’s Deputy Chief, the main stumbling block for greater CDC engagement with the WHO remained the lack of a clear definition of its international health activities and mechanisms to contribute more actively.⁸ Despite not being involved at the highest policy making level, technical collaboration related to surveillance between both organizations took place from the late 1950s. This area of cooperation with the WHO and inclusion of the CDC into international health and surveillance was not related to epidemiology, but rather to the laboratory and diagnostic services on influenza.

4.3 Laboratory Surveillance and Influenza

A form of closer collaboration between the CDC and the WHO came through the designation of its laboratory as the Influenza Reference Center for the Americas in 1957. This inclusion in a global surveillance network, however, did not originate from the CDC but emerged in the U.S. during the 1940s. Ideas about the role of the laboratory for surveillance of influenza derived from the work of virologist and epidemiologist Thomas Francis Jr. and his discovery of a second

⁶ I further explore the Technical Development Laboratories in chapter 4 and 5.

⁷ Letter from Alan W. Donaldson, Deputy Chief, CDC to Dr. P.M. Kaul, Assistant Director-General WHO, September 16, 1963.

⁸ Letter from Alan W. Donaldson, Deputy Chief, CDC to Dr. P.M. Kaul, Assistant Director-General WHO, September 16, 1963.

strain of the influenza virus.⁹ In 1940, while working at the Department of Bacteriology at the New York University College of Medicine, Francis isolated the influenza virus B which differed from the A strain identified in 1932.¹⁰ Research into the influenza viruses during the 20th century revealed that the disease causing organism underwent variations through antigenic shifts and drifts thus making each yearly epidemic different from the previous one.

Appointed as head of the United States Armed Forces Influenza Commission in 1941, Francis recognized the crucial role of laboratories in providing exact information about the nature of the virus responsible for an outbreak and ascertaining its antigenic characteristics. The structure imagined by Francis and his colleagues was comprised of a network of regional laboratories charged with isolating strains coupled with a central reference laboratory responsible for studies and comparisons of various influenza strains. This central laboratory, the Strain Study Center (SSC), was thus established in New York under Dr. Thomas P. Magill. In 1948, the National Institutes of Health (NIH) created the Influenza Information Center which served as a clearing house of influenza-related information, as the coordinating center of U.S. collaborating laboratories, and an organizer of conferences addressing vaccine production. Additionally, it encouraged doctors and other health officers to ascertain the aetiology of suspect respiratory infections by sending samples, and charged regional laboratories with conducting serological tests on patients. By 1949, the U.S. Influenza Study Program was comprised of 55 facilities ranging from Armed Forces and Federal laboratories to State and municipal laboratories.¹¹ Part of this

⁹ Ton van Helvoort. "Thomas Francis Jr.", *American National Biography Online*, <http://www.anb.org/articles/12/12-01332.html?a=1&f=%22Epidemiologists%22&d=10&ss=3&q=12>, accessed October 27, 2010.

¹⁰ C.W. Potter. "A History of Influenza", *Journal of Applied Microbiology*, Vol. 91, (2001), p. 572.

¹¹ James T. Culbertson. "Plans for United States Coöperation with the World Health Organization in the International Influenza Study Program", *American Journal of Public Health*, Vol. 39 (1949), p. 38-42.

network was the Virus Laboratory of the CDC in Montgomery, Alabama, to which we will return further below.

Discussions about influenza surfaced during meetings of the WHO Interim Commission in 1947. Addressing influenza surveillance was an obvious way of establishing the institution's credibility and its relevancy as the central actor of international health following World War II. In this, the spectre of the 1918-19 epidemic loomed large. Fearing a reoccurrence of this post World War I episode, discussions during the formative meetings of the WHO stressed the need to have an influenza program for the nascent organization.

When outlining the WHO's influenza program, Dr. Payne of the Division of Communicable Disease Services reminded his readers of the consequences in terms of human lives, economic loss and failure of health authorities to control the disease. Aside from this historical example, Payne also underlined that contracting influenza, unlike some other infectious diseases, does not confer permanent immunity against new strains; this combined with its rapid incubation period and the speed of its spread remained a potential threat. Another reason formulated was the economic losses still associated with influenza. Finally, despite all the knowledge acquired about the nature of the virus, one of its possible outcomes remained death.¹²

Proponents of the WHO influenza program articulated three objectives. Firstly, the program should aim at preventing a new global influenza pandemic. Its second objective was finding "control methods to limit the spread and severity of the disease" and finally to lessen the economic consequences of an influenza epidemic.¹³ It is with these objectives in mind that a proposal for a World Influenza Center located in London was made with similar functions to those of the Strain Study Center (SSC).

¹² A. M.-M. Payne. "The Influenza Programme of WHO", *Bull. World Hlth Org.* Vol. 8 (1953), p. 755-756.

¹³ A. M.-M. Payne. "The Influenza Programme of WHO", p. 756.

In 1948, the Interim Commission invited the USPHS to become part of the emerging influenza surveillance network in an effort to extend geographic coverage. This invitation was also necessary as the U.S. possessed the resources and expertise to conduct strain typing and thus could not be ignored to provide these services on an international scale.¹⁴ Additionally, the Strain Study Center accepted responsibilities for the Americas putting it at the center of the 17 WHO-designated laboratories in the Americas. Coupled with this laboratory-based collaborative system was the existing epidemiological information communications of the WHO with its daily and weekly bulletins. As mentioned above, health officials were primarily concerned about the spread and mutability of the virus, as well as about the necessity of establishing the exact character of the strain responsible of an outbreak. Thus making such information rapidly available to health authorities and vaccine manufacturers became a central issue. Reliance on the WHO's communication network addressed this need. Another objective of the influenza surveillance network was the standardization of laboratory procedures. This ranged from methods of strain comparison to diagnostic tests such as complement-fixation and haemagglutination-inhibition tests. During the early 1950s, experts appointed by the WHO had found that variability in techniques and procedures made any comparison between results difficult. Recommendations were formulated for a uniform training of laboratory workers and for the provision of standard reagents.¹⁵

Influenza surveillance was thus rooted in laboratories and the collaboration through national and international networks. In both the U.S. and at the international level, the core of the program was laboratory-based isolation and identification of various strains in order to provide an early warning to public

¹⁴ George Dehner, "Creating the World Influenza Surveillance System: Surveillance with a Purpose", presentation at *After 1918: History and Politics of Influenza in the 20th and 21st Centuries*, August 24-26, 2011, Rennes. Nationalist tensions over "American brashness" and rejection of "European hide-bound methods" characterize the early construction of the influenza surveillance network.

¹⁵ A. M.-M. Payne. "The Influenza Programme of WHO", p. 763-764

health authorities so steps could be taken to manufacture vaccines adapted to specific outbreaks. Data would come from serological surveys with samples collected by health professionals (physicians and nurses) and forwarded to regional laboratories for further analysis.¹⁶ To complete this laboratory and clinically based information, proponents of influenza surveillance sought to create an index of the presence of “influenza-like disease based [...] on absenteeism among public-transport workers, in factories, or in school.”¹⁷ The idea behind this proposal was establishing a baseline through regular data collection against which comparison would be possible.

4.4 Asian Influenza and the CDC

In 1947, the Interim Commission of the WHO extended an invitation to the USPHS to collaborate in influenza surveillance. Including the U.S. laboratories into a planned international network of “listening posts”, despite technical limitations, offered many advantages for both parties. For the WHO, it increased its network’s geographic coverage and secured collaboration with some of the foremost experts on influenza. For the NIH, which administered the U.S. influenza program, the benefits of an international system were that, if an influenza virus was isolated outside of its borders, a vaccine could be produced and distributed before its importation in the U.S.¹⁸

Technical difficulties related to vaccine production and virus mutability remained the weak link in this system of epidemic prevention. Influenza surveillance as conceived by Francis was supplemented by his work on vaccines. With a group of facilities focused on identifying influenza strains, researchers began experimenting with protective vaccines. Francis himself took part in their

¹⁶ I would like to thank Michael Bresalier for outlining these characteristics.

¹⁷ A. M.-M. Payne. “The Influenza Programme of WHO”, p. 760.

¹⁸ James T. Culbertson. “Plans for United States Coöperation with the World Health Organization in the International Influenza Study Program”, p. 37.

development, testing and evaluation only to find them rather ineffective because of the rapid mutation of influenza viruses. Furthermore, additional work on influenza led to the discovery of another strain (influenza C virus) in 1950 which made containing an outbreak or protecting the population only more complicated.¹⁹ While vaccine manufacturing also remained an obstacle in the chain linking laboratory identification of strains and concrete public health measures, mainly immunization, it appeared that the desirable mechanisms for detecting and tracking influenza epidemics, at the least in the U.S., were in place when Asian influenza reached the country in 1957.

Until 1955, the CDC played a secondary role when compared to the organizations described above. During the construction of both the U.S. and the WHO influenza surveillance networks, the CDC remained at the periphery. In the United States, activities were concentrated in New York and Bethesda while for the rest of the world specialists collaborated in London. In this organization, the CDC laboratory assumed only regional responsibilities servicing laboratories in one of the seven regions part of the U.S. network of collaborating facilities. Geographically, the Montgomery laboratory headed by Maurice Schaeffer supervised the work of laboratories located in the southern U.S., from New Mexico to Virginia.²⁰ Concretely, the staff in Montgomery was to coordinate the work of collaborative laboratories. It also distributed influenza antigens and antiserums, and finally the laboratory carried out identification of influenza virus isolates before sending them to the SSC.

Tensions between the SSC, headed by Magill, and the U.S. Commission in Influenza (or Advisory Committee) combined with a lack of interest in the WHO program by prominent figures in influenza research had two consequences: more responsibilities for the CDC and a movement from a subordinate role in the

¹⁹ Ton van Helvoort. "Thomas Francis Jr.", accessed October 27, 2010.

²⁰ Dorland J. Davis, "World Health Organization: Influenza Study Program in the United States" *Public Health Reports*, Vol. 67, No. 12 (December, 1952), p. 1185-1190.

U.S. to a center of surveillance. In 1954, during a visit to U.S. health facilities, a WHO official worried about the deteriorating collaboration between the SSC and the Commission (which withdrew its funding) and its impact on international surveillance. He further noted the lack of interest on the part of Francis and Jonas Salk (his former lab assistant) to cooperate with the WHO's program, their focus lying in the development of vaccines.²¹ In the wake of Magill's request to be relieved of his duties as SSC for the Americas, the Advisory Committee convened in 1955 and decided to make the Virus and Rickettsia Section (Laboratory branch) of the CDC a reference center for the hemisphere.²²

As the CDC settled into its role in laboratory-based surveillance of influenza, the appearance of a new strain in early 1957 signalled a more proactive role for CDC epidemiologists in regards to this disease. In February 1957, reports of a new strain of influenza virus came from China, and the virus was spreading to other Asian nations. As the epidemic unfolded, it reached American military facilities in Japan and Korea in April and May. In the continental U.S., the first cases also appeared in military bases by June 1957 but eventually cases also started appearing in the civilian population. One the first outbreaks outside of military facilities to be investigated occurred during the summer in Tangipahca parish, Louisiana.²³ As this was within its area of responsibility, the CDC dispatched EIS officers to further study the disease and establish an epidemiological evaluation of the situation. There, CDC personnel found that attack rates ranged from 40%

²¹ Letter from Alick Issacs to Dr. A. M. -M. Payne, February 16, 1954. Document attached to "Report to the World Health Organisation on a Visit to the United States of America made in December 1953 in Connection with the W.H.O. Programme on Influenza," WHO 2 DC INFL 6 W.I.C. 6 (microfiche), WHO Archives, Geneva. It must also be specified that Francis and a British scientist, Dr. Andrewes who designed the structure of the WHO influenza system and designed the WIC in London were bitter rivals in influenza research. See George Dehner, "Creating the World Influenza Surveillance System: Surveillance with a Purpose".

²² "Minutes of the Meeting of the Advisory Committee Influenza Study Program in the United States", September 29, 1955. WHO I2/886/3 J.1 (Microfiche), WHO Archives, Geneva.

²³ Donald A. Henderson *et al.* "Public Health and Medical Responses to the 1957-58 Influenza Pandemic", *Biosecurity and Bioterrorism*, Vol. 7, No. 3 (2009), http://www.upmc-biosecurity.org/website/resources/publications/2009/2009-08-05-public_health_medical_responses_1957.html, accessed March 21, 2011.

to 60% in schools where most cases were localized.²⁴ Furthermore, serological surveys revealed that even in individuals showing no symptoms, about half were asymptomatic carriers of the Asian influenza strain. While this initial summer epidemic subsided four weeks after its appearance, public health authorities began to prepare for an expected surge in the number of cases during the usual autumn influenza season.

In spite of being early proponents of influenza surveillance and despite the expectations associated with the creation of a network of laboratories, the U.S. seemed ill-equipped to track and locate cases through the existing system supervised by the SSC. Furthermore, despite having pioneered surveillance of other diseases such as polio and malaria dating back to the 1940s, the CDC was a late comer to epidemiological surveillance of influenza, laboratory-based identification activities notwithstanding. In response to fears concerning an increase in outbreaks during the autumn, the CDC created an Influenza Surveillance Unit in July 1957 to monitor the expected epidemic and assist State and Territorial officers in dealing with the additional cases. This Unit was a joint undertaking of CDC's rival branches: Epidemiology Branch and Laboratory Branch.²⁵ Prior to the establishment of this Unit, epidemiological tools to follow influenza were weekly telegraphic reports of deaths categorized under either "pneumonia" or "influenza".²⁶ Later evaluation of this reporting system showed a time lag of 10 days after death notification and of approximately three weeks after initial onset of influenza.²⁷ Thus, at the beginning of the Asian influenza epidemic, reporting systems of actual cases, not limited to identification of the

²⁴ Donald A. Henderson *et al.* "Public Health and Medical Responses to the 1957-58 Influenza Pandemic", *Biosecurity and Bioterrorism*, accessed March 21, 2011.

²⁵ On the tense relationships, see Elizabeth Etheridge, *Sentinel for Health: A History of the Centers for Disease Control* (Berkeley: University of California Press, 1992), p. 51-54. Alexander D. Langmuir *et al.*, "Asian Influenza Surveillance", *Public Health Reports*, Vol. 73, No. 2 (Feb., 1958), p. 114.

²⁶ Donald A. Henderson *et al.* "Public Health and Medical Responses to the 1957-58 Influenza Pandemic", *Biosecurity and Bioterrorism*, accessed March 21, 2011.

²⁷ Donald A. Henderson *et al.* "Public Health and Medical Responses to the 1957-58 Influenza Pandemic", *Biosecurity and Bioterrorism*, accessed March 21, 2011.

strain involved, were a far cry from the stated objectives of the WHO fifteen years before which sought to make use of multiple sources of information to assess the size of epidemics.

Concurrent to the CDC's consolidation of epidemiological surveillance of influenza under its roof, the Unit responsible of tackling Asian influenza sought to materialize the program outlined by Payne and establish a more sensitive reporting system. It proceeded by multiplying sources of information in addition to death notifications, which constituted, until the summer of 1957, the basis of its surveillance network; county reports, national health surveys and reports of absenteeism began to be forwarded to the Influenza Unit. Among these new sources of epidemiological information, county reports were the most comprehensive as each county was assigned an observer which reported suspected cases of influenza to State epidemiologists who in turn informed the CDC. As for the national health survey, it was created with the aim of generating data about health conditions in the general population by conducting weekly interviews with 2000 people in 700 households. CDC epidemiologists instructed the director of the health survey to provide information about cases of respiratory diseases. Finally, absenteeism data, as proposed by the WHO, came from AT&T which despite, its lack of representativeness (a fact acknowledged by the CDC Influenza Unit), constituted a valuable indicator.

What is revealing about the organization of influenza surveillance at the CDC is the prominence of epidemiologists and of concerns about information beyond the detection of new strains which constituted the main preoccupation a decade earlier. Earlier plans of surveillance of influenza had emphasized and given a central role to the laboratory and the importance of strain identification for the production of vaccines. The objectives of Langmuir and D.A. Henderson were to follow more closely an unfolding epidemic by applying and refining ideas formulated by Culbertson and Payne. The CDC surveillance system went beyond

the limited strain identification strategy for influenza epidemic control. Also, better distribution of vaccines could be expected because of the reduction of the time lag between onset and mortality resulting from a more precise epidemiological picture of Asian influenza to ascertain outbreaks. Even though early warning of a new viral strain could theoretically give manufacturers enough time to produce enough vaccine, this crucial aspect of the rationale behind strain surveillance network operating in New York and London had not still been resolved.²⁸ Anticipating shortages of vaccines during 1957 and 1958, the Surgeon General recommended establishing priorities for immunization – a strategy facilitated by closer epidemiological surveillance.²⁹

As historian Elizabeth Etheridge noted, the CDC's response to the Asian influenza epidemic did much to enhance its public image.³⁰ The media and the public recognized the role played by the agency, and this recognition was not limited to the U.S. In the wake of the Asian epidemic, the Influence Surveillance Unit created a more comprehensive reporting system and contributed by deploying officers this seemed to validate the WHO's decision to extend an invitation to designate the Montgomery Laboratory as a reference center for the Americas. The CDC became responsible for providing samples to subordinate laboratories in the surveillance network, including to the Influenza Information Center in Bethesda, and also for training staff sent by the WHO.³¹ Concretely, it moved the

²⁸ See George Dehner. "WHO Knows Best? National and International Responses to Pandemic Threats and "Lessons" of 1976", *Journal of the History of Medicine*, Vol. 65 (October 2010), p. 478-513.

²⁹ Donald A. Henderson *et al.* "Public Health and Medical Responses to the 1957-58 Influenza Pandemic", *Biosecurity and Bioterrorism*, accessed March 21, 2011.

³⁰ Elizabeth Etheridge. *Sentinel for Health: A History of the Centers for Disease Control*, p.85.

³¹ Letter from Fred L. Soper to Leroy E. Burney, 30 June 1958. Records of the USPHS, Office of International Health, RG 90.130.65.41.1-7 Box 7, Folder: United Nations – 1957-1958, NARA College Park. In Etheridge's history of the CDC, she contends that the Montgomery laboratory was already the Influenza Reference Center for the Americas in 1957. Based on the letter from Soper to Burney, it would appear it was only in summer 1958 it officially assumed those functions. See Elizabeth Etheridge, *Sentinel for Health*, p. 83. Ralph Hogan, chief of CDC Laboratory Branch, also shares that same date. Keith E. Jensen and Ralph Hogan, "Laboratory Diagnosis of Asian Influenza", *Public Health Reports*, Vol. 73, No. 2 (Feb., 1958), p. 140.

center of gravity of American participation in global influenza surveillance from the NIH to the CDC. Expenses were to be covered by a remittance but the amounts were insufficient to cover the activities of the Influenza Reference Center for the Americas.³² Nevertheless, influenza and epidemiological surveillance systems deployed in 1957 and 1958 established the CDC as a well-equipped agency to participate in international influenza surveillance: it not only possessed laboratory facilities to carry out strain isolation and identification but it could also count upon a cadre of epidemiologists able to create an index system to track an unfolding epidemic.

Until 1957, influenza surveillance was not included in the activities of the Epidemiology Branch. As scientists and public health experts met in 1960 to reflect upon Asian influenza and define areas of investigations for the future, Langmuir joined his colleagues from the Laboratory branch to represent the CDC.³³ Finally, because of its mandate to assist U.S. States in dealing with public health issues, the CDC possessed an extensive network of contacts with State and local epidemiologists on which it could count to provide prompt and accurate epidemiological information.

CDC Laboratory Branch considered the inclusion in the global influenza surveillance network and its designation as the WHO Influenza Reference Center for the Americas were the foremost aspects of its international health activities. In a survey of international activities conducted at the CDC at the end of the 1950s (discussed in chapter 2), collaboration with foreign laboratories through diagnostic services and training of WHO fellows were the main aspects underlined.³⁴ In the same survey, the Epidemiology Branch did not mention

³² Interview with David Sencer by author, October 26, 2010.

³³ At the International Conference on Asian Influenza in Bethesda (February 17-19, 1960), the CDC was represented by Alexander Langmuir, Roslyn Q. Robinson, Morris Schaeffer, Robert E. Serfling and James H. Steele. Papers presented at the conference are available in a special issue of the *American Review of Respiratory Diseases*, Vol. 83, No. 2, Pt. 2 (February, 1960).

³⁴ Memo from Chief, Bureau of States Services to Chief, Division of General Health, BSS, "Survey of BSS Functions in the International Area", January 30, 1961. Records of the CDC, Office of the

these activities despite being the seat of surveillance at the CDC. This suggests that recognition of Langmuir's efforts during the Asian influenza epidemic did not specifically benefit the international status of the Epidemiology Branch and that he did not consider national influenza surveillance as a component of an international network. More profoundly, laboratory surveillance of diseases such as influenza reporting was only one component in Langmuir's vision of surveillance activities. As we will see below, his belief was that an essential component of surveillance was field investigation with the laboratory serving as a confirmatory mechanism for diagnostics. In spring 1958, Langmuir jumped on an opportunity to test his ideas about surveillance and disease reporting in an overseas environment and establish his Branch as a key site for the CDC's international participation.

4.5 Surveillance in the Field – Alex Langmuir in East Pakistan

Application and development of surveillance methods for influenza did enhance CDC's status as a key participant in international health in the late 1950s, but if the system developed by the Influenza Surveillance Unit was adapted for a developed country like the U.S., what could be expected in the context of a developing country? In the spring of 1958, East Pakistan faced severe epidemics of both smallpox and cholera. Sensing an opportunity to contribute to U.S. efforts already on the ground to contain the epidemic, Langmuir offered assistance to the International Cooperation Administration (ICA) in the form of an epidemic aid mission composed of EIS officers. ICA readily accepted Langmuir's offer, along with a team from the U.S. Naval Medical Research Center. CDC officers led by the Chief of the Epidemiology Branch arrived in Dacca in May 1958.

Chief, CDC General Files – 1961, RG 442.64.A809 Box 1, Folder: Cooperation International Report on International Hlth Act. CDC 1960, NARA Morrow, Georgia.

Surprisingly, the team had not defined its objectives on how it could help, aside from providing extra manpower, in this unfolding public health crisis. Rather, it was upon arrival that Langmuir and his colleagues conferred with members of a United States Operations Mission (USOM) and Pakistani health officials to dovetail CDC expertise with needs in the field. Its focus was on surveillance and reporting methods, which is indicative of the speciality of CDC epidemiologists: “it was decided that our team would serve as the “eyes and ears” of the [vaccination] campaign and, by means of epidemiologic investigation, serving to direct vaccination efforts towards the regions and age groups most in need.”³⁵ In other words, Langmuir and his colleagues aimed at drawing an epidemiological map of smallpox cases and send vaccination teams to contain outbreaks.³⁶ However, despite the epidemiological soundness of early reporting and targeted vaccination based on surveillance reports, the realities of working in a developing country caught up with an inexperienced CDC team when it came to health work abroad.

Figure 4.1: Alexander Langmuir in a hospital in Matlab Bazer, East Pakistan, 1958

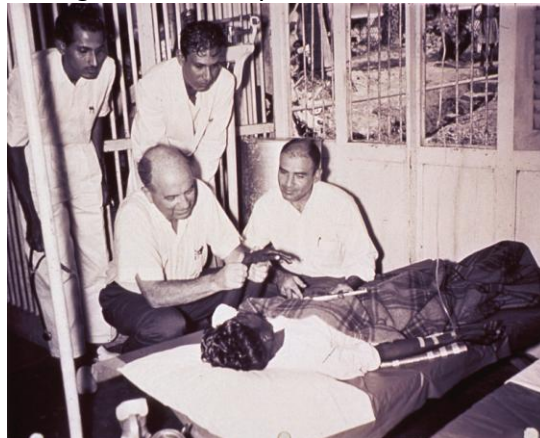


Image courtesy of the National Library of Medicine

³⁵ *Terminal Report. Epidemic Aid Mission to East Pakistan, May to July, 1958*. Report assembled by Glenn S. Usher, Records of the USPHS, Office of International Health, RG 90.130.65.41.5 Box 3, Folder: Diseases Smallpox Pakistan Epidemic 1958, NARA College Park, p. 11.

³⁶ The report does not specify why the CDC team was more interested in smallpox than cholera despite the severity of the epidemic of the latter.

As the team soon found out upon their arrival, immunization in East Pakistan relied not solely on public health professionals but mostly on volunteers to carry out mass vaccination. Langmuir and his colleagues became acutely aware that volunteers did not act upon epidemiological surveillance data in their immunization practices. If the initial objective of the CDC team was to deploy resources to areas and groups where the most pressing needs were felt, a volunteer-based campaign made it difficult to apply surveillance techniques to direct efforts. The team specifically criticized the crude approach to immunization entailed by relying on non-experts: "It was observed that an inherent weakness of a volunteer vaccination program is its lack of selectiveness. It is impossible with volunteers to concentrate activities upon the segments of the population that are in greatest need of vaccinating."³⁷ As a consequence, objectives were redefined to reach more modest goals.

If the original intent of the CDC team had been to serve as the "eyes and ears" of the campaign with reports filtering to public health authorities which in turn would have directed vaccination teams to areas most severely affected by smallpox, local circumstances forced a review of objectives. Less ambitious goals of evaluation of the vaccination campaigns, studies of smallpox and its characteristics and basic training of Pakistani public health staff in the methods and principles of field epidemiology were adopted. It was through this last aspect that the CDC team tried to make a lasting contribution to public health in a developing country. In the training seminars, members of the CDC emphasized concepts of surveillance and response through dispatching of vaccination teams to communities affected by smallpox outbreaks. Taking into account the particular context, Langmuir delayed application of this recommendation: "When the present epidemic has subsided to a level where it is feasible, each case of smallpox which occurs should be regarded as an emergency calling for immediate vaccination of every members of the community. Consideration

³⁷ *Terminal Report. Epidemic Aid Mission to East Pakistan, May to July, 1958*, p. 11.

might be given to imposition of a curfew or an area quarantine in such situations to assure vaccination of every person in the affected area.”³⁸ To demonstrate how such a strategy might be implemented, Glenn Usher (a member of the CDC team) worked with the USOM representative Aidan Cockburn³⁹ in setting up a control room to carry out rudimentary surveillance by concentrating all field reports and sending vaccination teams to prevent the explosion of a few smallpox cases into a full-blown outbreak.

Despite the intentions, demonstration and training by the CDC, surveillance and responses to outbreaks through rapid reporting of cases and deployment of professional public health workers did not resonate with local officials. We do not know whether Langmuir sincerely believed that a team on an emergency mission acting as foreign consultants could have a lasting influence upon public health practice. However, the belief in the principles of surveillance applied to public health was deeply rooted in Langmuir and his colleagues: they would be instrumental in strengthening public health in developing countries. In other words, time would vindicate CDC practices of surveillance. The report concluded: “At present writing, the outlooks for the implementation of our recommendations are not good”, but the effects of demonstrations and training seminars would be felt in the future.⁴⁰ Immediate lack of adoption was explained by the observation “that recommendations made by foreign “experts” in the newly developing countries often undergo an “incubation period” before being implemented.”⁴¹ For CDC epidemiologists, application of surveillance practices in developing country at grips with smallpox inevitably led to the control and eventual the eradication of smallpox.

³⁸ *Terminal Report. Epidemic Aid Mission to East Pakistan, May to July, 1958*, p. 12.

³⁹ Aidan Cockburn was a former employee of the CDC and had been fired by Langmuir. This resulted in some tension during the mission to East Pakistan. Interview with David J. Sencer by author, 26 October, 2010.

⁴⁰ *Terminal Report. Epidemic Aid Mission to East Pakistan, May to July, 1958*, p. 14.

⁴¹ *Terminal Report. Epidemic Aid Mission to East Pakistan, May to July, 1958*, p. 15.

In the international response to the 1958 epidemic, multilateral organizations such as the WHO or the South-East Asia Region Organization (the regional branch of WHO) did not seem heavily implicated, whereas both the United States and the Soviet Union sent teams of medical personnel to help local efforts to jugulate cholera and smallpox. The final report makes no mention of representatives from either multilateral organization. Promotion of surveillance was made to national, regional and local Pakistani public health officials rather than through larger agencies. Later efforts, as we will see, would combine promotion of such techniques to communicable disease control at both the national and international level.

Deployment of a team of epidemiologists led by the Chief of the Epidemiology Branch gave the CDC first hand experience in the control of an epidemic in a developing area of the world. More specifically, it revealed to Langmuir and his colleagues the difficulties of establishing a surveillance system abroad: collection of morbidity and mortality statistics, case finding and rapid deployment of vaccination teams in the event of detection of infected areas/persons. As evidenced by the changes in the objectives of the CDC team, which shifted from serving as the “eyes and ears” and directing vaccination teams based upon field reports collected in a control room to more modest evaluation and training activities, realities of a developing countries where public health infrastructures are less comprehensive and immunization practices (including reliance on volunteers) exemplified to Langmuir the obstacles associated with application of his ideas overseas. Thus, while there is acknowledgement of the obstacles in applying surveillance in foreign lands, it is precisely these obstacles that opened opportunities for the CDC, and specially the Epidemiology Branch, to expand its international health mandate. East Pakistan became a valuable lesson when Langmuir outlined plans for the future of the CDC in international health.

4.6 International Health at the Epidemiology Branch

The change of administration in 1960 and the recommendations of the Humphrey subcommittee prompted an extensive review of international health programs and related activities carried out at the CDC during the previous decade (see chapter 2). More importantly, policy makers and officers in the upper echelons of the USPHS opened their consultations to include propositions for an extension of international health activities. It must be specified that under the International Health Act of 1960, the USPHS could directly conduct missions overseas if they concerned medical *research* but could not dispatch officers to administer/assist public health programs in foreign countries. This aspect of international health activities remained the purview of development agencies, specifically the USAID, which borrowed personnel from the USPHS to staff its field programs.

This opening for suggestions and favorable context for additional international involvement during the early days of the Kennedy administration attracted the interest of Langmuir who made the most comprehensive and ambitious proposition of all CDC branches. To the leaders of the USHPS, he stated: “Epidemiology Branch is warmly sympathetic to a major expansion of international health activities” wrote Langmuir.⁴² He further added: “CDC should strive to become a world center for the control of communicable disease.”⁴³ Looking at international activities within his branch, Langmuir deplored the lack of clear direction: “the activities of the branch have been (and still are)

⁴² Memo from Alexander D. Langmuir, Chief, Epidemiology Branch to Clarence A. Smith, Chief, CDC, “Expansion of International Health Activities”, August 14, 1961. Records of the CDC, Office of the Chief, CDC General Files – 1961, RG 442.64.A809 Box 1, Folder: Cooperation International Report on International Hlth Act. CDC 1960, NARA Morrow, Georgia.

⁴³ Memo from Alexander D. Langmuir, Chief, Epidemiology Branch to Clarence A. Smith, Chief, CDC, “Expansion of International Health Activities”, August 14, 1961.

opportunistic, haphazard and lacking in orderly structure or apparent purpose. Improvement is clearly in order.”⁴⁴

Interviews with close collaborators of Langmuir reveal his interest in international health and his influence in pushing for greater CDC participation in addressing the public health issues affecting developing countries, although not under the umbrella of contributing to their development but rather as a way of averting outbreaks and epidemics.⁴⁵ Concretely, Langmuir emphasized three areas of expertise which could readily be applied to an overseas setting, if additional funds, personnel and authority could be obtained: training in quota sampling techniques to evaluate coverage of immunization campaigns, provision of Epidemic Aid Teams to heed foreign calls, and finally surveillance of communicable disease on an international scale.

To carry out these three missions, Langmuir put forward the creation of an international epidemiological service that would “render aid, participate in field investigations, and provide consultation anywhere in the world in a pattern essentially similar to that presently followed within the United States.”⁴⁶ Under the umbrella of the international epidemiological service, Langmuir sought to apply the mechanism of the Program of Surveillance of Communicable Diseases of National Importance which traced cases of polio, encephalitis, influenza and malaria.⁴⁷ Thus, it articulated both disease surveillance and availability of epidemiologists specially assigned to international duties that would investigate outbreaks detected by an international reporting system located at the CDC.

⁴⁴ Memo from Alexander D. Langmuir, Chief, Epidemiology Branch to Clarence A. Smith, Chief, CDC, “Expansion of International Health Activities”, August 14, 1961.

⁴⁵ Interviews by author with Don Millar (November 17, 2010) David J. Sencer (October 26, 2010), and D.A. Henderson (August 18, 2010). Also see Stanley O. Foster and Eugene Gangarosa, “Passing the Epidemiologic Torch from Farr to the World. The Legacy of Alexander D. Langmuir”, *American Journal of Epidemiology*, Vol. 144, No. 8 (Suppl) (1996), p. S65-S73.

⁴⁶ Memo from Alexander D. Langmuir, Chief, Epidemiology Branch to Clarence A. Smith, Chief, CDC, “Expansion of International Health Activities”, August 14, 1961.

⁴⁷ Memo from Alexander D. Langmuir, Chief, Epidemiology Branch to Clarence A. Smith, Chief, CDC, “Expansion of International Health Activities”, August 14, 1961.

In this proposition, the lessons of East Pakistan were not lost on Langmuir. His experience of the realities of working in a foreign/under developed area gave the Chief Epidemiologist firsthand knowledge on the importance of field conditions to epidemiologists deployed to assist local health authorities and investigate outbreaks. Despite adhering to principles of transfer of knowledge and expertise which guided most development schemes, Langmuir nonetheless nuanced his proposition to his superiors at the USPHS: “Without question, much of the existing medical and health knowledge in this country is directly applicable overseas, but many and perhaps the most important overseas problems are uniquely different.”⁴⁸ To which he further added: “Modern methods and principles may be applicable but only after thorough study and careful adaptation to peculiar local needs by imaginative and interested persons on the scene.” Perhaps looking back at how his initial objectives failed in East Pakistan and the limited impact his team had on efforts to vaccinate vulnerable groups and contain smallpox, Langmuir concluded: “Here is where we have largely failed in the past.”⁴⁹ Direct intervention to implement surveillance at the international level would have to take another route and a presentation on disease surveillance paved the way for CDC involvement in redefining the international system preventing the spread of infectious diseases across borders.

4.7 Defining Modern Surveillance in the U.S.

In May 1962, Alex Langmuir delivered the Cutter Lecture on Preventive Medicine at the Harvard School of Public Health, which focused on the surveillance of communicable diseases in the United States. This presentation became an article in the *New England Journal of Medicine* published in January 1963. As a

⁴⁸ Memo from Alexander D. Langmuir, Chief, Epidemiology Branch to Clarence A. Smith, Chief, CDC, “Expansion of International Health Activities”, August 14, 1961.

⁴⁹ Memo from Alexander D. Langmuir, Chief, Epidemiology Branch to Clarence A. Smith, Chief, CDC, “Expansion of International Health Activities”, August 14, 1961.

consequence, it propelled the CDC and Langmuir into redefining the rules guiding international disease control. But what did Langmuir expose in his paper? The chief of the Epidemiology Branch elaborated on the historical roots of his conception of surveillance which he attributed to William Farr, super-intendent of the Statistical Department of the Registrar General's Office in London during the 19th century. More than merely recording epidemiological data (especially mortality data), Langmuir admired how Farr articulated epidemiological trends with concrete public health measures. "His was no ivory tower existence", Langmuir observed, "He accepted the responsibility of seeing that action was taken on the basis of his analysis."⁵⁰ Pointing to the development of disease surveillance in the United States, the article also stressed the novelty of CDC methods: "Since his [Farr] time, only rarely, if ever, has his standard been met with immediate, imaginative, practical use of statistics for the definition of current problems and their effective control."⁵¹ In sum, surveillance conducted by the CDC found its originality in its 19th century roots. As Langmuir noted: "During the past decade an effort has been made to recapture some of the old and vital spirit of William Farr."⁵² If the origins are clearly defined, what constituted surveillance according to the Chief Epidemiologist?

Langmuir defined two types of surveillance: traditional surveillance and disease surveillance. In his understanding, traditional surveillance focused on the individual to "detect the early signs of infections without restricting his freedom of movement."⁵³ Additionally, "it implied maintaining a responsible alertness, making systematic observations and taking action when indicated. It does not

⁵⁰ Alexander D. Langmuir, "The Surveillance of Communicable Diseases of National Importance", *New England Journal of Medicine*, Vol. 268, No. 4, Jan. 24, (1963), p. 182.

⁵¹ Alexander D. Langmuir, "The Surveillance of Communicable Diseases of National Importance", p. 182.

⁵² Alexander D. Langmuir, "The Surveillance of Communicable Diseases of National Importance", p. 182.

⁵³ Alexander D. Langmuir, "The Surveillance of Communicable Diseases of National Importance", p. 182.

involve the restrictions of either isolation or quarantine.”⁵⁴ However, what Langmuir stressed and what constituted the core of CDC surveillance activities was surveillance of *diseases* rather than *individuals*. Contrary to traditional surveillance, disease surveillance entailed systematic and continual “collection, consolidation and evaluation of morbidity and mortality reports and other relevant data” to monitor the distribution and trends in occurrence of communicable diseases. Furthermore, and in line with Langmuir’s belief in the application of epidemiological data to disease control, the second type of surveillance also included the distribution of data and analyses to those contributing in the collection of mortality and morbidity data and those in position to take action on their basis.⁵⁵ In short, the gaze of public health, Langmuir argued, shifted from following individuals as carriers of disease to look at numbers and statistics to pinpoint the existence and origins of outbreaks.

Drawing examples from malaria, polio, influenza and hepatitis surveillance, Langmuir described how gathered data served to assess the extent of epidemics as well as the impact of imported cases from foreign countries in spreading infections, how surveillance data informed the deployment of CDC investigation teams, and how it led to recommendations for immunization according to age groups. To further illustrate how the U.S. program functioned, Langmuir used figures and curves that combined reported cases with estimates which enabled the CDC to detect epidemics and predict on the short-term additional cases. The most striking use of surveillance measures deployed by the CDC was its involvement in the Cutter incident when EIS officers investigated cases of polio

⁵⁴ Alexander D. Langmuir, “The Surveillance of Communicable Diseases of National Importance”, p. 182. On the point of quarantine and isolation, it seems that Langmuir modified his position when compared with his recommendations concerning smallpox in East Pakistan when he readily proposed applying curfews or area quarantine to prevent the explosion of outbreaks into epidemics. Another hypothesis was that Langmuir felt that isolation and quarantine were not socially and legally acceptable in U.S. while their application in East Pakistan did not face the same difficulties.

⁵⁵ Alexander D. Langmuir, “The Surveillance of Communicable Diseases of National Importance”, p. 183.

which were eventually linked to an infected batch of vaccines.⁵⁶ Disease surveillance could serve concrete public health measures but Langmuir emphasized that the role of epidemiologist was limited to providing detailed information: “When major health problems arise, someone must make decisions. This is not the primary responsibility of the epidemiologist. Administrative and political as well as technical considerations must also be brought to bear. It is the epidemiologists’ function to get the facts to the decision makers.”⁵⁷ The lecture and the subsequent article had been primarily aimed at an American audience, with the emphasis on relations between the Federal and State governments. Surveillance of specific diseases was also a topic on which Langmuir wrote from the 1950s onward.⁵⁸ This also caught the attention of a Czech epidemiologist who would eventually assume a key role at the WHO.

4.8 Meeting of the IEA – Princeton 1964

Interest in CDC-type surveillance at the WHO followed the appointment of Czech epidemiologist Karel Raskà as director of the Division of Communicable Disease in 1964. However, close contact and shared interests developed prior to Raskà’s appointment in Geneva. According to Langmuir, his 1963 article in the *New England Journal of Medicine* had been the basis for disease surveillance methods applied by Raskà in Czechoslovakia.⁵⁹ An initial meeting between the two men took place in Princeton in 1964 at the triennial conference of the International

⁵⁶ Paul A. Offit, *The Cutter Incident: How America’s First Polio Vaccine Led to the Growing Vaccine Crisis* (New Haven: Yale University Press, 2005)

⁵⁷ Alexander D. Langmuir, “The Surveillance of Communicable Diseases of National Importance”, p. 191.

⁵⁸ For instance, N. Nathanson and AD Langmuir, “Epidemiological Surveillance Program”, *Stat Report*, No. 214 (1955): 183-185. AD Langmuir, N Nathanson, WJ Hall, “Surveillance of Poliomyelitis in the United States in 1955”, *American Journal of Public Health*, No. 46 (1956), p. 75-88. AD Langmuir, M. Pizzi, WY Trotter, FL Dunn, “Asian Influenza Surveillance”, *Public Health Reports*, 73 (1958), p. 114-120.

⁵⁹ Alexander D. Langmuir, “An Appreciation of Karel Raska”, *International Journal of Epidemiology*, Vol. 17, No. 3 (1988), p. 491.

Epidemiological Association (IEA).⁶⁰ Under the overall theme of the conference “The comparability of international surveillance”, Langmuir organized a panel on “developing concepts in surveillance” which included presentations by Lee Howard (USAID) and Perez Yekutieli on malaria and more crucially by D.A. Henderson and Karel Raskà on viral hepatitis.⁶¹ The Chief Epidemiologist recalls that “from our first meeting we related warmly to each other.”⁶² Langmuir attributes to his Czech counterpart the initiative of applying epidemiological intelligence internationally, for which he solicited his assistance⁶³

⁶⁰ Alexander D. Langmuir, “An Appreciation of Karel Raskà”, *International Journal of Epidemiology*, p. 491-492. In his recounting of this first meeting, Langmuir wrongly indicates 1965 rather than 1964. This meeting of the IEA took place in 1964 as John Pemberton points out. See John Pemberton, “Fifteenth International Scientific Meeting of the IEA”, *International Journal of Epidemiology*, Vol. 29, No. 2 (2000), p. 382-383.

⁶¹ Alexander D. Langmuir, “Developing Concepts in Surveillance”, *The Milbank Memorial Fund Quarterly*, Vol. 43, No. 2, Part 2: Comparability in International Epidemiology (April 1965), p. 369-372.

⁶² Alexander D. Langmuir, “An Appreciation of Karel Raskà”, p. 491. It must be noted that these types of appreciations tend to highlight the contributions and qualities of those being appreciated. However, in this case it seems that a close working/intellectual relationship did evolve out this first meeting. For instance, in his presentation at the IEA meeting, aside from himself, Langmuir only quoted Raskà, (Karel Raskà, “The Epidemiological Surveillance Programme”, *Journal of Hygiene, Epidemiology, Microbiology, and Immunology*, Vol. 8 (1964), p. 137-168. Similarly, Raskà quoted Langmuir’s article in the *New England Journal of Medicine* in his 1964 article.

⁶³ While Langmuir utilizes “surveillance”, Raskà used the term “epidemiological intelligence”. These are to be understood as synonyms. Alexander D. Langmuir, “Developing Concepts in Surveillance”, p. 371. As stated in the introduction, meanings and definitions of surveillance constantly changed and evolved during the twentieth century. As Fairchild, Bayer and Colgrove maintained, even Langmuir repeatedly argued with fellow CDC members and other federal officials on its definition. See Amy L. Fairchild, Ronald Bayer and James Colgrove, *Searching Eyes. Privacy, the State, and Disease Surveillance in America* (Berkeley: University of California Press, 2007), p. xviii. Others refrained in directly mapping the history of the concept and practice of surveillance by including it in broader themes. For instance, in Alfredo Morabia (ed.), *A History of Epidemiologic Methods and Concepts* (Basel: Birkhäuser Verlag, 2004) does not have a specific entry on surveillance/disease reporting and rather emphasizes refinement of statistics in epidemiology. In Walter W. Walter Holland, Jorn Olsen & Charles du V. Florey (eds.), *The Development of Modern Epidemiology: Personal Reports from those who were there*. (New York: OUP, 2007), surveillance is alluded to in articles by Lester Breslow and Roger Detels, “Public Health and Epidemiology”, Kenrad Nelson, “Outbreak investigations”, and Warren Winkelstein Jr and Elizabeth Barrett-Connor, “The development of epidemiology: the United States of America”.

Figure 4.2 1964 Meeting of the International Epidemiologic Association – Princeton, New Jersey



On the last row stand Karel Raskà (11), D.A. Henderson (18) and Alexander Langmuir (19). Other notables include: Martin Kaplan (Third row, 29), Thomas McKeown (Third row, 30), A.M.M Payne (Last row, 10) and J.A. Lee Howard (Last row, 14). © International Epidemiological Association (2000).

This international conference provided an opportunity for the CDC's Chief Epidemiologist to reflect on surveillance not only as practiced in the U.S. but on a global level. As he took a broader view on this public health practice when compared to his policy proposal for expansion of CDC epidemiological activities, additional activities now came to be included. For instance, Langmuir, who played an active role during the Asian influenza epidemic of 1957-58 and considered its epidemiological surveillance mainly on a national scale, enlarged his scope to acknowledge international influenza-related reporting: "While the global system of reporting influenza epidemics and identifying strains of virus originated before the term surveillance came into wide use, it is *now* classed as part of this broad function."⁶⁴ His recognition also addressed global malaria eradication which "incorporates surveillance not only as a means of planning, guiding and evaluating the success of the program, but also as an intrinsic

⁶⁴ Alexander D. Langmuir, "Developing Concepts in Surveillance", p. 369. Emphasis added.

feature of the control operations themselves.”⁶⁵ In a sense, this meeting in Princeton marks a shift for Langmuir from viewing disease surveillance as a national activity primarily to consider it as a practice which intertwined country-level activities with international programs, networks and organizations.

4.9 WHO: Raskà-Langmuir-Henderson

In his official functions of Division Director, Raskà first contacted the CDC in June 1964 to be included on the mailing list of surveillance reports produced in Atlanta. To James Mosley of the Hepatitis Surveillance Unit, he stated: “I feel that they [surveillance reports] are extremely useful for my activities in the Division of Communicable Disease.”⁶⁶ Additionally, Raskà visited the CDC to enlist D.A. Henderson to join him in developing an international system for surveillance, which is further detailed below.⁶⁷ Thus, initial development of a global surveillance program began at the end of 1964 and involved CDC’s Epidemiology Branch and the Czech epidemiologist from its very inception. Raskà sought out CDC expertise in this domain which in turn provided an opportunity for CDC epidemiologists, mainly Langmuir and Henderson, to promote their techniques not in the field or at the national level as Langmuir attempted during his mission in East Pakistan but at the highest echelons of international health.

Raskà’s initial choice to assist him in establishing disease surveillance at the WHO, founded on practices developed in Atlanta, was not Langmuir but his deputy D.A. Henderson. In November 1964, Raskà informed D.A. Henderson that the creation of a global surveillance system figured on the agenda of the WHO’s Division of Communicable Diseases and sought the expertise in this discipline to

⁶⁵ Alexander D. Langmuir, “Developing Concepts in Surveillance”, p. 369.

⁶⁶ Letter from Karel Raskà, Director, Division of Communicable Diseases, WHO to James Mosley, Chief, Hepatitis Surveillance Unit, June 8, 1964. Records of the CDC, Epidemiology Branch – Foreign Quarantine, RG 442.69.A688 Box 2, Folder: WHO Correspondence (1963-64), NARA Morrow, Georgia.

⁶⁷ Alexander D. Langmuir, “An Appreciation of Karel Raska”, p. 491.

conduct a meeting with top epidemiologists. Development of global surveillance however was the not main concern of D.A. Henderson. Replying to Raskà, Henderson expressed his satisfaction that surveillance would be developed from the vantage of point of the WHO, but his interests lied in smallpox. As he writes: “I have been working diligently to accelerate our own national efforts in participation in the international smallpox eradication program with, I believe, notable prospect of success. The present status of planning is such that it would be preferable for me to pursue the smallpox activities for the immediate present if there is a choice.”⁶⁸ Despite Henderson’s different priorities, smallpox and surveillance, the WHO and the CDC were inextricably tied.

The creation of a global disease surveillance program was intimately linked with the promotion by Henderson of the smallpox eradication program within the U.S. government (see chapter 2) and at the WHO. In regards to the Geneva-based organization, he used his contacts with Charles W. Cockburn, a British epidemiologist, to stay informed about the WHO’s intentions concerning smallpox. His participation at a conference on measles in July 1963 appears to be the key event that enabled Henderson to position himself advantageously towards the WHO.⁶⁹ As Anne-Emmanuelle Birn argues, scientific meetings in the field of international health, even if they do not automatically lead to adoption of new programs, are venues offering opportunities to “stimulate country-to-country interactions, continent-wide exchanges, and informal networking by policy makers, health officers, and government authorities.”⁷⁰ Following their

⁶⁸ Letter from Donald A. Henderson to Karel Raskà, December 11, 1964. Records of the CDC, Epidemiology Branch – Bacterial Disease Section Correspondence (1961-1965), RG 442.67.A730 Box 4, Folder: Foreign Correspondence – WHO 1964-65, NARA Morrow, Georgia.

⁶⁹ World Health Organization, *Measles Vaccines: Report of a WHO Scientific Group*, Technical Reports Series 263 (Geneva: World Health Organization, 1963). http://whqlibdoc.who.int/trs/WHO_TRS_263.pdf, accessed November 30, 2011. Henderson and Cockburn were both members of the secretariat, the former as consultant and the later as joint secretary.

⁷⁰ Anne-Emmanuelle Birn, ““No More Surprising Than a Broken Pitcher”? Maternal and Child Health in the Early Years of the Pan American Sanitary Bureau”, *CBMH/BCHM*, No. 1, Vol. 19 (2002), p. 19.

meeting in 1963, Cockburn and Henderson exchanged a number of letters which touched upon policy developments concerning smallpox eradication, combined vaccinations, national policies on immunization, etc. Henderson and Cockburn mutually informed each other, acting as windows into WHO and USPHS bureaucracies.

In addition to the policy orientations of both the U.S. government and the WHO, Henderson's personal motivations affected the implementation of disease surveillance on an international scale. Through his contact with Cockburn, Henderson signified his interest in smallpox eradication and his ambition to act as consultant for the WHO's program. As he replied to Raskà: "Dr. Cockburn wrote me a month or so ago to inquire as to my availability to work with a team which could develop a program and guidelines to the future with respect to global eradication of smallpox."⁷¹ However, his close involvement with the WHO did not come to fruition as by the end of 1964 he was informed of two events. Through Cockburn, Henderson first learned that the highest echelons of the WHO preferred other candidates over the CDC representative: "Dr Kaul and the Director-General have recommended two other consultants, one Dr Lal, who is in charge of the smallpox eradication programme in India, as epidemiologist and the other Dr Rodrigues from Brazil as the administrator."⁷² Secondly, Raskà informed him about the postponement of scientific meetings on disease surveillance.⁷³ Thus, by the end of 1964, one of the CDC members with the most extensive contacts, and who had lobbied for participation with the WHO was not able to translate these efforts into concrete involvement in either setting the

⁷¹ Letter from Donald A. Henderson to Karel Raskà, December 11, 1964.

⁷² Letter from Charles Cockburn to Donald A. Henderson, December 15, 1964. Records of the CDC, Epidemiology Branch – Bacterial Disease Section Correspondence (1961-1965), RG 442.67.A730 Box 4, Folder: Foreign Correspondence – WHO 1964-65, NARA Morrow, Georgia.

⁷³ Letter from Karel Raskà to Donald A. Henderson, December 17, 1964. Records of the CDC, Epidemiology Branch – Bacterial Disease Section Correspondence (1961-1965), RG 442.67.A730 Box 4, Folder: Foreign Correspondence – WHO 1964-65, NARA Morrow, Georgia.

agenda for smallpox eradication nor contributing in developing disease surveillance at the global level.

Despite these setbacks, Henderson assured himself of not closing any doors at the WHO by explicitly linking disease surveillance with smallpox eradication. While his main ambition clearly lies with the latter program, Henderson informs Raskà of his continuing interest in the international epidemiologic surveillance program.⁷⁴ In his correspondence with Cockburn, this linkage between the two programs is more forcefully expressed: “If a program in international surveillance is to be initiated, I can think of no happier place to begin than with smallpox.”⁷⁵ As with Langmuir, Henderson makes a clear difference between a laboratory-based surveillance system which ascertains viral identity and a field-based surveillance program which provides data to a “calculation center” which analyzes and disseminates this information to health workers and policymakers. For instance, Henderson does not mention the existence of an influenza surveillance program in which, incidentally, the CDC played a role for the Americas.⁷⁶ Furthermore, he conceptually associates surveillance and eradication:

The simple count of cases in each of the countries is a starting point but not more than this. If a program of good international surveillance for this one disease could be made to operate effectively, international surveillance for this one disease could be made to operate effectively, international surveillance programs for other diseases could follow logically. In my mind, the

⁷⁴ Letter from Donald A. Henderson to Karel Raskà, December 22, 1964. Records of the CDC, Epidemiology Branch – Bacterial Disease Section Correspondence (1961-1965) RG 442.67.A730 Box 4,, Folder: Foreign Correspondence – WHO 1964-65, NARA Morrow, Georgia.

⁷⁵ Letter from Donald A. Henderson to Charles Cockburn, December 22, 1964. Records of the CDC, Epidemiology Branch – Bacterial Disease Section Correspondence (1961-1965), RG 442.67.A730 Box 4, Folder: Foreign Correspondence – WHO 1964-65, NARA Morrow, Georgia.

⁷⁶ The malaria eradication program was organized in four phases (planning, attack, maintenance and surveillance). For more on malaria eradication, see chapters 4 and 5.

evolution of a good surveillance for smallpox could have more important implications than eradication of the disease itself (although I must confess that eradication of even one disease is no mean accomplishment).⁷⁷

Thus, by linking two programs being either carried out (smallpox eradication) or being considered (global disease surveillance) by the WHO, Henderson makes it explicit that surveillance would be instrumental in achieving eradication but also that implementation of surveillance methodologies into the smallpox program could be a stepping stone to its expansion to other diseases. In other words, investing in one program meant strengthening the other. Additionally, by arguing for a surveillance-based strategy for smallpox eradication, Henderson positions himself as especially competent to occupy an eventual opening at the WHO and direct global efforts, his interest clearly lying with smallpox. It would be Langmuir, not Henderson, who would play a prominent role in shaping global surveillance for diseases other than smallpox in the second half of the 1960s.

While intensification of smallpox eradication at the WHO was still a few years away, collaboration between Geneva and Atlanta on defining international surveillance continued on in 1965. Before following the trajectory of surveillance, we must return to another field mission which specifically studied its application outside the U.S.

4.10 South America: International Organizations and Disease Surveillance

Another opportunity to study the feasibility of applying surveillance strategies as conceived by Langmuir to a developing country occurred in late 1964 and early 1965. After the mission to East Pakistan, where a CDC team sought to implement

⁷⁷ Letter from Donald A. Henderson to Charles Cockburn, December 22, 1964. Records of the CDC, Epidemiology Branch – Bacterial Disease Section Correspondence (1961-1965), RG 442.67.A730 Box 4, Folder: Foreign Correspondence – WHO 1964-65, NARA Morrow, Georgia.

some elements of surveillance to immunization and disease control activities, a mission to Brazil and Peru was only the second occasion on which CDC epidemiologists studied closely the prospects of establishing a surveillance system also associated with smallpox. In the previous chapter, we followed a CDC group led by Don Millar through the angle of technology assessment of jet injectors. In this section however, we will focus on surveillance and disease reporting. In addition to these aspects, the issue of collaboration on the field with a multilateral health organization, namely the Pan American Health Organization (PAHO) will be explored. Thus, we first return to Brazil in September and October 1964 when Millar and John Neff began to demonstrate jet injectors but also assess stumbling possible strategies for the eradication of smallpox in the Western Hemisphere.

When compared with the context in which Langmuir worked in the late 1950s, the situation in Brazil differed in two significant ways. First, Millar and Neff traveled not to assist local health authorities in dealing with an epidemic but rather to assess and make recommendations on possible strategies to achieve smallpox eradication. As we have seen previously, the Kennedy Administration had committed to this objective as stated in the program for of the Alliance for Progress. Secondly, the PAHO was committed to smallpox eradication since 1950, whereas in East Pakistan Langmuir had no interaction with the South-East Asia Regional Organization. It was through the PAHO that the CDC dispatched Millar and his colleagues to South America. Consequently, the PAHO figured prominently in reports and field evaluation concerning surveillance.

During the initial trip to Brazil in September and October 1964, Millar first noticed inexactitudes in the data concerning smallpox. Soon after his arrival, he concluded that official numbers about the prevalence of the disease were grossly underestimated, with variola minor being widely distributed geographically and

among every age group.⁷⁸ Furthermore, the application of surveillance techniques and epidemiological investigations, Millar reported, were “relegated to a position a waiting until the [vaccination] campaign is nearer completion presumably 1968.”⁷⁹ However, during the mission to Brazil, and unlike in East Pakistan, the CDC team found a receptive climate to ideas on increasing the emphasis on epidemiology and assigning resources to investigation: “But in contrast to what I have seen elsewhere there is a lot of competence in Brazil and a willingness to accept surveillance and field investigation as a completely necessary fact of life in the eradication effort and the people here feel this is really the top priority item for planning.”⁸⁰ Indeed, Millar confided to Langmuir that Brazilian epidemiologists were eager to apply methods and techniques developed at the CDC in their country. Mentioning the response of his Brazilian counterpart, the CDC team leader states: “He (Allyrio Macedo Filho) sees the need for beefing up the epidemiological aspect of the campaign and welcomed all our suggestions about data handling etc.”⁸¹ The reception in Brazil of these ideas and methods provoked in Millar and Langmuir a sense of vindication that surveillance could be successfully applied outside the U.S. or in developed countries more generally. Both CDC epidemiologists make comments in this direction, Millar writing: “It has been very repeating (sic) to see the eagerness here to pursue mechanisms of surveillance and the farsighted awareness of epidemiology in the overall plan of operation. As usual, epidemiologists are few in number but the competence of people in the campaign surpassed what I have

⁷⁸ Letter from Don Millar to D.A. Henderson, September 26, 1964. Records of the OASH, Office of International Health, RG 514.130.71.4.1, Box 16, Folder: Diseases Measles-Smallpox (Brazil), NARA College Park.

⁷⁹ Letter from Don Millar to D.A. Henderson, September 26, 1964.

⁸⁰ Letter from Don Millar to D.A. Henderson, October 11, 1964. Records of the OASH, Office of International Health, RG 514.130.71.4.1, Box 16, Folder: Diseases Measles-Smallpox (Brazil), NARA College Park.

⁸¹ Letter from Don Millar to Alexander Langmuir, October 11, 1964. Records of the OASH, Office of International Health, RG 514.130.71.4.1, Box 16, Folder: Diseases Measles-Smallpox (Brazil), NARA College Park.

seen any place else abroad.”⁸² Langmuir responding: “It’s gratifying to see so much activity, to hear that the EIS Course had a slight contribution, and most of all, to learn that surveillance as we understand the word is the key to the solution.”⁸³ After disappointment in East Pakistan, Langmuir believed that Brazil would be where surveillance could be applied to achieve smallpox eradication.

In the final report, conclusions and recommendations emphasized epidemiological investigations and establishment of disease surveillance systems at both the national and the hemispheric level. These two activities were specifically linked with smallpox and its eradication in the Americas and in line with Henderson’s appraisal of the situation at the global level as seen above. More specifically, surveillance and epidemiological investigations were defined in a way that articulated a strong collaboration between the PAHO and the CDC. Millar’s first conclusion states that the PAHO should support a regional eradication program “soundly based on epidemiological appraisal” in each country, “accompanied by the establishment in each country of a surveillance system adequate to guide the present eradication effort and to detect the presence of the disease quickly during the vigilance phase.”⁸⁴ In conjunction with this first aspect for development of surveillance in the Americas, Millar recommended that the PAHO provide technical assistance in epidemiology and surveillance techniques. He favored a more proactive attitude from the PAHO:

by establishing a resource of consultant epidemiologists available for instantaneous field evaluation and assessment of outbreaks of smallpox wherever they occur in the hemisphere. Such a resource could be

⁸² Letter from Don Millar to Alexander Langmuir, October 11, 1964.

⁸³ Letter from Alexander Langmuir to Don Millar, October 19, 1964. Records of the OASH, Office of International Health, RG 514.130.71.4.1, Box 16, Folder: Diseases Measles-Smallpox (Brazil), NARA College Park.

⁸⁴ J.D. Millar and J.M. Neff, *Report to the Pan American Health Organization of Consultation on Smallpox Eradication with Brazil and Peru, September 20 – October 25, 1964*, p. 1-2. Records of the OASH, Office of International Health, RG 514.130.71.4.1, Box 16, Folder: Diseases Measles-Smallpox (Brazil), NARA College Park.

developed by assigning epidemiologic technicians to specific country programs, with the understanding that once surveillance mechanism in those programs are progressing reasonably well, these technicians would be available for epidemic aid assistance and epidemiologic consultation to other countries in the Americas when needed.⁸⁵

Similarities of the role assumed by the CDC in the U.S. with those proposed by Millar for the PAHO are obvious in regards to the importance accorded to disease surveillance, epidemiologists and their deployment to assist States in facing outbreaks. Further resemblance is to be perceived with establishment of a resource of epidemiologists at the PAHO for hemispheric deployment and the EIS program in the U.S.

In addition to the institutional similarities between the CDC and the PAHO, intensification of relations between both organizations on surveillance and field epidemiology revolved around training. In the case of developing surveillance mechanisms in Brazil, Millar noted that their epidemiologists should be given a chance to learn relevant methods and techniques to expedite their smallpox program. Specifically, the CDC team leader advised that “it would seem well advised for the epidemiologist assigned to the Commission for eradication of smallpox to spend four to five weeks in an agency such as the Communicable Disease Center to become familiar with surveillance techniques which might be of use in Brazil.”⁸⁶ Conversely to having Brazilian public health officials training in the U.S., CDC epidemiologists could be dispatched directly to the national program for a long-term assignment. Thus, relationships between the two organizations revolved around the problem of smallpox and development of a continental surveillance program which would mean an extension of activities

⁸⁵ J.D. Millar and J.M. Neff, *Report to the Pan American Health Organization of Consultation on Smallpox Eradication with Brazil and Peru, September 20 – October 25, 1964*, p. 2.

⁸⁶ J.D. Millar and J.M. Neff, *Report to the Pan American Health Organization of Consultation on Smallpox Eradication with Brazil and Peru, September 20 – October 25, 1964*, p. 4-5.

into a new area for the PAHO at the same increased international involvement than that of CDC epidemiologists trained and specialized in disease reporting and investigations.

Prospects seemed bright on the American continent and in Brazil especially as USPHS international health officers adhered to hemispheric and national surveillance in the region with assignment of CDC epidemiologists to Brazil and the PAHO.⁸⁷ Indeed, plans drafted during the closing months of 1964 and early 1965 slated three epidemiologists for Brazil and the PAHO to assist in “developing a National Surveillance and Investigation program”⁸⁸ and building closer technical relationships between the PAHO and the CDC to extend the initial Brazilian program to cover South America in its entirety.

These plans and discussions on how to implement them were based upon three basic assumptions from international health leadership at the USPHS: first, that the PAHO could be the vehicle of choice to execute hemispheric surveillance; second, that Brazilian public health authorities were committed to this strategy; and finally that American technical assistance is fundamental in initiating surveillance-based public health interventions. When Millar returned to Brazil to further study the prospects of a close cooperation with Brazil and PAHO on surveillance/smallpox, these beliefs were severely tested.

4.11 Reality Check: PAHO, Surveillance and Commitments

In the autumn of 1964, Millar had concluded that while surveillance mechanisms were rudimentary in most South American countries, with help from CDC

⁸⁷ Memo from James Watt (Director OIH) to Acting Associate Chief for Community Health, “Smallpox eradication in the Americas”, February 11, 1965. Records of the OASH, Office of International Health, RG 514.130.71.3.3 Box 6, Folder: Diseases Smallpox Eradication in the Americas, NARA College Park.

⁸⁸ Delmar W. Ruthig, *Review of the CDC Summery Proposal – Program for Smallpox Eradication in the Americas*, February 26, 1965. Records of the OASH, Office of International Health, RG 514.130.71.3.3 Box 6, Folder: Diseases Smallpox Eradication in the Americas, NARA College Park.

experts, notification systems could be successfully applied throughout the region. Furthermore, they were mandatory if national smallpox programs wanted to achieve their goal of eradication.⁸⁹ When returning to Brazil in early 1965, CDC epidemiologists dispatched to evaluate disease reporting mechanisms found greater difficulties than anticipated during the previous trip. These were related to a number of issues ranging from organizational structures to commitment of resources to surveillance.

Firstly, Millar focused on reporting mechanisms, their multiple channels and organizations engaged in these activities. What became apparent during this second mission was that despite the number of Brazilian agencies, in addition to the PAHO, involved in surveillance, coverage remained inexistent in large areas. The first reporting system was based on States sending information to Federal health authorities to consolidate all epidemiological data regarding smallpox. Reporting to State authorities, Millar noted, only existed on paper and did not figure high on priorities. Aside from being the responsibility of part-time personnel in States engaged in reporting to the Federal government, a third of the country did not have the health services essential to gather epidemiological data. Writing to Henderson, Millar explains: “There are some states [...] which do report regularly and adequately. However, 33% of the counties in Brazil have no health services at all (that is no doctors, no nurses, no care) and thus the grass roots aspects are very thin and large areas are uncovered.”⁹⁰ Only through financial stimuli did the Federal government coax States into regular reporting.

The second channel of reporting, and the most promising in Millar’s evaluation, was through the *Serviço Especial de Saúde Pública* (SESP). Created in 1942 as a joint U.S.-Brazil temporary wartime agency, the SESP was most active in rural

⁸⁹ Memo from Deputy Chief, BSS to Surgeon General, “*Smallpox Eradication in the Americas*”, January 14, 1965. Records of the OASH, Office of International Health, RG 514.130.71.3.3 Box 6, Folder: Diseases Smallpox Eradication in the Americas, NARA College Park.

⁹⁰ Letter from Don Millar to D. A. Henderson, January 22, 1965. Records of the OASH, RG 514.130.71.4.1 Box 16, Folder: Diseases Measles-Smallpox (Brazil), NARA College Park.

areas with its initial functions related to sanitation of the Amazonian Valley (especially malaria control and medical assistance to workers extracting rubber), training of public health professionals and management of a leprosy control program.⁹¹ As an instrument to expand Federal authority in Brazil's interior, the SESP constructed a network of medical centers in remote areas and trained local populations to administer these centers and carry out basic public health activities. Furthermore, it maintained close relations with the U.S. through agreements with the Institute of Inter-American Affairs as an instrument of Cold War politics until 1960.⁹² This network of health centers scattered in rural areas formed the core of Millar's favourable opinion on co-opting the SESP in surveillance. Indeed, as he reported to his superior: "SESP has 300 health units scattered throughout rural Brazil and these report on a regular monthly basis to the SESP office in Rio. Obviously, this by no means approaches total coverage but it does reach key areas where nothing else does. This does have considerably potential without major change."⁹³ Contrary to State health authorities, the SESP, Millar added, enjoyed close relationships and had agreements with all the States "to permit their coming and going ad lib in the execution of field studies."⁹⁴ Finally, the team found SESP officials willing to engage in surveillance activities in a manner similar to CDC's activities in the U.S.

A third channel of disease reporting identified by Millar was through the PAHO. As he travelled across Brazil, the epidemiologist learned of one PAHO statistician who stimulated reporting in States he visited. However, local health authorities only reported to him, with no signs of sharing epidemiological information with either the Federal government or the SESP.

⁹¹ Andre Luiz Viera de Campos, "Politiques internationales (et réponses locales) de santé au Brésil: le Service Spécial de Santé Publique, 1942-1960", CBMH/BCHM, No. 1, Vol. 25, (2008), p. 115.

⁹² Andre Luiz Viera de Campos, "Politiques internationales (et réponses locales) de santé au Brésil: le Service Spécial de Santé Publique, 1942-1960", p. 123.

⁹³ Letter from Don Millar to D. A. Henderson, January 22, 1965.

⁹⁴ Letter from Don Millar to D. A. Henderson, January 22, 1965.

The difficulties associated with the existence of multiple and independent reporting channels were further compounded with local attitudes towards surveillance. Contrary to previous reports from Brazil on the possible implementation of surveillance and field investigations in the national campaign against smallpox, further pressure from Millar and his team revealed ambiguous opinions and dedication towards applying foreign solutions. As Millar explained to Henderson: “The people we are working with are very excited about surveillance as a concept, reflex action as a concept, recruiting of young epidemiologist as a concept, show leather work, etc., we (sic) stand favorable to the whole concept, but the absence of any real evidence of an earnest to goodness, nose-to-the-grinds line, grim determination to get on with it makes it difficult to foresee much but frustration.”⁹⁵ This dim view of implementation of surveillance-based strategies for smallpox eradication on the part of Brazilian public health authorities was shared by fellow CDC epidemiologist Tom Mack: “Now as to the type of job that is feasible, I agree with Don that any attempt at formal national surveillance is doomed to failure. Two or three lines of communication for passive surveillance now exist, and the various agencies and individuals simply do not hold the same objectives.”⁹⁶ As for the type of solutions to encourage consolidation and improvement of disease reporting mechanisms, few were formulated. Reminiscent of Langmuir’s conclusions for similar public health measures in East Pakistan, Millar and Mack hoped that “passage of time” would ameliorate the situation.⁹⁷

Frustrations about lack of commitment towards surveillance and about the organizational landscape had further consequences in the CDC’s plans for active

⁹⁵ Letter from Don Millar to D.A. Henderson, January 29, 1965. Records of the OASH, Office of International Health, RG 514.130.71.4.1 Box 16, Folder: Diseases Measles-Smallpox (Brazil), NARA College Park.

⁹⁶ Letter from Tom Mack to D.A. Henderson, February 5, 1965. Records of the OASH, Office of International Health, RG 514.130.71.4.1 Box 16, Folder: Diseases Measles-Smallpox (Brazil), NARA College Park.

⁹⁷ Letter from Tom Mack to D.A. Henderson, February 5, 1965.

participation in a hemispheric campaign against smallpox and prospects of implementing its type of surveillance outside the United States. Among the issues emphasized in letters from South America was finding counterparts in Brazil's public health system to oversee the development and operations of surveillance activities. CDC plans for South America hinged on acting as consultants on disease reporting mechanisms and training of field epidemiologists. What Millar discovered on his second tour to Brazil was that a limited role would be difficult: "In essence, there is no place for advisory help as there is no people to advise except the two or three in the program in Rio."⁹⁸ In other words, if CDC epidemiologists were eager to participate in the Brazil national program for eradication, besides from local epidemiologists with whom Millar and colleagues collaborated, there were few points of entry for foreign experts that would make it possible to test and apply surveillance mechanisms.

With difficulties in eliciting firm commitment on the part of Brazilian health authorities and governmental authorities, the CDC team remained hopeful that it could somehow be involved in local efforts albeit on a moderate scale. Millar sternly warned Henderson that: "Unless we want to commit CDC to eradicate smallpox here, I don't see how we can entertain seriously sending good people into the program as it now stands."⁹⁹ He further recommended postponing large scale involvement in the country aside from a possible limited collaboration with the Institute Oswaldo Cruz (IOC), a biomedical research center established at the end of the 19th century which remained relatively independent from the Brazilian Federal government.¹⁰⁰ Millar and Tom Mack praised the IOC's quality of work

⁹⁸ Letter from Don Millar to D.A. Henderson, February 5, 1965. The passage was underlined presumably by D.A. Henderson.

⁹⁹ Letter from Don Millar to D.A. Henderson, February 5, 1965.

¹⁰⁰ On the Oswaldo Cruz Institute, see Nancy Stepan, "Initiation and Survival of Biomedical Research in a Developing Country: The Oswaldo Cruz Institute of Brazil, 1900-1920", *Journal of the History of Medicine and Allied Sciences*, Vol. 30 (1975), p. 303-325.

and organizational flexibility which they considered less political and more scientific.¹⁰¹

In their appraisal of the institutional landscape and overall organization of eradication efforts and implementation of surveillance, Millar and Mack kept their most severe criticism for the PAHO. A series of observations made on the field raised doubt about the relevance and usefulness of the PAHO in the efforts to establish a continental disease surveillance service, let alone direct an eradication campaign. As Millar initially noted upon arriving in Brazil, the PAHO did not provide his team with any sort of support and did not foresee any improvement: “Of course given a little catalysis here and there the thing might fall into place but that would be a bet out of character and not something to put a lot of odds on.”¹⁰² Far from improving their opinions about the PAHO as their mission progressed, evaluations about collaborating with and working through the multilateral organization worsened. In their final letters, Mack and Millar stressed the futility of seeking further collaboration on eradication/surveillance: “One more thing should be said, PAHO is really of little help down here. We have been disappointed in their cooperation even in such things as securing hotel accommodations. [...] PAHO seemingly has little capability to have these arranged let alone handle any major operational activities. It seems the federal government gives minimal concern to PAHO at least.”¹⁰³ Tom Mack suggested collaborating with the IOC, on the basis that, aside from their its scientific resources and operational flexibility: “[...]PAHO does not have to come in.”¹⁰⁴ Field reports and correspondence made evident that any commitment of CDC personnel and creation of a hemispheric surveillance network for smallpox, and

¹⁰¹ Letter from Don Millar to D.A. Henderson, February 5, 1965 and letter from Tom Mack to D.A. Henderson, February 5, 1965.

¹⁰² Letter from Don Millar to D.A. Henderson, January 29, 1965. Underlined in the original.

¹⁰³ Letter from Don Millar to D.A. Henderson, February 5, 1965.

¹⁰⁴ Letter from Tom Mack to D.A. Henderson, February 5, 1965.

eventually other diseases through the PAHO met with little enthusiasm on the part of epidemiologists dispatched in South America to assess the situation.

In their report to the PAHO, the CDC epidemiologists underlined the organizational obstacles to the establishment of formal disease surveillance in Brazil, made pious recommendations on the need to devote additional resources to implement these activities, and highlighted the necessity of reinforcing Brazilian Federal authority in the national campaign. Misgivings about the PAHO however were understandably absent in the CDC report on the situation. Rather, the focus was out on the obstacles to rapid and comprehensive disease reporting mechanisms and channels in Brazil. Recommendations listed a number of possible organizational and structural reforms within the national program which would ensure better surveillance in Brazil.¹⁰⁵ Contrary to opinions expressed in letters, the PAHO was not considered as an obstacle or an irrelevant actor, but as a possible partner to assist Brazilians in improving their national campaign against smallpox. Millar diplomatically suggested that “PAHO [...] directs assignment of international epidemiologists to the smallpox program for purpose of supporting and developing surveillance aspects of the program.”¹⁰⁶ Thus, instead of findings avenues to keep the PAHO away from a possible CDC involvement in South America, the final report emphasized its role as a potential catalyst to encourage necessary steps in establishing an effective surveillance system.

The opinions and letters of Millar and Mack were directed at CDC and USPHS decision makers, but there are few indications that they affected U.S. plans to participate in the region and globally. This can be explained in two ways. Firstly,

¹⁰⁵ J.D. Millar *et al.*, *Report to the Pan American Health Organization of Evaluation of Use of Jet Injection in Smallpox Vaccination in Brazil, January 16 – March 3, 1965*, p. 46. Records of the CDC, Laboratory Branch - Laboratory Program General Files - 1961-1966, RG 442.69.A0124, Box 1, Folder: Reports - Report to the Pan American Health Organization on Jet Injection in Smallpox Vaccination in Brazil, 1965, NARA Morrow, Georgia.

¹⁰⁶ J.D. Millar *et al.*, *Report to the Pan American Health Organization of Evaluation of Use of Jet Injection in Smallpox Vaccination in Brazil, January 16 – March 3, 1965*, p. 11-12.

the USPHS favored international health involvement and deployment of its human resources through multilateral organizations. It enjoyed close relationships with the PAHO and the WHO. This position was endorsed by CDC leadership which, despite field reports from its own epidemiologists, suggested assigning personnel to Brazil under PAHO auspices. In Goddard's opinion, the PAHO would be the ideal site for CDC's participation: "Such activities themselves, intrinsically of importance, would serve further to provide a more substantial base for departure should the proposed program for smallpox eradication and surveillance in the Americas be approved and monies appropriated."¹⁰⁷

Secondly, it ran contrary to foreign policy orientations of the mid-1960s. In addition to commitments to smallpox eradication enshrined in the Alliance for Progress, Johnson sought to increase the number of "U.S. nationals on the staff of International Organizations in which the United States plays a role."¹⁰⁸ Alignment with this policy could augment the probabilities of receiving funding and authorizations, reasoned international health officials at the USPHS. For James Watt, this aspect: "is of particular significance in view of the importance of the smallpox eradication program to the United States as well as to the countries of South America."¹⁰⁹

Furthermore, deficiencies and difficulties in establishing a surveillance network for the western hemisphere were occulted in correspondence between the CDC and the WHO. Despite numerous mentions of obstacles encountered in Brazil and with the PAHO from Millar and Mack, Henderson remained silent on whether international organizations were adapted to undertake disease

¹⁰⁷ Memo from James Goddard, Chief CDC to Deputy Chief, BSS, "Proposed Program for Smallpox Surveillance and Eradication in the Americas", February 26, 1965. Records of the OASH, Office of International Health, RG 514.130.71.3.3 Box 6, Folder: Diseases Smallpox Eradication in the Americas, NARA College Park.

¹⁰⁸ Memo from James Watt, Director, OIH to Acting Chief from Community Health, "Smallpox eradication in the Americas", February 11, 1965. Records of the OASH, RG 514.130.71.3.3 Box 6, Folder: Diseases Smallpox Eradication in the Americas, NARA College Park.

¹⁰⁹ Memo from James Watt, Director, OIH to Acting Chief from Community Health, "Smallpox eradication in the Americas", February 11, 1965.

reporting and investigation on a continental scale, let alone on a global scale. To his long time correspondent Charles Cockburn, D.A. Henderson explained: “We are developing a number of ideas pertinent to programs and international surveillance in cooperation with PAHO and would like very much to explore in depth current thoughts on this matter as you view the problem from Geneva.”¹¹⁰ Opinions on the role and usefulness of international organizations such as the PAHO in disease surveillance were thus divided whether they were expressed from the field or from behind a desk. Despite the negative assessments from Millar and Mack, surveillance was on the international agenda, especially in Geneva.

4.12 Popularity of Langmuir

Following appointment of Czech epidemiologist Karel Raskà in 1964, global disease surveillance had become a possible area for expansion of the WHO. . As mentioned above, Raskà sought CDC expertise in disease surveillance when attempting to create a scientific panel in late 1964. Despite the postponement of this initiative, Raskà and Langmuir developed a working relationship which gave birth to surveillance-based International Health Regulations at the end of the 1960s. Raskà, however, was not the only WHO official interested in the CDC’s surveillance methods. In the summer of 1965, the Chief Epidemiologist was contacted by long-time WHO official and peace activist Martin D. Kaplan.

Parallel to the work carried out by the Division of Communicable Disease, the office of the Director-General established a special task group charged with studying the research and operational requirements of creating surveillance and monitoring systems for communicable diseases, drugs and environmental

¹¹⁰ Letter from D.A. Henderson to W. Charles Cockburn, February 9, 1965. Records of the CDC, Epidemiology Branch - Bacterial Diseases Section Correspondence (1961-1965), RG 442.67.A730 Box 4, Folder: Correspondence - Foreign Correspondence - WHO 1964-65, NARA Morrow, Georgia.

contaminants.¹¹¹ These efforts were born out a meeting of scientific advisors in November 1963 which looked into creating a “World Health Research Center”. This group defined three areas for the WHO’s involvement in research: epidemiology, communications science and technology, and biomedical research. The World Health Research Center became an issue during the 1964 meeting of the World Health Assembly where it was argued by WHO’s Director-General that: “There was a most urgent need for the creation of a world center for communications and information on health research.”¹¹² As special adviser on research and development at the WHO, Kaplan turned to the CDC, namely to Langmuir, Henderson and Robert E. Serfling¹¹³, to constitute a core of experts on communicable disease surveillance. In a series of discussions scheduled for August 1965, Kaplan’s “[...] primary concern in the discussions [...] is defining the programme of research necessary in epidemiology and communications science to develop monitoring systems for communicable diseases, drugs and environmental contaminants.”¹¹⁴ Contrary to the objectives pursued by Raskà and shared by Langmuir, the special task group sought to analyze monitoring and “epidemiological surveillance” on what Kaplan qualified as a more “fundamental level.”¹¹⁵ As such, aside from invitations extended to CDC epidemiologists (and biostatisticians), Kaplan assembled an elite group mostly composed of

¹¹¹ Letter from Martin D. Kaplan to Alexander D. Langmuir, June 9, 1965. Records of the CDC, Epidemiology Branch - Bacterial Diseases Section Correspondence (1961-1965), RG 442.67.A730 Box 4, Folder: Correspondence - Foreign Correspondence - WHO 1964-65, NARA Morrow, Georgia.

¹¹² Marcolino Candau quoted in Socrates Litsios and WHO, *The Third Ten Years of the World Health Organization* (Geneva : World Health Organization, 2008), p. 89.

¹¹³ The later was a biostatistician who developed quota sampling methods for surveys of immunization campaigns while working at the Epidemiology Branch. In July 1965, he left the USPHS for a fellowship at the University of Michigan. Robert E. Serfling and Ida L. Sherman, “Survey Evaluation of Three Poliomyelitis Immunization Campaigns”, *Public Health Reports*, Vol. 78, No. 5 (May 1963), p. 413-418. Robert E. Serfling, “Methods for Current Statistical Analysis of Excess Pneumonia-Influenza Deaths”, *Public Health Reports*, Vol. 78, No. 6 (June 1963), p. 494-506. Letter from Martin D. Kaplan to Alexander D. Langmuir, June 9, 1965.

¹¹⁴ Letter from Martin D. Kaplan to Alexander D. Langmuir, June 29, 1965. Records of the CDC, Epidemiology Branch - Bacterial Diseases Section Correspondence (1961-1965), RG 442.67.A730 Box 4, Folder: Correspondence - Foreign Correspondence - WHO 1964-65, NARA Morrow, Georgia.

¹¹⁵ Letter from Martin D. Kaplan to Alexander D. Langmuir, June 29, 1965.

mathematicians, computer science specialists and epidemiologists.¹¹⁶ To further emphasize the fundamental/practical divide, the WHO's special adviser stressed: "The epidemiological experience of CDC could provide valuable background for our discussions, but this should not be confused with field programme activities for possible extension of "surveillance" in communicable diseases to which Dr Raskà is now giving thought. The latter is his field of responsibility, but he is giving great weight to any guidance he may receive from our discussions for long-range development of surveillance and monitoring in communicable diseases."¹¹⁷

While the opportunity of joining Kaplan and his task force appealed to Langmuir, some reservations remained. He questioned the program envisioned by Kaplan: "It is not clear to me how one can discuss 'research necessary in epidemiology and communications science to develop monitoring systems' without defining the basic surveillance procedures that are practical."¹¹⁸ For Langmuir, implementation of surveillance on an international scale rested upon addressing issues related to the application of epidemiological techniques to field programs and circulation of data. His assessment of CDC expertise made collaboration with fellow epidemiologist Karel Raskà more likely than with the group assembled by Kaplan. Consequently, Langmuir informed the latter that the CDC would rather act as a consultant to Raskà in developing surveillance than participate in discussions which "frankly confuse[d] [him] quite a bit."¹¹⁹ As an epilogue, while the World Health Research Center never materialized, the Division of Research

¹¹⁶ Among the mathematicians were Murray Eden (MIT), Marcel-Paul "Marco" Schützenberger (Sorbonne), Walter Rosenblith (MIT), Alfred Renyi (Hungary), Boris Gnedenko (Kiev) and Klaus Krickeberg (Heidelberg). The group of epidemiologists was composed of Anthony M. M. Payne (Yale), Hans Valkenberg (Rotterdam), John C. Cassel (University of North Carolina), John R. Goldsmith (WHO), Richard Doll (UK), Karel Raskà (WHO) and Jan Kostrzewski (Poland).

¹¹⁷ Letter from Martin D. Kaplan to Alexander D. Langmuir, June 29, 1965.

¹¹⁸ Letter from Alexander D. Langmuir to Martin D. Kaplan, July 1, 1965. Records of the CDC, RG 442.67.A730 Box 4, Epidemiology Branch - Bacterial Diseases Section Correspondence (1961-1965), Folder: Correspondence - Foreign Correspondence - WHO 1964-65, NARA Morrow, Georgia.

¹¹⁹ Letter from Alexander D. Langmuir to Martin D. Kaplan, July 1, 1965.

and Communication Science did start operating by mid-1968 but it did not survive long, being merged with another program to become the Division of Strengthening of Health Services in August 1972.¹²⁰

Collaboration by Langmuir on surveillance with the WHO involved initiatives promoted by the Division of Communicable Disease inspired by mechanisms applied in Atlanta. However, the aborted cooperation with Martin Kaplan shows that international health bureaucrats looked to the CDC and Langmuir specifically when it came to developing and implementing surveillance on a global scale. Conversely, as its relations with the WHO intensified in the mid-1960s at a higher level than before, CDC leadership sought to familiarize itself with the Geneva-based organization. Indeed, David Sencer recognized this aspect: “CDC’s involvement with the World Health Organization is growing, and we feel that it would benefit the Center [...] to be familiar with the administrative operation of the World Health Organization.”¹²¹ As such, an executive officer was dispatched to Geneva to establish contacts with WHO personnel. Intensification of involvement covered not only plans for global surveillance shared by Raskà and Langmuir, but also included were discussions concerning smallpox eradication, to which we alluded in the previous chapter, and increased responsibilities in malaria eradication. These were accompanied by a diversification of CDC personnel participating in WHO expert panels and an augmentation in overall presence in those meetings. If insecticides and veterinary public health dominated the agenda during the 1950s, the following

¹²⁰ On the fate of the World Health Research Center and the Division of Epidemiology and Communication Science, see in Socrates Litsios and WHO, *The Third Ten Years of the World Health Organization*, p. 87-94. A background of discussions regarding the establishment of the WHRC and U.S. policy in this matter is to be found in John Walsh, “Health Research: A Small Start for an International Center”, *Science*, Vol. 155, No. 3766 (3 March, 1967), p. 1088-1090. The Alexander Hollaender Papers conserved at the American Philosophical Association also contain some documents on the WHRC.

¹²¹ Memo from David Sencer, Deputy Chief, CDC to Benjamin Blood, DIH, Office of Surgeon General, “Visit to World Health Organization to World Health Organization Headquarters”, March 22, 1965. Records of the USPHS, Office of International Health, RG 90.130.67.29.6 Box 26, Folder: Travel, NARA College Park.

decade is marked by a larger variety of infectious diseases and issues being addressed: enteric diseases, respiratory diseases, smallpox and measles vaccines, health laboratory services, immunological surveys, etc., alongside continuing involvement with insecticides and vector control. The number of appearances on expert panels increased from 16 to 22. No single member from CDC monopolized attendance as was the case earlier with the maximum number of participations being two.¹²² The second half of the 1960s would be indeed the years of closer relations between the CDC and the WHO and surveillance remained at the core. Finally, appointment of Henderson as head of the WHO's smallpox eradication program in November 1966 after years of lobbying, and of Langmuir on the WHO Advisory panel on malaria from 1967 to 1972 are indicative that relationships were building at a higher level than what had been the norm a decade earlier.

4.13 Surveillance, Quarantine and Regulations

As Raskà pushed the surveillance agenda within the WHO, he laid out his program in an article published in 1966. Again, the influence of Langmuir is palpable. In *National and International Surveillance of Communicable Diseases*, the Czech epidemiologist attributed recent developments in epidemiology to the CDC: "The surveillance programme developed in the Communicable Disease Center, Atlanta, Ga., USA, includes the systematic collection of data pertaining to the occurrence of specific diseases, the analysis and interpretation of these data, and the dissemination of consolidated and processed information to the programme and other interested persons."¹²³ Raskà highlighted the investigative capabilities of the CDC which were now intrinsically part of surveillance: "Special

¹²² Those who participated in two WHO expert panels were: D.A. Henderson, Donald Schliessmann, W.J. Hayes Jr. and Herbert Schoof.

¹²³ Karel Raskà, "National and International Surveillance of Communicable Diseases", *WHO Chron*, Vol. 20, No. 9 (September 1966), p. 315. Copy in Records of CDC, Office of Director Files 1967-1968, RG 442.71.A831 Box 2, Folder: World Health Organization, NARA Morrow, Georgia. Raskà also pointed to increased emphasis on disease surveillance in Czechoslovakia where, according to the author, laboratories played a more prominent role than in the United States.

epidemiological investigations, field surveys, and individual case studies are frequently undertaken to complete data collected on a routine basis.”¹²⁴ CDC influence is further present in the bureaucratic decision of creating an Epidemiological Surveillance Unit in the Division of Communicable Disease in 1965 on the model of Epidemiology Branch’s own Surveillance Section.

Interestingly, Raskà casts a wider net in defining surveillance than Langmuir and Henderson. When reviewing individual country activities, he readily includes laboratory procedures in carrying immunological surveys and lack of such facilities being impediments to national surveillance efforts. On a global level, the influenza reference laboratories and surveillance in the malaria eradication program are included in his review of examples. His definition of global disease surveillance articulated a privileged position for the WHO: “The surveillance of communicable disease on an international scale is something more than the sum of national surveillance activities, since it is concerned with the dynamics of the spread of the disease or infection not only within a single country to another”, to which he further added: “WHO has unique opportunity to collect and process all existing information[.]”¹²⁵ Logically Raskà pointed to one of the WHO’s core activity related to surveillance: application of the International Sanitary Regulations. In their reformulation at the end of the 1960s, the Langmuir-Raskà tandem would play a pivotal role in changing the international rules for disease control.

Conceived in the 19th century, the International Sanitary Regulations (ISR) listed infectious diseases and measures to limit their spread to European countries.¹²⁶ Targeted by these regulations continually revised during the 19th and 20th

¹²⁴ Karel Raskà, “National and International Surveillance of Communicable Diseases”, p. 315.

¹²⁵ Karel Raskà, “National and International Surveillance of Communicable Diseases”, p. 320.

¹²⁶ On the origins of the International Sanitary Regulations, see W.F. Bynum, “Policing Hearts of Darkness: Aspects of the International Sanitary Conferences”, *Hist Philos Life Sci*, Vol. 15, No. 3 (1993), p. 421-34. A detailed account of successive iterations of the ISR from a Russian/Soviet perspective is to be found in Oleg P. Schepin and Waldemar V. Yerkamov, *International Quarantine*, (Madison, Connecticut: International Universities Press, 1991)

century were smallpox, cholera, yellow fever, typhus, plague and relapsing fever. Central to their control were quarantine measures supplemented by additional means (sanitation regulations, inspection, segregation, pest control and disinfection) sometimes opposed by colonial powers engaged in extensive international trade.¹²⁷ New institutions devoted to international health such as the *Office international d'hygiène publique* and the League of Nations Health Organization assumed responsibilities of epidemiological notification of communicable diseases covered by the ISR. These fell under the WHO's responsibility following World War II.

Interest and adoption of surveillance as a cornerstone for communicable disease control spurred by Raskà and Langmuir shaped the reformulation of the basic principles guiding the international health regulatory regime.¹²⁸ At the WHO, the recent Epidemiological Surveillance Unit first articulated the possible abandonment of quarantine measures. It argued that: "Theoretically, therefore, one might postulate that surveillance activities could substitute functions of the International Sanitary Regulations."¹²⁹ Here, it appears that new attitudes towards surveillance and quarantine at the international level echoes similar modifications in the United States in 1967. Border control to prevent the importation of diseases covered by the ISR was the responsibility of the USPHS Foreign Quarantine Service. As this service was transferred under the authority of the CDC, demands for budgetary cuts came from the White House. These translated into the reduction of personnel and the closure of offices as well as placing emphasis on epidemiology and surveillance rather than on quarantining

¹²⁷ W.F. Bynum, "Policing Hearts of Darkness: Aspects of the International Sanitary Conferences", p. 431.

¹²⁸ David Leive, *International Regulatory Regimes: case studies in health, meteorology and food* (Lexington, Mass: Lexington Books: 1976), p. xxiii.

¹²⁹ Epidemiological Surveillance Unit, World Health Organization, *The Potential Role of Epidemiological Surveillance in the Prevention of International Spread of Quarantinable and other Communicable Diseases*, Committee on International Quarantine, 28 November – 7 December 1967. Records of the CDC, RG 442.71.A831 Box 2, Office of the Director Files 1967-1968, Folder: World Health Organization, NARA Morrow, Georgia.

at ports of entry. As Sencer pointed out: “Better epidemiology provided an early warning system on the occurrence of communicable diseases anywhere in the world. Better surveillance within the states picked up any threats to health that slipped by.”¹³⁰ A similar argument was also voiced by the WHO’s Epidemiological Surveillance Unit: “If such [surveillance] measures were scientifically correct and carried out promptly and efficiently inside a country becoming aware of an actual or threatened introduction of cases of certain diseases, these might in the end prove more effective than “quarantine” measures aiming at preventing entry of cases into the country”¹³¹

The influence of the CDC on surveillance practices at the WHO is further felt when we look at ambitions on developing investigative capabilities similar to those of the EIS program. In the same programmatic document, arguments for obtaining additional powers for the multilateral organization in this area are formulated. The Epidemiological Surveillance Unit suggested convincing the World Health Assembly to make it compulsory for its member-states to report communicable diseases, including those not covered by the ISR, and to permit the WHO to take action based upon those reports.¹³² These actions included: “the right of investigating epidemiological events which the Director-General deems to constitute a threat to international health.” However, this idea of epidemiological intelligence at the international level is not a new one. During the 1920s, Polish health internationalist Ludwik Rajchman working in the League of Nations Health Organization informed member governments of his intention of organizing an epidemiological intelligence service. While this service

¹³⁰ David Sencer interviewed by Elizabeth Etheridge, *Sentinel for Health: A History of the Centers for Disease Control*, p. 158-159.

¹³¹ Epidemiological Surveillance Unit, World Health Organization, *The Potential Role of Epidemiological Surveillance in the Prevention of International Spread of Quarantinable and other Communicable Diseases*, Committee on International Quarantine, 28 November – 7 December 1967.

¹³² Epidemiological Surveillance Unit, World Health Organization, *The Potential Role of Epidemiological Surveillance in the Prevention of International Spread of Quarantinable and other Communicable Diseases*, Committee on International Quarantine, 28 November – 7 December 1967.

eventually was established and financed partly by the Rockefeller Foundation, it was relatively small, composed of four professionals and three general service staff.¹³³

Background documents were prepared by Raskà and Langmuir for whom it was a marking experience. Looking back on his collaboration with Raskà, he wrote: “Working with Karel Raskà was an experience long to be remembered. His scientific knowledge in the broad field was superb.”¹³⁴ As a consultant collaborating with a like-minded WHO official, Langmuir was in a position of orienting and defining the shape and form of what could become disease surveillance at the international level beyond communication of basic epidemiological information through the WHO’s weekly bulletin. The Chief Epidemiologist drew upon his experience to propose a more proactive role for the WHO towards member States not dissimilar to the one assumed by the CDC towards U.S. States in case of epidemiological emergencies. In these events, he maintained that the Geneva-based organization should first “help deficient national surveillance systems to become reoriented and strengthened to a degree that permits it to deal adequately with an emergency” and second “maintain sufficient flexibility to an epidemiological emergency with assistance appropriate to the situation, on the request of a Government whose services are not yet adequate to cope with a sufficient disease outbreak.”¹³⁵

Discussions about the international sanitary regulations and possible modifications took place in Geneva in November and December 1967. Among the members of the Committee on International Quarantine, the United States was the only country represented by two members, both from the CDC: David

¹³³ Norman Howard-Jones, *International Public Health between the Two World Wars: the Organizational Problems*, (Geneva: The World Health Organization, 1978), p. 36 and p. 57

¹³⁴ Alexander Langmuir, “An Appreciation of Karel Raskà”, p. 491.

¹³⁵ Epidemiological Surveillance Unit with assistance from Dr A. D. Langmuir, *Background Document for Reference Use at the Technological Discussions on National and International Surveillance of Communicable Diseases*, April 5, 1968. Records of the CDC, RG 442.71.A831 Box 2, Office of Director Files 1967-1968, Folder: World Health Organization, NARA Morrow, Georgia.

Sencer and Kenneth D. Quarterman. However, initially invited by the WHO's assistant Director-General to participate was Langmuir, another indication of his growing reputation in Geneva.¹³⁶ Other commitments and the scheduling of this meeting however forced the Chief Epidemiologist to decline the invitation; he suggested CDC Director, Sencer, to replace him. Indeed, Langmuir was losing career members who were taking new responsibilities in smallpox and malaria eradication programs and the EIS program saw a doubling of admissions for the EIS.¹³⁷ The main focus of the Committee was thus to make an extensive review of the ISR and formulate recommendations in light of ever increasing international traffic. Prior examination and implementations of these regulations dated back to 1951-52 and were amended a number of times, making their interpretation difficult.¹³⁸ This revision was a major overhaul of the regulations designed to limit the spread of communicable diseases across borders.

The Committee examined a large number of issues ranging from medical staff at ports and airports to methods of aircraft disinfection. It also studied the role of the WHO in regards to disease reporting and ensuing actions to control outbreaks. Problems of compliance were frequently reported: if member states were under a moral obligation to notify the WHO of an outbreak of any disease covered by the ISR, they faced no sanction in case of non-compliance. As the

¹³⁶ Letter from P.M. Kaul to Alexander D. Langmuir, 31 July 1967. Records of the CDC, RG 442.71.A831 Box 2, Office of Director Files 1967-68, Folder: World Health Organization.

¹³⁷ Letter from Alexander D. Langmuir to P.M. Kaul, 7 August 1967. Records of the CDC, Office of Director Files 1967-68, RG 442.71.A831 Box 2, Folder: World Health Organization. These circumstances of increased demands at the international level, key members of his staff assuming duties in other programs and sizable augmentation in admission in the EIS are to be considered in the rift which developed between D.A. Henderson and Alexander Langmuir. Henderson counted upon EIS officers to carry out his plan for measles control and smallpox eradication in West Africa and during the same period CDC was assuming operational responsibilities for USAID-financed malaria eradication in several countries. On the Henderson-Langmuir clash, see Donald A. Henderson, *Smallpox: The Death of a Disease* (Amherst, New York: Prometheus Book, 2009), p. 73. Also, interview with Donald A. Henderson by author, August 18, 2010.

¹³⁸ Committee on International Quarantine, *Fourteenth Report of the Committee on International Quarantine, Vol. 1*, Geneva 28 November – 7 December, 1967. Records of the CDC, Office of Director Files 1967-68, RG 442.71.A831 Box 2, Folder: WHO International Quarantine Committee I, p. 5.

Committee noted: “It has [...] happened that on several occasions that the system of notification breaks down when an outbreak of a disease occurs in a new area. The purpose of the Regulations, to give early warning of new infections to neighboring countries and to other parts of the world, is thus unfulfilled.”¹³⁹ Judging this a “serious inadequacy”, it suggested bolstering investigative capabilities of the WHO in case of internationally threatening outbreaks and enshrining these powers in the new regulations.¹⁴⁰ Furthermore, it retained the idea of epidemic assistance teams to assist member states in dealing with the control of outbreaks.¹⁴¹ More fundamentally, these recommendations questioned quarantine as a disease control measure. Strengthening surveillance, as the WHO Epidemiological Surveillance Unit suggested, could substitute quarantine measures and contribute to monitor diseases not covered by the ISR such as polio and influenza.

In May 1968, global surveillance became the subject of technical discussions at the Twenty-First World Health Assembly. In its content, the opening address by the Chairman of this meeting retained ideas formulated by Langmuir such as comparing earlier concepts of surveillance of persons versus surveillance of diseases, emphasizing the circulation of data from the field to analysis centers and ultimately to authorities dealing with public health issues, and engaging in investigations and surveys in the field.¹⁴² Moving beyond quarantine measures to surveillance elicited enthusiasm as the next step in preventing epidemics and eradicate diseases. A bright future was thus predicted. “One can safely predict

¹³⁹ Committee on International Quarantine, *Fourteenth Report of the Committee on International Quarantine*, Vol. 2, Geneva 28 November – 7 December, 1967. Records of the CDC, RG 442.71.A831 Box 2, Office of Director Files 1967-68, Folder: WHO International Quarantine Committee II, p. 20.

¹⁴⁰ Committee on International Quarantine, *Fourteenth Report of the Committee on International Quarantine*, Vol. 2, p. 20.

¹⁴¹ Committee on International Quarantine, *Fourteenth Report of the Committee on International Quarantine*, Vol. 2, p. 24.

¹⁴² Adetokunbo O. Lucas, “Address by the General Chairman at the Opening of the Technical Discussions at the Twenty-First World Health Assembly”, 10 May 1968, p. 2, Records of the CDC, Office of Director Files 1967-1968, RG 442.71.A831 Box 2, Folder: World Health Organization, NARA Morrow, Georgia.

that international and global surveillance will make major advances during the next decade” argued the Chairman for these technical discussions.¹⁴³

Agreement on implementation of surveillance in the renewed convention on communicable diseases, now designated as the International Health Regulations (IHR) and supervised by the Committee on International Surveillance of Communicable Diseases was facilitated by the fact that U.S. representatives had successfully transposed their own national approach based on surveillance rather than quarantine. As we have seen, this approach was also shared by Raskà and WHO officials but more crucially, CDC Director David Sencer took part in negotiations in Geneva, and Alexander Langmuir laid the conceptual groundwork in scientific journals and background documentation. Additionally, Sencer articulated the position of the U.S. delegation for the annual meeting of the World Health Assembly in May 1968. To James Watt of the USPHS Office of International Health, he recommended: “The U.S. delegation should urge that the intent of the Committee Report, i.e. surveillance, investigation, and control of disease outbreaks vs. strict quarantine, be adopted by the Assembly.”¹⁴⁴ Only minor objections were noted related to aircraft disinfection and measures touching upon medical staffing at ports of entry as it would mean an increase in affected personnel. As mentioned above, this last aspect went against budgetary decisions taken by the CDC. Finally, while Sencer supported the idea of the WHO assisting in investigation of outbreaks and providing teams to help contain them, he was doubtful that the Geneva organization possessed the resources to be effective.¹⁴⁵ A gap between intent and capability thus existed which the CDC

¹⁴³ Adetokunbo O. Lucas, “Address by the General Chairman at the Opening of the Technical Discussions at the Twenty-First World Health Assembly”, May 10, 1968, p. 2.

¹⁴⁴ Memo from David Sencer, Director NCDC to James Watt, Director OIH, “Comments on Fourteenth Report of the Committee on International Quarantine and Special Review of the International Sanitary Regulations”, 15 April 1968. Records of the CDC, RG 442.71.A831 Box 2, Office of Director Files 1967-1968, Folder: World Health Organization, NARA Morrow, Georgia.

¹⁴⁵ Memo from David Sencer, Director NCDC to James Watt, Director OIH, “Comments on Fourteenth Report of the Committee on International Quarantine and Special Review of the International Sanitary Regulations”

could fill since most countries lacked expertise in field epidemiology and surveillance-based disease control strategies and because it could deploy staff at a moment's notice.

CDC leaders ensured that during the two year negotiations, the surveillance principles embedded in the revised ISR were in line with what had been developed in Atlanta. David Sencer recalled the long discussions over specific terms and the tensions between the representatives of certain countries over abandonment of quarantine. Involvement at this level of international health diplomacy was something new for the CDC, and for Sencer, the inclusion of all states was a priority: "We were very careful that everyone would be signatory."¹⁴⁶ However it was clear that the CDC was taking the leading role in this process. "I practically rewrote the regulations myself", declared Sencer.¹⁴⁷ Aside from this personal engagement, the CDC made sure to establish its credentials for disease surveillance on an international level during the meetings of the review committee. Coinciding with the review process (1967-1969), the public health agency published the *International Epidemiologic Report* which assembled morbidity and mortality data on quarantinable and other serious diseases from the WHO, the PAHO and "other sources." This journal was more an exercise in public relations to justify CDC leadership in changing the regulations as the *International Epidemiologic Report* was "[A]n unofficial document for administrative use, it should not be cited in publications in the medical literature."¹⁴⁸ Its publication ceased in 1969 as the WHO enacted the new rules guiding disease notification and control measures.

The International Health Regulations (IHR) went into force in 1969. Aside from abandonment of strict quarantine, the list of diseases subjected to the IHR was shortened to plague, cholera, smallpox and yellow fever (deleting typhus and

¹⁴⁶ Interview with David J. Sencer by author, October 26, 2010.

¹⁴⁷ Interview with David J. Sencer by author, October 26, 2010.

¹⁴⁸ *International Epidemiologic Report*, Vol. 1, No. 1 (July 1967), p. 1. The IER was published from 1967 to 1969 for three volumes and three issues in total.

louse-born relapsing fever) and a new category for “disease under surveillance” was created. Under this heading, communicable diseases which had been monitored in separate programs were now brought under a single umbrella. For instance, malaria and influenza were now considered an intrinsic part of epidemiological surveillance at WHO-level, countries were no longer obligated to notify the WHO about outbreaks of typhus and relapsing fever; finally polio was included.

4.14 Conclusion: Tanks in Prague

Karel Raskà was primarily responsible for promoting surveillance in Geneva and securing resources to offer training to epidemiologists largely based on Alexander Langmuir’s ideas and methods. The two epidemiologists had collaborated in the second half of the 1960s to define international surveillance to see it become a cornerstone in controlling outbreaks and preventing epidemics, and eventually see it engraved in the 1969 International Health Regulations. After working in tandem to change the rules guiding State responsibilities and actions, Raskà convinced the organizers of the Eight International Congresses on Malaria and Tropical Medicine taking place in Teheran in September 1968 to devote a plenary session to the issue of surveillance. This session was organized by Langmuir.¹⁴⁹ Prior to this conference, in mid-August 1968, the Czech epidemiologist invited his CDC counterpart, among other proponents of surveillance, to attend a course in Karolyvary.

In the spring of 1968, Czechoslovakia experimented with liberalization of Communism. Reforms for ‘socialism with a human face’ by Alexander Dubcek included rehabilitation of past victims of political trials and purges,

¹⁴⁹ Alexander Langmuir, “Outline of General Plans for Fourth Plenary Session”, December 7, 1967. Records of the CDC, Office of Director Files 1967-1968, RG 442.71.A831 Box 3, Folder Communication General 1-1 International Correspondence, NARA Morrow, Georgia.

democratization of political life, and liberalization of the economic system.¹⁵⁰ Soviet leaders, uneasy with these steps to reform Czech Communism, invaded the country with 500,000 soldiers on August 21st, restoring censorship and repressing the social-democratic impulse. In his appreciation to Karel Raskà, Langmuir remembers: “For the first two days the course went with enthusiasm of pioneers on an expanding front. On the third morning we were greeted with the news of the Soviet invasion and occupation. It was a sad group that left by bus to the border.”¹⁵¹ He adds: “Following this tragic event, Karel’s star became eclipsed.”¹⁵²

Surveillance as an international health practice continued its development despite losing one of its most ardent supporters. In 1970s, training courses were developed and centers for the coordination of surveillance were created in Africa and in the Caribbean by the WHO. Technical manuals were also available from 1971 on surveillance of diseases covered by the IHR and those under the new “under international surveillance” category.¹⁵³

Aside from becoming the underlying concept of the IHR, surveillance practice demonstrated its usefulness in eradicating smallpox. At the level of the CDC, surveillance was a cornerstone in its West African measles control and smallpox eradication program designed and carried by CDC officers with the cooperation of regional African health organizations.¹⁵⁴ It was in this African theatre that a novel strategy to eradicate smallpox called surveillance-containment was deployed to interrupt transmission and locate remaining cases.¹⁵⁵ In Brazil, CDC

¹⁵⁰ Tony Judt, *Post-War: A History of Europe since 1945* (London: Penguin Books, 2005), p. 440-441.

¹⁵¹ Alexander D. Langmuir, “An Appreciation of Karel Raskà”, p. 491.

¹⁵² Alexander D. Langmuir, “An Appreciation of Karel Raskà”, p. 491.

¹⁵³ Socrates Litsios and WHO, *The Third Ten Years of the World Health Organization*, p. 176-177.

¹⁵⁴ On surveillance in the West African program, see Jeremy R. Younde, *Biopolitical Surveillance and Public Health in International Politics* (New York: Palgrave MacMillan, 2010), chapter 3.

¹⁵⁵ William Foege, an EIS officer and future Director of CDC, is credited with devising surveillance-containment as a complementary strategy to mass vaccination. His findings were presented in the *American Journal of Epidemiology* as selective epidemiologic control measures. William H.

officer Leo Morris on detail to the PAHO worked with Brazilian epidemiologists to implement improved surveillance and disease notification mechanisms into the national eradication program.¹⁵⁶ Appointment of D.A. Henderson as head of the WHO's Smallpox Unit further consolidated surveillance in international health and can be construed as an indication of CDC influence upon the Geneva-based organization in the field of communicable disease control. He brought with him his expertise and belief in surveillance as evidenced in publications on its role in eradicating smallpox.¹⁵⁷ Its application, especially as surveillance-containment, proceeded in fits and starts and led to resistance in local populations in the final stages of the eradication campaign.¹⁵⁸

When interviewed, former CDC officers generally qualified their relationship with the WHO as difficult.¹⁵⁹ In some field operations in West African, intrusion was not necessarily well received aside from assistance in providing some basic necessities such as fuel.¹⁶⁰ Looking back on his directorship, Sencer hypothesized

Foege, J. Donald Millar and J. Michael Lane, "Selective Epidemiologic Control in Smallpox Eradication", *American Journal of Epidemiology*, Vol. 94, No. 4 (1971), p. 311-315. Interestingly, the authors do not quote Alexander Langmuir who had observed in East Pakistan in 1958 that selectiveness (or lack of) could significantly benefit any smallpox control/eradication program. Thus, we can argue that the idea of selectiveness based on surveillance predates Foege's experience in Nigeria with the initial insights of Langmuir and his team. However, it is entirely conceivable that Foege and his colleagues were not aware of the conclusions of the 1958 CDC mission as circulation of the final report was limited. Letter from Glenn S. Usher to Eugene P. Campbell, 7 November, 1958. Records of the USPHS, RG 90.130.65.41.5 Box 3, Folder: Diseases Smallpox Pakistan Epidemic 1958, NARA, College Park. In a recent book, Foege acknowledges the historical roots of surveillance-containment pointing to late 19th century Britain when similar ideas were applied to smallpox. According to CDC's former director, the novelty was rather surveillance-containment predominance as strategy over mass vaccination. William H. Foege, *House on Fire: The Fight to Eradicate Smallpox* (Berkeley: University of California Press, 2011), p. 75-79.

¹⁵⁶ Interview of Leo Morris by Kata Chillag, July 14, 2006, <http://globalhealthchronicles.org/smallpox/record/view/pid/emory:158th>, accessed November 30, 2011

¹⁵⁷ D.A. Henderson, *Smallpox Surveillance in the Strategy of Global Eradication*, Inter-Regional Seminar on Cholera and Smallpox, 11-18 November, 1971.

¹⁵⁸ Paul Greenough, "Intimidation, Coercion and Resistance in the Final Stages of the South Asian Smallpox Eradication Campaign, 1973-1975", *Social Science & Medicine*, Vol. 41, No. 5 (1995), p. 633-45.

¹⁵⁹ Interview with David J. Sencer by author, October 26, 2010.

¹⁶⁰ Interview with Don Millar by author, November 17, 2010.

that it was distasteful of the WHO to ask for assistance from the CDC and that there was a part of jealousy involved as well. He further added that for an agency composed of many young officers, working under the strict protocols of the WHO was difficult.¹⁶¹ For Don Millar, the WHO was where former British colonial officers went to pursue their careers after the Empire collapsed and they were thus reluctant to embrace the ideas and people from the CDC.¹⁶² Philip Brachman, Langmuir's successor as Chief Epidemiologist, qualified the relationship as cordial.¹⁶³ As a whole, the relationship between the WHO and the CDC depended on individual personalities and could thus be tense, or conversely fruitful as evidenced through the relationship between Karel Raskà and Alexander Langmuir and between Charles Cockburn and D.A. Henderson.

Nevertheless, when following the trajectory of surveillance, we can conclude that collaboration between the CDC and the WHO was crucial in promoting and implementing surveillance at the international level. Attempts to foster this practice in the field during epidemic missions or on assessment duties as shown in East Pakistan and Brazil did not lead to its implementation. As we have seen in establishing its international role, the CDC benefited from a favorable context for surveillance in Geneva and specifically from the presence of similarly minded officers at the WHO. Through the multilateral organization and the 1969 IHR, the CDC vindicated surveillance going beyond the system developed for monitoring influenza.

¹⁶¹ Interview with David J. Sencer by author, October 26, 2010.

¹⁶² Interview with Don Millar by author, November 17, 2010.

¹⁶³ Interview with Philip Brachman by author, October 5, 2010.

Chapter 5: Bilateral Assistance Part 1: Insecticides and Politics (1948-1960)

5.1 Introduction

After examining cooperation over surveillance with multilateral organizations, in the following two chapters, I will focus on relations with a different type of partner in the CDC's international health activities: bilateral assistance agencies. A growing sector of U.S. involvement overseas after World War II, bilateral aid to Europe and the developing world took various forms such as economic packages, technical and military assistance, and training. These chapters explore CDC relationships with U.S. bilateral aid agencies in health matters. Dating back to the late 1940s, collaboration between these agencies revolved around procurement of experts (personnel) and knowledge (manuals, audiovisual material). A concrete example, seen previously, is the Epidemic Aid team lead by Alexander Langmuir in East Pakistan sent through bilateral channels. This first part of my exploration of the CDC's participation in bilateral assistance concentrates mainly on the International Cooperation Administration period (1954-1960). In terms of activity, my focus is on the area of most intensive collaboration: vector-borne diseases, and more precisely malaria.

That connections developed between the CDC and the ICA concerning malaria is not surprising. Indeed, prior to its official establishment as a civilian agency in 1946, the CDC was known as the Malaria Control in War Areas (MCWA) and responsible of charged with protecting military facilities in the U.S. South against the vector-borne disease. During these years, experts such as toxicologists, entomologists and sanitary engineers grouped in Savannah to conduct research into residual insecticides, spraying equipment and control measures. Some of this personnel later participated in scientific meetings related to these issues organized by the World Health Organization (WHO) as seen previously. Development agencies also shared the same concern with malaria during the

1940s but this preoccupation reached higher importance after the U.S. officially committed to eradication in 1957. Subsequently, the ICA and the USAID (from 1961) made malaria their largest budgetary allocation towards public health until a reorientation in favour of family planning from the mid-late 1960s.

Taken together, multilateral and bilateral organization constituted the public health equivalent of the “big science” model emerging in the wake of World War II. Indeed, malaria eradication included investments in field operations, research and development, a variety of local and international actors, manpower and infrastructures.¹ My goal is not to untangle and differentiate bilateral programs with those of the WHO or the Pan American Sanitary Bureau (predecessor to the Pan American Health Organization), as WHO/ICA networks and initiatives overlapped and were not mutually exclusive. My objective is rather to trace the CDC’s involvement with the bilateral aid agency in the larger context of shifts in malaria programs and Cold War politics. Indeed, the interest in closely following CDC-ICA relations lies in their belonging to the regulated, formalized, and bureaucratic environment of the U.S. government. It involves financial, intellectual and human resources, divisions of labour and foreign policy objectives, types of expertise and boundaries.

In this first part of my examination of CDC participation in bilateral aid programs, I demonstrate that its involvement shifted from comprehensive field evaluations combining political and epidemiological factors to narrower technical questions.

¹ Perez Yekutieli uses the term “big eradication campaign” in Perez Yekutieli, “Lessons from the Big Eradication Campaign”, *World Health Forum*, Vol. 2, No. 4 (1981): 465-490. Epidemiologist Roberta B. Ness also addresses the issue of big science in relation to epidemiology but rather with concerns about the training of junior investigators and large cohort studies such as the Women Health Initiative. Roberta B. Ness, “‘Big’ Science and the Little Guy”, *Epidemiology*, Vol. 18, No. 1 (January 2007): 9-12. In a presentation on the costs of medical care, David P. Cutler differentiates between ‘big’ public health measures (nutritional advances, sanitation, clean water) and ‘little’ public health measures (washing hands, refrigeration, etc.). David P. Cutler, “Are the Benefits of Medicine Worth What We Pay For It?”, *Center for Policy Research*, Paper 16, (2004), <http://surface.syr.edu/cpr/16>, accessed May 2nd 2011, p. 7. On the history of big science in terms of costs, equipment, institutional developments and policy, the reference remains, Peter Galison and Bruce William Hevly (eds.), *Big Science: The Growth of Large-Scale Research*, (Stanford: Stanford University Press, 1992)

This modification occurred as the ICA increasingly turned to CDC technically-oriented experts such as sanitary engineers and entomologists to support its growing malaria eradication activities, constituting a major axis of collaboration. I further show that confinement to technical questions permitted greater overseas involvement through bilateral means in response to foreign policy objectives and unfolding obstacles to ICA-supported programs. Despite this, lines of tensions still existed over spheres of authority and responsibilities as the CDC sought operational autonomy in exchange for its expertise. Finally, I show that CDC leaders counted upon U.S. involvement in malaria eradication as it offered a great opportunity to channel funds from the ICA to Atlanta to finance research and development and international field operations.

This chapter covers a period from 1948, the year of the first assignment of a CDC member to a bilateral assistance program in Iran, to 1960 when an evaluation team traveled to Central America to alleviate ICA concerns over eradication activities.

I begin with a brief overview starting with the conceptual and scientific foundations of malaria eradication in the 19th century until the introduction of DDT in vector control operations. The subsequent section is a detailed examination of the first overseas assignment of a CDC officer associated with bilateral assistance and malaria which highlights the links between development, Cold War politics and malaria. The growing collaboration between the ICA and the Technical Development Laboratories (TDL) during the 1950s constitutes the next step of analysis. It explores the motivations and contextual factors behind gradual intensification of inter-agency relationships: increased vector resistance to residual insecticides, U.S. endorsement of malaria eradication and introduction of new molecules by the TDL. From malaria, I take a side-step to examine CDC-ICA negotiations over a sleeping sickness control program in Liberia. This section shows the difficulties of collaborating as clashes took place

over autonomy, program implementation and spheres of authority. I then return to malaria by analyzing the composition, conclusions and expected effects on the CDC's role in bilateral assistance resulting from an evaluation mission in Central America. This mission became a model for CDC leaders wishing to broaden partnerships with the ICA. Finally, I identify reasons behind the decision to prioritize collaboration with the ICA on malaria rather than smallpox by comparing Alexander Langmuir's mission to East Pakistan with the CDC Central America survey team. Political and U.S. foreign policy elements are woven in each section of this chapter for a better understanding of the specific context surrounding CDC participation in ICA programs.

5.2 Malaria Eradication: Origins

The organization of the Global Program for Malaria Eradication rested on three important breakthroughs made at the end of the 19th century: Alphonse Laveran discovered the causative agent of malaria and Ronald Ross demonstrated in 1898 the role of the anopheline mosquitoes in the transmission of malaria in birds. The same year Giovanni Grassi established that the same anopheline mosquitoes also transmitted malaria to humans.² This effectively identified the targets for future control and eradication measures, and fostered entomological research on anopheles transmission of malaria. Following these discoveries, public health authorities on every continent experimented with control measures focused either on mosquitoes or treatment of patients with quinine. For example, Ross himself carried out two attempts. From 1899 to 1904, he traveled to Sierra Leone where he tried to curb malaria infection by eliminating known breeding sites. Another experiment in Punjab from 1902 to 1909 combined the elimination of breeding sites with other measures such as destruction of

² Randall M. Packard, *The Making of a Tropical Disease: A Short History of Malaria* (Baltimore: Johns Hopkins University Press), p. 115.

anopheline larvae, oiling of irrigation ditches, and removal of infected persons from the region along with the distribution of quinine.³ Despite enormous efforts, Ross's experiments met with limited success, if not outright failure.

Vector control achieved some victories in other parts of the world. In Malaya, Malcolm Watson, a British doctor, achieved a short-term victory by modifying the breeding sites in colonial plantations and succeeded in reducing malaria prevalence. But ten years later, a major outbreak occurred, overthrowing Watson's earlier efforts. In Panama, William Gorgas applied extensive control measures during the construction of the Canal. He modeled his strategy on the Cuban experience with yellow fever: systematic destruction of larvae with fumigation and oiling, destruction of the breeding sites, and the screening of houses combined with distribution of quinine therapy.⁴

Aside from findings and experiments made in the field, mathematical modeling of the period tended to support the control approach advocated by leading malariologists. Ronald Ross elaborated a model which concluded that programs should aim at reducing mosquito density below a certain threshold level. He concluded that "control programs that integrated vector reduction (larvicides), drug treatment, and personal protection (bed nets) were more likely to succeed than efforts that relied on just one intervention measure."⁵ If the mathematical model pointed in the direction of malaria control, debates over the proper methods arose out of entomological findings and measures applied in the field.

The 1920s and 1930s saw the elucidation of the problem of anophelism without malaria (presence of vectors without the plasmodium), the emergence of the

³ Socrates Litsios, *The Tomorrow of Malaria* (Wellington: Pacific Press, 1996), pp. 42-44.

⁴ Socrates Litsios, *The Tomorrow of Malaria* pp. 44-46 and Richard H. Morrow and William J. Moss, "Malaria" in Walter W. Holland, Jørn Olsen and Charles Du V. Florey (eds.), *The Development of Modern Epidemiology: Personal Reports from those Who were There* (New York: Oxford University Press, 2007), p. 161.

⁵ F. Ellis McKenzie and Ebrahim M. Samba, "The Role of Mathematical Modeling in Evidence-Based Malaria Control", *Am. J. Trop. Med. Hyg.*, Vol. 71, Suppl 2 (2004), p. 94.

concept of species sanitation, the promotion of reclamation of marshlands, and general rural economic progress. The synthesis of these integrated approaches of malaria control is found in the published reports of the Malaria Commission of the League of Nations Health Organization.⁶ As a result of these international discussions, malaria was framed as a socio-economic disease to which reduction of transmission was the ultimate solution. It was believed that entomology would bring a better understanding of anopheles species responsible for the prevalence of the infection and thus point to the most effective methods of control. As Iris Borowy noted, it is difficult to assess the work of the LNHO in regards to malaria. She notes the coexistence of various conceptualizations of malaria (social and economic views vs. bacteriological views) and public health measures advocated to attack the disease. The historian argues that the LNHO shifted from one approach to another, and by the late 1930 it was promoting various anti-malaria projects resting upon contradictory concepts.⁷ Thus the debate on whether anti-malaria measures should focus on patients or vectors continued as public health officials tested and experiments with different strategies.

A conceptual shift from control to eradication based on attacks on malarial vectors emerged in Brazil where Rockefeller Foundation officer Fred L. Soper organized a campaign to eliminate an invasion of *Anopheles gambiae*, an African mosquito imported in South America. Soper however had to convince his superiors at the Rockefeller Foundation about the feasibility of the project. It is important to remember that integrated methods of vector control were advocated by leading (mostly European) malariologists. They had achieved considerable success in the 1930s⁸ in Italy under Mussolini and in the U.S. during

⁶ Socrates Litsios, *The Tomorrow of Malaria*, p. 133-135.

⁷ Iris Borowy, *Coming to Terms with World Health: The League of Nations Health Organization, 1921-1946* (Frankfurt am Main: Peter Lang GbmH, 2009), p.253-255.

⁸ Randall M. Packard and Paulo Gabehla, "A Land Filled with Mosquitoes: Fred L. Soper, the Rockefeller Foundation, and the Anopheles Gambiae Invasion of Brazil", *Medical Anthropology*, Vol. 17, 1997, p. 216. Frank M. Snowden, *The Conquest of Malaria: Italy, 1900-1962* (New Haven,

the dam building operations of the Tennessee Valley Authority in the late 1930s and early 1940s.⁹ Finally, the Rockefeller Foundation's mitigated success with yellow fever and hookworm eradication made it wary about new ventures in eradication schemes.¹⁰

To combat the malaria epidemic in Northern Brazil in 1939, Soper deployed methods which marginalized integrated malaria control strategies and mass distribution of chemical therapies. His approach rested upon routine spraying of Paris green and the careful verification of results by capturing adult mosquitoes along with larval searches. It was supplemented by the use of pyrethrum insecticides.¹¹ For the Rockefeller Foundation officer, eradication differed from malaria control because of its relative simplicity. There was no longer any need to establish threshold levels and safe indexes for malaria exposition and vector density as mosquitoes were simply eliminated. Eradication functioned on a binary logic: either eradication is achieved or not.¹² Therefore according to this approach little or no attention was given to educational efforts and entomological investigations. While Soper had focused on species eradication and, by contrast, the WHO eradication aimed at eliminating the disease, this Brazilian experiment became an important argument for those argued for attacks on vectors and predicted the end of malaria.¹³

Conn.: Yale University Press), p. 152-173. The Italian strategy, the *bonifica integrale* rested upon hydraulic, agricultural and hygienic interventions in the Pontine Marshes and constituted a cornerstone of Fascist propaganda.

⁹ Marcos Cueto, *Cold War, Deadly Fever: Malaria Eradication in Mexico, 1955-1975* (Baltimore: Johns Hopkins University Press, 2007), p. 3. Margaret Humphreys, *Malaria: Poverty, Race, and Public Health in the United States* (Baltimore: Johns Hopkins University Press, 2001), p. 103-106. Humphreys also argues that migration of Black workers and changes in the socioeconomic fabric played a major role in the decline of malaria in the South.

¹⁰ Marcos Cueto, "The Cycles of Eradication: the Rockefeller Foundation and Latin American Public Health, 1918-1940" in Paul Weindling (ed.), *International Health Organisations and Movements, 1918-1939*, (New York: Cambridge University Press, 1995), p. 236.

¹¹ Socrates Litsios, *The Tomorrow of Malaria*, p. 51.

¹² Socrates Litsios, *The Tomorrow of Malaria*, p. 51-52. J. Jackson, "Cognition and Global Malaria Eradication Programme", *Parassitologia*, Vol. 40, No. 1-2 (1998), p. 195.

¹³ Randall M. Packard, *The Making of a Tropical Disease*, p.138-140.

The success in Brazil was loudly announced by the Rockefeller Foundation. Soper had sold his strategy to his superiors and proved that eradication, despite setbacks with other diseases, was valid and preferable to integrated malaria control methods. After Brazil, Fred Soper traveled to Egypt where he applied similar techniques to combat another invasion of *Anopheles gambiae*, again achieving a resounding victory. Species eradication helped boost Soper's career when he was elected as director of the Pan American Sanitary Bureau (PASB) in 1947. From his position he could influence the anti-malaria policies in the Americas and those of other countries through the network of the nascent WHO.¹⁴ Soper's influence peaked with the election in 1953 of Marcolino Candau, his former assistant in Brazil, as WHO's Director-General.

5.3 Introducing DDT

If the feasibility of vector eradication had been demonstrated in Brazil and in Egypt, the cost of any large scale application of the Soper's methods remained beyond the means of countries grappling with malaria. The introduction of DDT would help tip the balance in favour of eradication over malaria control and the focus on mosquito vectors. The insecticide also dovetailed with the binary logic of vector eradication developed by Soper: a single effective weapon used in a single-minded approach. First synthesized in Germany in 1874, DDT was recognized as a powerful insecticide in the late 1930s.¹⁵ Military forces used DDT during World War II to fight malaria and other vector-borne diseases in North Africa, Southern Europe and in the Pacific theatre.¹⁶ These successful operations would impact the world of malariology by progressively marginalizing alternative

¹⁴ J. Jackson, "Cognition and Global Malaria Eradication Programme" p. 197. Marcos Cueto, *The Value of Health: A History of the Pan American Health Organization* (Washington D.C.: PAHO, 2007), p. 91-97.

¹⁵ Richard H. Morrow and William J. Moss, "Malaria", p. 162.

¹⁶ Randall M. Packard, "'No other logical choice': Global Malaria Eradication and the Politics of International Health in the Post-War Era", p. 218.

control methods and effectively reduce malaria research initiatives as entomologists shifted their attention from mosquito behaviour to concentrate on insecticide development.¹⁷

A large experiment in species eradication using DDT took place in Sardinia in 1945 bringing together three major institutional players: the International Health Division (IHD) of the Rockefeller Foundation, the United Nations Relief and Rehabilitation Agency (UNRRA) and the U.S. Economic Cooperation Administration. The initial objective was to eliminate all breeding sites of the local malaria vector (*Anopheles labranchiae*) using larvicides, environmental measures and finally indoor spraying of dwellings with DDT.¹⁸ As anthropologist Peter Brown noted, the Sardinian project represented a departure from the Brazilian and Egyptian operations. Aside from DDT, the Italian program differed on the level of scale. The number of workers was much higher than in Brazil and the mountainous terrain added extra difficulty. Furthermore, the project started before any entomological research on the habits of *A. labranchiae* had been conducted.¹⁹ Four years after its initiation, the Sardinian project failed in completely eliminating the mosquito vector. Sponsoring agencies nevertheless transformed this disappointing result into a success by emphasizing the interruption of transmission and went on to demonstrate similar strategies in other countries.²⁰ Thus by the end of the 1940s and early 1950s, the actors which would lead the global fight against malaria in the following decades (United Nations technical agencies and the United States foreign assistance agencies) were in place, but the debate on control versus eradication was not yet settled.

¹⁷ Randall M. Packard, "'No other logical choice': Global Malaria Eradication and the Politics of International Health in the Post-War Era", *Parassitologia*, Vol. 40, No. 1-2 (1998), p. 219. Randall M. Packard, *The Making of a Tropical Disease*, p.140-142.

¹⁸ Walter H. Wernsdorfer and Sir Ian McGregor, *Malaria: Principles and Practice of Malariology*, Volume 1 (Edinburgh, New York: Churchill Livingstone), p. 48.

¹⁹ PJ Brown, "Failure-as-Success: Multiple Meanings of Eradication in the Rockefeller Foundation Sardinia Project, 1946-1951", *Parassitologia*, Vol. 40, No. 1-2 (1998), p. 122.

²⁰ Walter H. Wernsdorfer and Sir Ian McGregor, *Malaria: Principles and Practice of Malariology*, p. 49-50

It is in this context that Justin Andrews visited Iran in November 1948, the CDC's first assignment in a foreign country.

5.4 Modernization, Politics and Mosquitoes: Justin Andrews in Iran (1948)

At the end of World War II, Iran found itself in the middle of tensions which foreshadowed escalating conflict between the U.S. and the Soviet Union, management of the United Kingdom's waning influence in world affairs and Iranian national politics. As argued by James A. Bill: "Iran in the 1940s was an exploding cauldron of political forces and issues."²¹ What were these elements which explained Andrew's presence in the land of the Shah?

During the war, Allied forces had stationed troops in the country to secure the oil resources and counter Nazi influence. The agreements over Iran concluded in 1942 pledged the withdrawal of all foreign troops by 1946 but Russia announced its renouncement and proceeded with a build up of soldiers.²² While Iranian leadership manoeuvred adroitly to have Moscow remove its troops thus reducing threats of a Communist takeover, concerns about its influence embodied in the Tudeh party remained present in U.S. assessments. Consequently, foreign assistance in the form of military aid gradually increased after years of demands for arms from the Shah with the goal of strengthening the monarchy "against internal challenges."²³ Further tension evolved around British control of Iran's oil resources and monopolization of most of the profits by the Anglo-Iranian Oil Company (AIOC). While the issue exploded only in the 1950s, grievances had been escalating during the 1940s. As Rubin asserts, the economic implications were central to this issue and also included a non-

²¹ James A. Bill, *The Eagle and the Lion: The Tragedy of American-Iranian Relations* (New Haven, Conn.: Yale University Press, 1988), p. 25.

²² Barry Rudin, *Paved with Good Intentions: The American Experience and Iran* (New York: Oxford University Press, 1980), p. 31-32.

²³ James A. Bill, *The Eagle and the Lion*, p. 41.

negligible political dimension as well: “due to its very size and importance the company came to symbolize foreign domination of Iranian affairs.”²⁴ The U.S., initially a marginal party in this issue, gradually took interest as any settlement would inevitably affect American companies active in the region and hamper the flow of oil to Western Europe in the process of being reconstructed.²⁵ U.S. policy was generally favourable to Iranian positions in these matters and many within the State Department believed that British hegemony in Iran was “living on borrowed time.”²⁶ Furthermore, some concerns existed over aggressive actions on the part of the United Kingdom to defend AIOC which would give Moscow a pretext to directly intervene.²⁷ In 1921, the USSR and Iran had signed a friendship treaty which allowed Soviet intervention in case of an invasion from a foreign power. Finally, Iranian politics were also undergoing troubled times. In addition to Communist influence, American policymakers worried about corruption, poverty and popular dissatisfaction which could eventually lead to domestic collapse.

Despite multiple demands from the Shah for economic and military assistance, the U.S. was initially reluctant to provide loans and equipment, as assessments underlined Teheran’s lack of a clear plan in putting foreign currencies to good use.²⁸ While initial ambitions of Washington aimed at greater democracy in Iran during the mid-1940s, this policy was abandoned during the later part of the decade as the U.S. came to support the monarchy and its authoritarianism. This switch triggered criticisms from Iranian nationalists who came to view U.S.

²⁴ Barry Rudin, *Paved with Good Intentions*, p. 43.

²⁵ Steve Marsh, “Continuity and Change: Reinterpreting the Policies of the Truman and Eisenhower Administrations toward Iran, 1950-1954”, *Journal of Cold War Studies*, Vol. 7, No. 3 (2005), p. 82. Francis Gavin, “Politics, Power, and U.S. Policy in Iran, 1950-1953”, *Journal of Cold War Studies*, Vol. 1, No. 1 (1999), p. 65.

²⁶ Simon, Davis, “A Projected New Trusteeship? American Internationalism, British Imperialism, and the Reconstruction of Iran, 1938-1947*”, *Diplomacy and Statecraft*, Vol. 17, No. 1 (2006), p. 34.

²⁷ Francis Gavin, “Politics, Power, and U.S. Policy in Iran, 1950-1953”, p. 68.

²⁸ Barry Rudin, *Paved with Good Intentions*, p. 36.

assistance to the Shah as a form of imperialism.²⁹ In 1948, the Iranian government received its first military aid from the American government and by the end of the same year another type of assistance – technical assistance – arrived in Teheran in the person of Justin Andrews.

An experienced parasitologist, Justin M. Andrews had started his career teaching at the John Hopkins School of Public Health and Hygiene in 1926. In 1938, he joined Georgia's Department of Public Health becoming the director of the Division of Hookworm and Malaria. Andrews began working for the USPHS in 1941 and subsequently entered the U.S. Sanitary Corps serving in malaria control operations in North Africa and in the Pacific Islands. Upon his return in Atlanta, he became Deputy Chief of the newly created Communicable Disease Center with a reputation as an expert of malaria control activities. In 1952, Andrews would become Chief of the CDC before his appointment as Director of the National Institute of Allergy and Infectious Diseases (NIAID).

In autumn 1948, Andrews received orders from the Federal Security Administration and the Department of State to assist and advise the Iranian government in planning a national malaria control program. Behind this request from the nascent foreign assistance apparatus lied the Iranian government's goal for a rapid modernization of the country over a seven year period. Indeed, in 1946 Morrison-Knudsen International, an American public works and engineering corporation, had prepared a plan which covered education, agriculture, exploitation of natural resources and public health. A major proposal of the Morrison-Knudsen report was the construction of an extensive irrigation system to increase crop output and open new areas for farming. The expected multiplication of anopheline breeding sites resulting from these engineering

²⁹ James A. Bill, *The Eagle and the Lion*, p. 49-50.

works triggered the need to evaluate and suggest countermeasures against malaria.³⁰

For a month, the parasitologist crisscrossed the country (especially rural areas) to evaluate the epidemiological status of malaria, consulted with AIOC and Ministry of Health officials and was received by the Shah to present his plan. Andrews even combined tourism with public health as he visited the ruins of ancient Persepolis and “searched for mosquitoes in the tomb of Xerxes II and his wife.”³¹ Resulting from this month in Iran was a report of considerable breadth which not only covered recommendations on malaria but also included an articulation of public health with political and socioeconomic realities.

The first aspects covered in Andrews’ report were related to the geography, climate and demographics of Iran. These were presented in neutral terms and not related to matters of development. Where the advisor made his critical views of the Iranian situation was in his appraisal of the distribution of wealth and the political situation. Andrews noted: “The bulk of the country’s wealth is concentrated in the hands of an opulent but dominating minority, which derives its means primarily from the agricultural efforts of a poor, diseased and ignorant peasantry.”³² He further reported on the political situation by stating that a deep mistrust existed in rural areas towards a central government more interested in collecting taxes and using this wealth in Teheran than improving the conditions of the peasantry. Control of malaria and its side-effects on other insects could, Andrews argued, help restore confidence in political authorities.

³⁰ Justin M. Andrews, *Malaria Control Recommendations to Imperial Iranian Government*, March 1949, Records of the CDC, Office of the Chief Files – 1959, RG 442.60.A0140 Box 3, Folder: Disease (and Conditions) Correspondence and Reports, NARA, Morrow, Georgia, p. 8.

³¹ Memo from Justin M. Andrews to the Administrator, Federal Security Agency, “Trip Report – Iran”, 22 March, 1949. Records of the CDC, Office of the Chief Files – 1959, RG 442.60.A0140 Box 3, Folder: Disease (and Conditions) Correspondence and Reports, NARA, Morrow, Georgia. The Morrison-Knudsen modernization scheme was to be implemented in seven years hence Andrews refers to it as the “Seven Year Plan”.

³² Memo from Justin M. Andrews to the Administrator, Federal Security Agency, “Trip Report – Iran”, 22 March, 1949, p. 6.

If he was critical of the distribution of wealth, his main argument in support of a national malaria program was to stabilize the system and gain support in areas far from the capital. “It seems likely that if the government would conscientiously sponsor a sound malaria control program [it] would go far to free the villagers from a harassing disease and of the discomfort of insects” asserted Andrews.³³ As Communist influence in Iran was a cause of concern for U.S. policymakers, Andrews took great care in stressing this element as a selling point to convince the Iranian authorities and the American foreign aid agency to finance malaria control. A malaria control program “might serve to restore some of the lost esteem and establish faith and confidence in the existing regime so that the citizenry would be more interested in the continuing to support a democratic monarchism than in accepting some *other political ideology*” concluded the CDC representative.³⁴ As few steps had been taken over the years in disease prevention, investment in this sector and in education would serve in maintaining the existing political structure and “benefit the rich and poor alike.”³⁵

Involvement in the health affairs of foreign countries was a new activity for the Department of State, a fact that Andrew readily pointed out. In his recommendations aimed at malaria specifically, he stated that his presence in Iran did not coincide with the high season of malaria. He nonetheless conducted an entomological overview and a spleen survey³⁶ only to find malaria prevalent in almost all parts of Iran and primarily in rural areas. When comparing with

³³ Memo from Justin M. Andrews to the Administrator, Federal Security Agency, “Trip Report – Iran”, 22 March, 1949, p. 6.

³⁴ Memo from Justin M. Andrews to the Administrator, Federal Security Agency, “Trip Report – Iran”, 22 March, 1949, p. 6, emphasis added.

³⁵ Memo from Justin M. Andrews to the Administrator, Federal Security Agency, “Trip Report – Iran”, 22 March, 1949, p. 6-7.

³⁶ Enlarged spleens (splenomegaly) are a symptom of malaria. The survey of enlarged spleens were, and still are to a lesser extent) used for the clinical diagnostics and epidemiological surveys to ascertain the presence of malaria. For an example, see H.C. Clark, “Spleen and Parasitic Rates as Measures of Malaria in the Caribbean Area”, *American Journal of Tropical Medicine*, Vol. 8, No. 4 (1928), p. 423-442.

international experts such as Soper who were gradually pushing for malaria *eradication*, Andrews emphasized *control* although he would acknowledge that his proposed program “*might* actually eradicate vectors and malaria in the more isolated villages.”³⁷ This was a collateral effect rather than the main objective. However the CDC parasitologist shared enthusiasm over the utilization of DDT not only to interrupt transmission of malaria but also to eliminate other insect nuisances. Andrew demarks himself from an emerging consensus in the control/eradication debate. Instead of the diminishing costs associated with eradication, he estimated an increase caused by popular demand.

Spraying of residual insecticides in dwellings, argued Andrews needed to be supplemented by educational measures to ensure popular support. If malaria control was to be successful in eliciting support for the political forces and reducing hostility towards the central government, local elites needed to be enrolled and popular cooperation encouraged by providing health education.³⁸ Opposition to the Iranian government and malaria control in particular could also be minimized by taking into account local economic activities such as the raising of silk worms and substituting spraying of DDT with alternative control measures: improved water drainage, larval control and chemotherapy.³⁹ Furthermore, the very structure of the control campaign aimed at gaining popular support for the regime through usage of the insecticide. Andrews envisaged a three step process: demonstration, operations and maintenance. Especially important in making the program popular, maintained the CDC consultant, was the first demonstrational phase as it gave visual proofs that DDT prevents malaria and thus create demand for greater coverage.⁴⁰ Indeed, the

³⁷ Justin M. Andrews, *Malaria Control Recommendations to Imperial Iranian Government*, March 1949, Records of the CDC, Office of the Chief Files – 1959, RG 442.60.A0140 Box 3, Folder: Disease (and Conditions) Correspondence and Reports, NARA, Morrow, Georgia.

³⁸ Justin M. Andrews, *Malaria Control Recommendations*, March 1949, p. 1.

³⁹ Memo from Justin M. Andrews to the Administrator, Federal Security Agency, “Trip Report – Iran”, 22 March, 1949, p. 12.

⁴⁰ Justin M. Andrews, *Malaria Control Recommendations*, March 1949, p. 1-2.

CDC representative believed that villagers would notice the decline of malaria morbidity and mortality associated with the spraying of households. In conclusion, Andrews stated that “done in the name of the government, it should have values in generating confidence in the government.”⁴¹

If the political and social impacts of malaria control on the Iranian monarchy and U.S. policy in the region are obvious, what effect could this mission have on CDC international health activities? Andrews’ observations pointed to the dearth of qualified personnel in Iran thus making recourse to foreign experts a necessity. Instead of presenting the CDC as a possible partner in helping Iranian public health authorities, Andrews acted more as an IHD representative. Indeed, he informally probed Paul Russell, director of the IHD, to measure his interest in assisting the Iranian government as Andrews estimated that the private foundation was in the best position to assume this role.⁴² Rockefeller officers are described as the foremost experts in initiating and implementing public health programs in developing countries and consequently, maintained Andrews, they should be put in positions of authority in Iran’s malaria control program. Comparatively, training in parasitology and malaria entomology, according to the report, was the only field in which the still fledging CDC could contribute to the Iranian program. In addition to the CDC still being in its infancy, future involvement in Iran’s malaria program depended on a still uncommitted U.S. government. Furthermore, Andrews presented the nascent WHO as a potential partner which still lacked the resources to assist Iran. In reviewing potential actors to assist the developing country, the report makes clear the balance of power in international health with the Rockefeller Foundation the foremost player, the U.S. government with an undefined commitment to public health programs in developing countries (outside of Latin America), and the WHO

⁴¹ Justin M. Andrews, *Malaria Control Recommendations*, March 1949, p. 22.

⁴² Justin M. Andrews, *Malaria Control Recommendations*, March 1949, p. 22.

making its first steps on the global stage.⁴³ As a new agency, the CDC remained marginal.

Aside from being the first direct assignment of a CDC officer by request from the State Department, the report is remarkable because of the readiness of Andrews to articulate the links between politics and public health when compared with later assessments made by the Atlanta-based agency. Indeed, later involvement of the CDC with malaria overseas during the 1950s and 1960s would be almost exclusively focused on technical issues related to insecticides and epidemiology. As the U.S. government created bureaucratic structures dedicated specifically to administer bilateral aid funds and programs in the following years, a division of labour instituted itself with foreign aid agencies taking over assessment of the political effects of malaria programs and their overall guidance. Starting in 1950, technical assistance agencies gradually consolidated public health programs conducted overseas, including malaria control and eradication, under their authority. This process resulted in a bureaucratic turf wars which pitted the USPHS international health establishment against the ICA Public Health Division during the second half of the 1950s (see chapter 2).

In this context, what kind of relationship did the CDC have with development agencies? As we will see in the next section, for nearly a decade, technical issues related to insecticides and training characterized the relationships between Atlanta and the U.S. international development apparatus. Surveys mixing malaria epidemiology and political assessments such as the one the conducted by Justin M. Andrews were no longer in the purview of the CDC but rather narrower technical issues opened a new continent to Savannah-based sanitary engineers, toxicologists and entomologists.

⁴³ Justin M. Andrews, *Malaria Control Recommendations*, March 1949, p. 21.

5.5 The Technical Development Laboratories

During the 1950s, links between the CDC and the ICA covered three areas: assistance in the control of foreign epidemics, training of personnel in overseas missions and finally development and testing of malaria-related material. In the case of control of outbreaks, the CDC dispatched officers in 11 missions overseas to tackle outbreaks of diseases ranging from encephalitis and polio to cholera and malaria between 1950 and 1959. These missions were supported and requested by different organizations such as the WHO, the USPHS and the Rockefeller Foundation. In sum, CDC provided services to these institutions. Out of these 11 missions, the ICA directly sought the CDC's assistance for three outbreaks: malaria and cholera in East Pakistan in 1954, febrile illness in Bolivia in 1955 and finally smallpox and cholera in 1958 also in East Pakistan.⁴⁴ CDC's Training Branch had over the course of several years prepared and processed audio-visuals and formed ICA participants for health programs.⁴⁵ Among these activities, the most intensive relationship between development agencies and the CDC revolved around mosquitoes and how to kill them.

The main axis of collaboration between the CDC and foreign assistance agencies during the 1950s involved the Technical Development Laboratories (TDL) located in Savannah, Georgia. Inclusion of this component into the CDC organization took place during World War II as MCWA took over the Henry Rose Carter Laboratory before moving to more spacious facilities on Oatland Island in 1947. Originally municipal property, the TDL centred its work on mosquito control by

⁴⁴ Memo from Alan W. Donaldson, Acting Chief, CDC to Acting Chief, Division of International Health "Request from Senator Humphrey", July 22, 1960, Records of the CDC, Office of the Chief Files (Personnel) – 1960, RG 442.63.A789 Box 3, Folder: Overseas Missions involving CDC Personnel, NARA Morrow, Georgia. The exact breakdown is three for ICA, two for WHO, two for the USPHS, and one for the Rockefeller Foundation, the U.S. Air Force, the U.S. Army and the Royal Air Force.

⁴⁵ Memo from Horace DeLien to Chief, CDC, "Channels of Relationships with the International Cooperation Administration", August 11, 1959. Records of the USPHS, Office of International Health, RG 90.130.65.42.2 Box 15, Folder: Coordination, NARA College Park.

developing new equipment, insecticides and procedures.⁴⁶ Relations with the ICA reflected the technical activities of CDC in malaria control. Since the mid-1950s, CDC staff tested and researched new insecticides and established standards for DDT formulations for ICA's malaria programs. Concretely, this ranged from U.S. Operations Missions (USOM) field manuals to narrow specifications for very precise aspects of DDT packaging and storing.⁴⁷

Other international organizations also called upon CDC knowledge. As seen previously, CDC experts in this domain were recurring participants in international high level discussions such as WHO's scientific committees on insecticides. Savannah even hosted the WHO expert committee on insecticides held in 1952. In the Americas, the PASB requested CDC personnel for field assignments. For instance, the PASB solicited John W. Kilpatrick, a senior CDC sanitarian, for a three month assignment in Mexico to carry out field experiments to ascertain optimum dosage and methods of application of dieldrin in anti-malarial programs.⁴⁸

A transition in the CDC-ICA relationships occurred in 1956 when the foreign assistance agency shifted from seeking advisory services and setting of specifications for insecticides and equipment to directly financing research and development and field testing of new anti-vector chemicals. To understand the timing behind the establishment of this closer relationship at this point, we must follow three inter-related trajectories taking us to Greece, Washington and finally Savannah.

⁴⁶ Elizabeth Etheridge, *Sentinel for Health. A History of the Centers for Disease Control*, (Berkeley: University of California Press, 1992), p. 4-5, p. 23.

⁴⁷ Division of International Health, *Malaria Manual for U.S. Operations Missions*, June 10th, 1955, Records of the USPHS, Office of International Health, RG 90.130.65.41.1-7 Box 6, Folder: Joint PHD-INH Staff, NARA College Park, p. 6. George W. Pearce, E.L. Gooden and Donald R. Johnson, "Specifications of the International Cooperation Administration for DDT Water-Dispersible Powder for Use in Malaria Control Programs", *Bull. Wld HlthOrg.*, Vol. 20 (1959), p. 913-920.

⁴⁸ Memo from Chief, BSS to Surgeon General, "Personnel 10", December 30th, 1955, Records of the USPHS, Office of International Health, RG 90.130.65.41.1-7 Box 7, Folder: United Nations 4-1-2 1954-1955, NARA College Park.

The first trajectory is the shift from control to eradication in the mid-1950s. As the effectiveness of DDT seemed to be confirmed during wartime anti-malarial campaigns starting in December 1943, its usage spread to civilian public health demonstrations in Latin America, Asia, and the Middle East. Sponsored and staffed by the WHO and supported financially by the UNICEF, the demonstration teams included entomologists, sanitary engineers and malariologists.⁴⁹ Initially dedicated to demonstrate control strategies, the work of these teams became the basis for eradication but behind international commitment to this new objective is a group of influential individuals. As noted by Jackson, a small epistemic community of malariologists were at the heart of efforts to switch from control to eradication. These five men, Jackson argues, were Fred L. Soper former IHD officer and Director of the PASB since 1947, Paul F. Russell of the Rockefeller Foundation, Professor George Macdonald from the Ross Institute at the London School of Hygiene and Tropical Medicine, Venezuelan malariologist Arnoldo Gabaldón and finally Emilio Pampana, an Italian medical officer with a long international career.⁵⁰

While this group slowly steered the WHO towards the goal of malaria eradication, their argument took on new force as field evidence coming from Greece in 1951 indicated that spraying operations could be halted without resumption of transmission. More disturbing observations also made in Greece revealed that continued usage of residual insecticides could lead to development of resistance to DDT or dieldrin in mosquito species. Indeed, it was noted that some species while resistant to DDT remained susceptible to dieldrin and vice versa; however, real concerns arose out of the development of double-resistance in malaria vectors which would render global eradication impossible.⁵¹

⁴⁹ Amy L. Staples, *The Birth of Development: How the World Bank, Food and Agriculture Organization, and World Health Organization Changed the World, 1945-1965*, (Kent, Ohio: Kent State University Press, 2006), p. 164.

⁵⁰ For a detailed description and the respective role of these five individuals, see J. Jackson, "Cognition and the Global Malaria Eradication Programme", p. 193-216.

⁵¹ Amy L. Staples, *The Birth of Development*, p. 164-165.

These fears prompted a call to arms to eliminate malaria before it was too late.⁵² Thus resistance became a strong argument, among others, mobilized by this cognitive community when the Eight World Health Assembly in 1955 voted to allocate significant resources and provide technical assistance to malaria eradication campaigns.

Let us turn to U.S. policy and involvement in tackling malaria. During the war and over the next decade, the U.S. government had supported malaria-related activities through various programs, such as the Marshall Plan for Greece and Turkey, or through organizations (WHO, PASB and the Institute for Inter-American Affairs). These channels of support also included bilateral assistance to countries in Asia and Africa (for instance the Philippines and Liberia). By 1955, seventeen countries were direct recipients of American funds and commodities for their malaria control operations.⁵³ The ICA and its predecessors had supported malaria-related activities in thirteen countries such as Jordan, Taiwan and in Central American countries. Until 1956, U.S. official policy emphasized control rather than eradication even if the PASB and the WHO had made eradication their ultimate goal. Nonetheless, ICA field officers received instructions to modify their objectives. Citing the “tremendous amount of interest” in malaria eradication around the globe, ICA “recommended that U.S. Operations Missions encourage a shift of emphasis from control to eradication wherever possible.”⁵⁴ A similar logic to the one articulated by the international malaria establishment presented above motivated a modification in programs supported by U.S. bilateral aid.

⁵² E.J. Pampana, “Changing Strategy in Malaria Control”, *Bull. Wld Hlth Org.*, No. 11 (1954), p. 513-520.

⁵³ Division of International Health, *Malaria Manual for U.S. Operations Missions*, June 10th, 1955, p. 1-2.

⁵⁴ Division of International Health, *Malaria Manual for U.S. Operations Missions*, June 10th, 1955, p. 7, underlined in the original.

Discussions in the U.S. also emphasized resistance as the chief argument, as humanity faced a “golden moment” and should not miss an opportunity to eliminate the disease “where possible.”⁵⁵ While experts acknowledged increasing resistance to residual insecticides, they took comfort in the fact that most species remained susceptible to DDT and other related chemicals. This change in priorities in field operations became official U.S. policy as the International Development Advisory Board (IDAB) studied the problem of malaria in Third World countries and its effect on the United States. Composed of businessmen, academics and members of organized labour, IDAB was a think-tank created to suggest policies dovetailing with Truman’s Point IV program. As Harry Cleaver argues, the ICA turned to the IDAB to formulate a new foreign assistance program which would counter Soviet initiatives in Third World countries.⁵⁶ In the Spring of 1956, an IDAB subcommittee examined the issue of U.S. policy towards malaria and the opportunity to endorse eradication as a guiding principle. Chaired by Wilton Halverston, Associate Dean of UCLA School of Public Health, this subcommittee included members of U.S. international health establishment such as Henry van Zile Hyde (USPHS), Paul F. Russell (Rockefeller Foundation) and Louis L. Williams Jr. (former director of the MCWA) while other players of international development were kept informed of conclusions and recommendations.⁵⁷ Based on a number of financial, technical and political arguments, the IDAB endorsed the subcommittee’s conclusions and prompted the U.S. to “take leadership in rapidly pushing forward a program of

⁵⁵ Division of International Health, *Malaria Manual for U.S. Operations Missions*, June 10th, 1955, p. 7.

⁵⁶ Harry Cleaver, “Malaria and the Political Economy of Public Health”, *International Journal of Health Services*, Vol. 7, No. 4 (1977), p. 571.

⁵⁷ For instance, Maurice Pate, director of UNICEF, and Henry van Zile Hyde exchanged information on the prospect of U.S. backing of eradication. Letter from Henry van Zile Hyde to Maurice Pate, April 19, 1956. Letter from Frederick J. Brady to Maurice Pate, May 1, 1956. Other actors in the know were ICA members such as Eugene Campbell and John J. Hanlon and Justin M. Andrews were also privy to the IDAB’s report. Memo from Henry van Zile Hyde, “Draft of Malaria Eradication Report”, March 28, 1956. Records of the USPHS, Office of International Health, RG 90.130.65.41.5 Box 2, Folder: Committees International Development Advisory Board 1956-1959, NARA College Park.

malaria eradication.”⁵⁸ Cleaver points to this report when explaining why the U.S. government under Eisenhower decided to support the endeavour.⁵⁹

The third trajectory which explains the ICA entering in a contractual relationship with the CDC is the development of a new chemical which promised to surmount the vector resistance problems evoked above and central in the shift from control to eradication. Announced in February 1955, dimethyl 2,2-dichlorovinyl phosphate, or DDVP, was a creation of the TDL. At this time however, the priority of the TDL was to temper the excitement over DDVP: “Since the discovery announcement, subsequent publicity unfortunately has, to some extent, overemphasized the present potentialities of this new insecticide.”⁶⁰ Kenneth Quarterman, a CDC biologist, carefully listed all the unknowns still surrounding DDVP such as toxicity for humans, optimum dosage and suitable formulations according to insect species. Furthermore, he stressed that this new compound might be more useful for agricultural use rather than in public health but he certainly elicited great interest by stating: “It has been shown to be toxic to DDT-resistant houseflies by topical application and in poison baits.”⁶¹ Additional research remained on the agenda for the coming years, but any additional weapons in the global campaign against malaria, untested in field operations as they may be, were too attractive for the ICA to pass on, as they were possible solutions to the resistance problem. Thus, the promise of new insecticides coming from the TDL explains the emergence of closer ties between the CDC and the ICA.

⁵⁸ Letter from Eric Johnson to John B. Hollister, Director, ICA, April 23, 1956. Records of the USPHS, Office of International Health, RG 90.130.65.41.5 Box 2, Folder: Committees International Development Advisory Board 1956-1959, NARA College Park.

⁵⁹ Harry Cleaver, “Malaria and the Political Economy of Public Health”, p. 572. For a more detailed account on IDAB, U.S. policy and the eradication epistemic community, see J. Jackson, “Cognition and Global Malaria Eradication Programme”, p. 198-200.

⁶⁰ Kenneth D. Quarterman, “DDVP... The New Insecticide’s Present Status”, *Public Health Reports*, Vol. 78, No. 5, (August 1955), p. 729.

⁶¹ Kenneth D. Quarterman, “DDVP... The New Insecticide’s Present Status”, p. 730.

Initial investment in 1956 was rather modest with the TDL receiving \$20,000 from the ICA and hiring two individuals to carry out research and development. Funding however increased rapidly between the late 1950s and the early 1960s. The amount flowing from USAID (replacing ICA in 1961) to CDC reached \$235,000 in 1962 and \$285,000 in 1964. Similarly, contract employees increased significantly with 12 chemists, 24 research assistants, 8 biologists and 2 engineers.⁶²

As Randall Packard argued, research in insecticides eclipsed other areas of investigations such as entomology and similar ecological studies.⁶³ Research and development were areas where investments in financial and human resources were made to ensure the success of and/or to salvage the global malaria eradication program. The administrators of bilateral malaria eradication protected this area of spending: “Because of the U.S. investment in the malaria program, it is essential that the U.S. government protect this expenditure by continuing to improve materials, methods, and application equipment.”⁶⁴ Negotiations and agreements during the 1960s between the USAID and the CDC specified that the former counted upon the latter for R&D.⁶⁵ Furthermore, USAID representatives were keen to point out their support to R&D and acknowledge CDC efforts in this matter indicating that the foreign assistance agency was taking increased resistance in vectors seriously and took steps to address this

⁶² Memo from Philip R. Lee, Health Service, Office of Technical Cooperation and Research to James Watt, OIH, “Summary of A.I.D. Agreement with Public Health Service, FY1965”, August 6, 1964. Records of the CDC, Office of the Chief Files 1963-1964, RG 442.66.A813 Box 3, Folder: Cooperation 2-1 DHEW, NARA Morrow Georgia.

⁶³ Randall M. Packard, *The Making of a Tropical Disease*, p. 141-142.

⁶⁴ Memo from Philip R. Lee, Health Service, Office of Technical Cooperation and Research to James Watt, OIH, “Summary of A.I.D. Agreement with Public Health Service, FY1965”, August 6, 1964, p. 6.

⁶⁵ *Proposed Research and Development Services for FY 1965 under the Participating Agency Research Agreement between the Agency for International Development and the Public Health Service*, n.d. (probably 1964). Records of the CDC, Office of the Chief Files 1963-64, RG 442.66.A813 Box 4, Folder: Cooperation 2-2 AID, NARA Morrow Georgia.

growing problem.⁶⁶ Facilities in Savannah were valuable to the American efforts in addressing emerging problems hamstringing eradication programs around the globe. Indeed, the TDL could be construed as a pipeline which would furnish the answer to vector resistance. A USAID document illustrates the importance of the activities of the TDL:

Recent experience [...] shows the need for research on and development of other mosquito reduction techniques to supplement or replace residual spraying. The Technical Branch of CDC provided the type of staff under a single administrative unit as well as the physical facilities for carrying on the technical work necessary and to 'back-stop' the AID malaria eradication programs and through all phases from the laboratory to full-scale field trials.⁶⁷

Aside from the USAID, multilateral health organizations also sought collaboration with the TDL. Indeed, the former also financed research, albeit on a more moderate scale, while the latter regularly sent personnel for training.⁶⁸ Through these collaborations with influential organizations and the work and reputation of S.W. Simmons (former head of the TDL and Chief of the Technical Branch) on insecticides, Savannah confirmed its status among the institutional landscape of global malaria eradication. Thus, the change from control to eradication, U.S. commitment to eliminate the disease and the promise of new chemicals to

⁶⁶ Philip R. Lee, Director, Health Services, HRSD, USAID "United States Overseas Assistance in Health Services through the Agency for International Development", Address to the Medical Aid Conference of the Ditchley Foundation, England, September 20-23, 1963. Records of the CDC, Laboratory Branch - Manuscripts 1952-1964, RG 442.66.A582 Box 2, Folder: Meetings, NARA Morrow, Georgia.

⁶⁷ *Proposed Research and Development Services for FY 1965 under the Participating Agency Research Agreement between the Agency for International Development and the Public Health Service*, p. 1.

⁶⁸ Marcos Cueto, *Cold War, Deadly Fevers. Malaria Eradication in Mexico, 1955-1975*, p. 87. Memo from R. W. Fay, Deputy Chief, T.D.L. to Wayland J. Hayes, Jr., Chief, Toxicology Section, "International Activities of the Technical Development Laboratories, Savannah, Georgia", June 7, 1963. Records of the CDC, Tropical Diseases – General Files, RG 442.74.C610 Box 52, Folder 2-3: Cooperation, NARA Morrow, Georgia.

surmount emerging problems in the field combined to create institutional linkages between the ICA and the CDC.

5.6 Flies in Liberia: Diplomacy and Technical Autonomy (1957)

With the CDC entering a formalized relationship through research contracts with the ICA in 1956, new areas of cooperation seemed to open up. Still centered on the expertise of the CDC's Technical Branch, the ICA sought to draw upon the knowledge located in Savannah to assist it with another vector-borne disease: trypanosomiasis or sleeping sickness. As seen above, for the foreign aid agency, the CDC was becoming a key resource in the research and development of new insecticides and equipment for global malaria eradication to overcome problems of increased resistance in mosquito species. On the one hand, if the CDC could be an asset for ICA's malaria program, for what other international development purposes could its experience and resources be mobilized? On the other hand, what were the limits of collaboration in bilateral assistance? Discussions on a rural health demonstration in the control of trypanosomiasis in Liberia foreshadowed future lines of tensions between the CDC and bilateral aid agencies over operational authority. These negotiations also exposed the CDC leaders to the potentially beneficial impact on its international health activities deriving from closer collaboration with technical assistance agencies.

Western encounters with African sleeping sickness resulted from the expansion of European colonial empires in the late 19th and early 20th century. As Helen Tilley points out, epidemics of sleeping sickness in the first decade of the 1900s were one of the most unsettling experiences faced by European powers as estimates of African victims hover between 750,000 and a million.⁶⁹ Alarmed in part by these outbreaks, colonial powers addressed the issue of trypanosomiasis

⁶⁹ Helen Tilley, "Ecologies of Complexity: Tropical Environments, African Trypanosomiasis, and the Science of Disease Control in British Colonial Africa, 1900-1940", *Osiris*, Vol 19 (2004), p. 24.

by establishing scientific commissions starting in 1901 which studied the aetiology and epidemiology of the disease. These investigations elucidated some basic questions such as its mode of transmission through the tsetse fly and its pathological action inside the human body. Development of prevention measures however were often improvised and applied in coercive ways. Tilley identifies four main actions taken during the 1900-1920 period: relocation of populations from infested to non-infested areas, increase in population densities in lightly affected rural areas, development of chemical treatments and prophylaxis, and finally control of tsetse fly populations by clearing bush and vegetation, instalment of traps and killing parasite-carrying animals.⁷⁰

Aside from imperial interest in sleeping sickness, the disease also attracted the attention of the LNHO which addressed the issue in three conferences during the 1920s and 1930s. Studies into trypanosomiasis, especially those carried out by British investigators, spurred ecological understandings of the disease and its control. Indeed, it became clear to a group of epidemiologists during the interwar period that spread of sleeping sickness in human populations could only be explained by taking into account multiple factors: the relationship between host and parasite, the habits of the tsetse flies, agriculture and breeding grounds, etc.⁷¹ Thus in more than one way the approach to sleeping sickness mirrors the complex understandings and integrated control methods of malaria in the same period.

Further similitude is to be found in the history of the treatment of sleeping sickness. Initial treatments against this infectious disease revolved around chemotherapy using derivatives of arsenic such as sodium arsenite and atoxyl utilized in the first decade of the 20th century and subsequently joined by melarsopol introduced in 1949. Clinical treatments began to rely on suramin, a

⁷⁰ Helen Tilley, "Ecologies of Complexity: Tropical Environments, African Trypanosomiasis, and the Science of Disease Control in British Colonial Africa, 1900-1940", p. 25.

⁷¹ Helen Tilley, "Ecologies of Complexity: Tropical Environments, African Trypanosomiasis, and the Science of Disease Control in British Colonial Africa, 1900-1940", p. 22-26, 38.

drug discovered by Paul Ehrlich during his work on synthetic dyes in 1920s. These treatments based upon arsenic derivatives proved to be lengthy and toxic if not administered properly. However, the most common treatment was pentamidine, a non-arsenical drug, introduced in 1936 and widely used in the 1950s and 1960s. Since then, its usage has declined in light of the development of resistance in parasites.⁷² As with malaria, development of residual insecticides offered the possibility of preventing sleeping sickness rather than providing treatment on a clinical basis. Campaigns were organized in various parts of Africa using DDT and dieldrin using ground or aerial spraying.⁷³ What the ICA wanted was the CDC's collaboration in setting a first stone on such a campaign in a strategic U.S. foothold in West Africa: Liberia.

U.S. involvement in public health in Liberia dated back to World War II. After its entry in the conflict, the U.S. and Liberia concluded a treaty to allow transit of personnel and material to the Middle and Far East. Furthermore, strategic resources were present in Africa and there was a need to prevent them to fall into the hand of Axis forces.⁷⁴ With soldiers debarking in Liberia also came USPHS personnel charged with protecting troops by engaging in disease control measures (especially of malaria) around bases and airfields. New leadership in the African country hoped to translate these limited measures aimed at protecting U.S. forces into the basis of national efforts aimed at the entire Liberian population.

Elected in 1944, William V. S. Tubman, remained president of Liberia until 1971. This leader sought to modernize every aspect of his country, including the mentalities, with investments in education, foreign policy, agriculture, medicine,

⁷² Francis E.G. Cox, "History of Sleeping Sickness (African Trypanosomiasis)", *Infect Dis Clin N Am*, Vol. 18, No. 2 (June 2004), p. 240-242.

⁷³ Francis E.G. Cox, "History of Sleeping Sickness (African Trypanosomiasis)", *Infect Dis Clin N Am*, Vol. 18, No. 2 (June 2004), p. 242.

⁷⁴ David McBride, *Missions for Science: U.S. Technology and Medicine in America's African World* (New Brunswick, N.J.: Rutgers University Press, 2002), p. 169.

commerce, and public health in every community of an ethnically and economically divided Liberia. According to David McBride, Tubman “cherished assistance in public health and medical training as much as foreign economic assistance.”⁷⁵ Development of a healthcare and public health system was where Tubman thought investments would translate into political support and minimize popular opposition to his rule and tensions resulting from the exploitation of Liberian natural resources by American firms.⁷⁶

In these plans for development of medicine and public health along U.S. and European lines, there was little room for indigenous knowledge and healing traditions. As McBride further points out, Tubman’s interest in fostering modernization in these areas “was not only in reaping the benefits of medical policing for his administration, but in going even further by eliminating the premodern cultural world views of Liberia’s rural masses – world views based on religion and superstitions.”⁷⁷ Calls for U.S. assistance in fighting diseases came in the first year of Tubman’s rule and it was provided in the form a USPHS team of 11 black physicians who simultaneously addressed military concerns about tropical diseases and demonstrated the power of Western medicine and public health, especially in controlling malaria.

The announcement of the Point IV program in June 1949 meant an increase in the amount and the type of programs supported by U.S. funds. Between 1949 and 1963, an estimated \$45.7 million in assistance and \$51 million in loans went to Liberia with an estimated 10 percent of these amounts earmarked for public health programs. In addition to financial support to make Tubman’s dream of a technology-driven modernization come true, U.S. technical personnel was present in the country to train Liberian counterparts and oversee projects and

⁷⁵ David McBride, *Missions for Science*, p. 171.

⁷⁶ David McBride, *Missions for Science*, p. 173.

⁷⁷ David McBride, *Missions for Science*, p. 174.

programs.⁷⁸ In this context of an increasing amount of American funds dedicated to development, an African leader embracing foreign assistance and technological modernization, and the introduction of new chemicals promised a cost effective method for preventing sleeping sickness that the ICA made an offer to the CDC to set foot on the Dark Continent.

In August 1956, the ICA first approached the USPHS Division of International Health (DIH) to assist in a trypanosomiasis control program done in conjunction with the Liberian government through a bilateral agreement. CDC involvement came six months later as both the DIH and the ICA contacted CDC's Technology Branch to prepare a plan of operation for the project. More precisely, the stated objective of the ICA was to "alleviate or eliminate human trypanosomiasis in Liberia" by conducting a rural health demonstration.⁷⁹ The campaign was to take place around the city of Voinjama in the Western Province, near the Guinean border, for a period of two to three years. Negotiations on the preparations for the projects are indicative of the respective spheres of responsibilities which had, since Justin Andrews' mission to Iran, become clearly separated in the functioning of bilateral assistance in health matters. As seen above, Andrews had openly associated stability of the Iranian government with public health programs, but a decade later, such an assessment no longer figured within the purview of CDC personnel dispatched abroad. Indeed, in justifying the program in contractual documents, the Technology Branch divided political and epidemiological reasons to undertake sleeping sickness control. As stated by the CDC: "Need for U.S. participation in this program is based upon political and economic considerations determined by the State Department."⁸⁰ On the other hand, the CDC gave public health reasons to get involved in this enterprise by

⁷⁸ David McBride, *Missions for Science*, p. 186.

⁷⁹ *Cooperative Project Agreement*, 1957. Records of the CDC, Office of the Chief Files, RG 090.83.0070 Box 2, Folder: Programs and Projects – Liberian Trypanosomiasis 1957, NARA Morrow, Georgia.

⁸⁰ *Cooperative Project Agreement*, 1957.

citing epidemiological surveys in the region, similar efforts in British and French colonies in the region and a lack of accurate information on the situation in the Liberian hinterland.⁸¹

In trying to cajole the CDC in contributing expertise and personnel to this project which figured high on the ICA's agenda of priorities, their negotiators offered two incentives. First, the ICA relied on its strategic position as a gatekeeper to overseas settings to suggest access to the African continent. The USPHS was not authorized under the Public Health Service Act to conduct direct operations in a foreign country.⁸² In exchange for personnel and expertise for three years, the ICA presented the sleeping sickness demonstration program as a first step towards establishment of a field station to study tropical diseases. Reporting on the negotiations, L.B. Abbey informed CDC Chief Robert J. Anderson that: "[The ICA representative] said it would be a good thing for the CDC to have this foreign station."⁸³ This aspect of the deal could be attractive as the CDC, despite having dispatched personnel in various areas of the world (mainly in Asia and Latin America), had no experience in Sub-Saharan Africa let alone in a program of such length.⁸⁴ The political context serves in large part to explain the absence of U.S. experts in Africa. Indeed, most of the Sub-Saharan region remained under French and British colonial rule and therefore were closed to American involvement in what could be considered internal affairs. Therefore, Liberia, as the only independent country in West Africa and with long ties with the U.S. government and with U.S. corporations, was a logical point of entry on the continent for the CDC.

⁸¹ *Cooperative Project Agreement*, 1957.

⁸² Later amendments to the PHSA made in 1960 opened some possibilities to the USPHS in directly sending personnel overseas but these missions had to be related to medical research.

⁸³ Memo from L.B. Abbey, Financial Management Officer to Chief, CDC, "Proposed Studies – Liberia", April 18, 1957. Records of the CDC, Office of the Chief Files, RG 090.83.0070 Box 2, Folder: Programs and Projects – Liberian Trypanosomiasis 1957, NARA Morrow, Georgia.

⁸⁴ It must be pointed out that Richard W. Fay, an entomologist at the Technical Development Laboratories, served for a period of four months in Egypt in fly control operations in 1954.

The second incentive was technical and administrative autonomy. Aware of its limitations in terms of expertise with insecticides and fly control operations, the ICA offered total autonomy to the CDC in drawing the plan of operations and in its implementation in the field. As CDC negotiator L.B. Abbey reported to his chief: “Mr Bunch (ICA) states that this should not be a PHS enterprise per se; it should be an ICA project but PHS should control it.”⁸⁵ This control even extended to the financial aspects of the program as this responsibility for administering ICA funds would also be delegated to CDC officers. Similarly to the access to a new geographical area in exchange for personnel, these early discussions also comported a trade. In exchange for technical autonomy, the ICA conserved visibility and credibility in carrying out health programs abroad as a consequence of the expected success of the Liberian program.

This facet was crucial as U.S. credibility in assisting Liberia in the field of public health was at stake, a fact understood and accepted by a CDC negotiator: “In view of the remote chance of failure, however, it does not appear appropriate to imply doubt of our effectiveness to Liberian officials, especially as an emphatic position has been taken previously which gives optimistic impression of ICA and PHS ability to conduct this project.”⁸⁶ Obtaining autonomy of action in drafting and implementing a program conducted abroad under the aegis of bilateral assistance represented a new experience for the CDC. This is illustrated by the unsure tone and lack of knowledge ranging from regulations guiding provision of funds and resources to a foreign country through bilateral channels to mundane

⁸⁵ Memo from L.B. Abbey, Financial Management Officer to Chief, CDC, “Proposed Studies – Liberia”, April 18, 1957.

⁸⁶ Memo from M.H. Goodwin Jr., Assistant Chief, Technology Branch to Dr. Frederick J. Brady, Assistant Chief, DIH, “Liberian Trypanosomiasis Control Project”, April 4, 1957. Records of the CDC, RG 090.83.0070 Box 2, Office of the Chief Files, Folder: Programs and Projects – Liberian Trypanosomiasis 1957, NARA Morrow, Georgia.

administrative procedures.⁸⁷ In sum, visibility and field experience in bilateral assistance were the currency exchanged between the two agencies.

With promises of autonomy and access to Africa, staff at the Technology Branch began drafting operations plans which defined the scope of work, the functions of administrative and field personnel and finally the material needed to engage in control of sleeping sickness. As drafts circulated back and forth between the CDC and the ICA during Spring and Summer 1957, it became clear that CDC autonomy was a mirage. Responding to early drafts, the ICA raised a number of issues which made CDC leaders question the promises made by the foreign aid agency in March 1957. For instance, the ICA insisted on regular progress reports, ownership of equipment and the management of funds to which the Technical Branch had opposed. Additionally, based on a survey of field conditions of Liberia, the CDC proposed the purchase of a plane, an element deemed crucial for the success of the demonstration project. However, the ICA responded negatively based on the fact that despite its necessity for operations it was against regulations to acquire aircrafts.

Parallel to the circulation of drafts, frustrations mounted in the Technology Branch and at the head of CDC. After months of producing different plans of operations which CDC staff thought would both meet ICA criteria and ensure the project's success, little headway had been made in deploying officers in the field. In October 1957, as another revision from the ICA arrived in Atlanta, a CDC public health advisor in Washington summarized the situation: "The over-all effect of these differences seems clear in that ICA's proposal fails to provide for the degree of autonomy of action and decision on both technical and administrative

⁸⁷ Memo from M.H. Goodwin Jr., Assistant Chief, Technology Branch to Dr. Frederick J. Brady, Assistant Chief, DIH, "Liberian Trypanosomiasis Control Project", March 21, 1957. Records of the CDC, Office of the Chief Files RG 090.83.0070 Box 2, Folder: Programs and Projects – Liberian Trypanosomiasis 1957, NARA Morrow, Georgia.

matters as has been stipulated by CDC.”⁸⁸ Indeed, the two organizations clashed over the degree of autonomy, the utilization of funds and the ICA’s requests for frequent updates thus contributing in souring negotiations. C.J. Carpenter attributed part of the difficulties in reaching an acceptable *modus operandi* on the CDC’s inexperience in dealing with complex legislative and diplomatic issues that come with bilateral negotiations. He explained to his superior the bureaucratic intricacies associated with the project in terms of responsibilities of each stakeholder, namely the ICA, the Liberian Government and USOM personnel on site. Obtaining administrative and technical autonomy for CDC field officers were thus a matter of not only reaching an agreement between Washington and Atlanta but of separate negotiations with the Tubman administration and American development personnel on site.⁸⁹

While the prospects of carrying out the demonstration project diminished as months passed, the long negotiations with the ICA had served the purpose of establishing a basis for future CDC participation in bilateral health programs overseas. Carpenter suggested maintaining a good working relationship with the ICA.⁹⁰ Indeed this organization had the legislative and financial tools to open foreign boundaries to CDC technical personnel and establish the public health agency as a player in international health. So despite a frustrating negotiation

⁸⁸ Memo from C.J. Carpenter, Public Health Advisor, CDC to Chief, CDC, “Liberian Trypanosomiasis Control Project”, October 2, 1957. Records of the CDC, Office of the Chief Files, RG 090.83.0070 Box 2, Folder: Programs and Projects – Liberian Trypanosomiasis 1957, NARA Morrow, Georgia.

⁸⁹ The following paragraph illustrates the complexity of negotiations for the project for which CDC could have the lead in directing operations: “It is conceivably possible that the GOL (Government of Liberia), under the bi-lateral (sic) agreement with ICA, might delegate through a mutually agreed upon plan considerable autonomy of authority for technical and administrative direction of the project to CDC, but even so such delegation would be a matter of separate negotiation between the USOM/L (U.S. Operations Missions/Liberia) and the GOL on behalf of the CDC. In any event, I doubt whether the question of the degree of autonomy GOL would be willing to delegate to CDC through provisions of an operating plan could be settled prior to or at the same time ICA and CDC are negotiating the subject special agreement. Memo from C.J. Carpenter, Public Health Advisor, CDC to Chief, CDC, “Liberian Trypanosomiasis Control Project”, October 2, 1957.

⁹⁰ Memo from C.J. Carpenter, Public Health Advisor, to Chief, CDC, “Liberian Trypanosomiasis Control Project”, October 2, 1957.

process, Carpenter encouraged both the CDC Chief and the Director the Technical Branch (S.W. Simmons) to attend a final meeting to discuss the Liberian project for two reasons. First, argued Carpenter, it would “provide CDC with a logical and diplomatic basis for cutting off all further efforts toward seeking CDC participation[.]”⁹¹ Secondly, attendance by two important CDC representatives may help iron out differences to “establish a workable foundation upon which CDC might find it both desirable and possible to pursue along well defined guide lines further efforts to render technical assistance[.]”⁹² Promises of technical and administrative autonomy never materialized as the CDC and the ICA did not compromise on the means and ways to conduct sleeping sickness control. CDC participation remained limited to a brief survey by Herbert F. Schoof in 1957 but nevertheless the discussions between the CDC and the ICA illustrate several characteristics.⁹³

5.7 Pathological Boundaries vs. Administrative Barriers

Moving from malaria to sleeping sickness and noting that the same personnel and expertise were mobilised for both indicates that there was some overlapping in programs designed to control, if not eradicate, vector-borne diseases. In this sense, mosquitoes, flies and insecticides were paths along which TDL personnel could travel to move from one disease to another. Boundaries defined by epidemiological and pathological characteristics were porous as long as preventive measures (DDT for instance) or means of transmission (vector-borne) shared some commonalities. The reduction of preventive measures for vector-

⁹¹ Memo from C.J. Carpenter, Public Health Advisor, to Chief, CDC, “Liberian Trypanosomiasis Control Project”, October 2, 1957.

⁹² Memo from C.J. Carpenter, Public Health Advisor, to Chief, CDC, “Liberian Trypanosomiasis Control Project”, October 2, 1957.

⁹³ Memo from R. W. Fay, Deputy Chief, T.D.L., to Wayland J. Hayes Jr., Chief, Toxicology Section “International Activities of the Technical Development Laboratories, Savannah, Georgia”, June 7, 1963. Records of the CDC, Tropical Diseases General Files, RG 442.74.C610 Box 52, Folder: Fed. Gov’t ’63, NARA Morrow, Georgia.

borne diseases from integrated approaches to rely on a single technical approach of insecticide formulation and application offered possibilities for individuals and organizations specializing in these activities to expand their programs. Instead of being limited by the silos created by vertical programs aimed at a single disease, these specialists found their knowledge readily transferrable from one vector to another. In the case of the CDC, this meant multiplying opportunities to expand international activities for a range of diseases (malaria, sleeping sickness, yellow fever, etc.), the deciding factor being political salience and foreign policy orientations of bilateral aid.

The ICA operated with this logic in trying to enrol experts of the Technology Branch, the common factor being the solution (DDT) rather than the vector (mosquitoes versus flies). Similarly, CDC personnel, in its eagerness to collaborate in bilateral assistance, with which it had little experience, also considered the differences between malaria and trypanosomiasis to be minimal. In fact, the short distance between malaria and sleeping sickness seemed to offer the CDC a way to get closer to a tropical environment where it had never set foot. On the other hand, as the CDC engaged in tripartite negotiations which, in addition to the ICA, included a foreign government and a USOM representative, administrative and legal boundaries became all the more apparent. A lack of experience and knowledge about the requirements, legislations and administrative process certainly hindered the CDC personnel in drafting and presenting an acceptable project which would meet ICA criteria and TDL desires for administrative and technical autonomy.

Discussions ingrained in the ICA the idea that the CDC could be a partner not only in providing tools (insecticides, sprayers) and knowledge (specifications for DDT formulations, manuals) but also feet on the ground provided that the CDC conforms to its administrative regulations and limits its participation to technical aspects of public health. For the Atlanta-based agency, negotiations with the ICA

brandished the prospect of expansion into international health paid for with foreign assistance funds and overseas assignments of longer period. Finally, combined with a new agreement for funding of insecticide-related research and development, the above discussions established an administrative channel and a belief, on both parts, that collaboration between the two agencies was to revolve around the insecticide-oriented personnel of the TDL. As we will see in the following section on malaria in Central America, mosquitoes and insecticides provided another opportunity for the CDC to engage with the ICA. Again, it would be the toxicologists and entomologists who would spearhead this renewed effort.

5.8 Crisis in Central America: CDC and resistance (1959)

Since the beginning of the Eisenhower administration, concerns over the stability of underdeveloped countries across the globe shaped policies towards Third World nations. During his first term, Eisenhower paid little attention to the political situation in Latin America despite its economic importance.⁹⁴ The demands and grievances of Latin American leaders over economic and political issues were generally ignored as it seemed that little could be feared from the USSR. Rather, internal stability of allied governments was of greater concern. Assessments stipulated that while direct Soviet military involvement in the region remained a distant possibility, covert operations to undermine U.S.

⁹⁴ On the economic importance, see Marcos Cueto, *Cold War, Deadly Fevers*, p.23-24. In Chapter 2, Cueto makes a case on the centrality of Latin America during the Eisenhower Administration. By concentrating on this region, he suggests that it figured highly on the foreign policy agenda. This view clashes with a historiographical review by Stephen G. Rabe who demonstrates that Latin America remained peripheral in U.S. foreign policy. Until from the overthrow of Arbenz in 1954, the Eisenhower administration faced more pressing issues in other areas (USSR, China, Korea, Vietnam, nuclear weapons, etc.) Perhaps, it would be wise to perhaps de-emphasize the overall importance of Latin America to U.S. foreign policy makers until the Nixon tour and Cuban Revolution. See Stephen G. Rabe "Eisenhower Revisionism" in Michael J. Hogan (ed.), *America in the World: The Historiography of American Foreign Relations since 1941*, (New York: Cambridge University Press, 1995), p. 300-325. On the developing world, see p. 320-323.

dominance preoccupied policymakers. As Dennis M. Rempe points out, fears existed on whether Third World nations, including in Latin America, were susceptible to subversion and paramilitary operations, representing a weak link in the global conflict opposing the U.S. and the USSR.⁹⁵ Consequently, the Eisenhower administration adopted policies aligning the U.S. with dictatorial regimes and discredited elites as ramparts against communism, generally depicted as hostile to social and democratic reforms. The most remarkable event in his first term was the decision to overthrow Guatemalan president Jacobo Arbenz in June 1954 and the elaboration of policies to strengthen the internal security apparatus of countries thought to be at grips with leftist (if not Communist) opposition.⁹⁶ This approach towards Central and South America remained the norm as the Eisenhower administration continued supporting dictatorial regimes through economic and military assistance.⁹⁷

Scholarship on U.S.-Latin American relations during the 1950s demonstrated a shift in Eisenhower's approach during his second term.⁹⁸ Influenced by a number of individuals, including Milton Eisenhower (the President's brother), pressure from Congress and fears of a Soviet economic offensive, the Administration re-examined policies that had plagued hemispheric foreign policy. These ranged from refusing to initiate a price support program for commodities and emphasizing on technical aid programs to insisting on private investments and

⁹⁵ Dennis M. Rempe, "An American Trojan Horse? Eisenhower, Latin America, and the Development of US Internal Security Policy 1954-1960", <http://www.icdc.com/~paulwolf/colombia/1290d.htm>, accessed June 2, 2011.

⁹⁶ On the history of the Overseas Internal Security Program (or 1290d programs) see Dennis M. Rempe, "An American Trojan Horse? Eisenhower, Latin America, and the Development of US Internal Security Policy 1954-1960". Rempe demonstrates the effect of the OISP in Latin American countries as authoritarian regimes utilized their invigorated security forces to oppress regular opposition leading to criticism in the U.S. of funds utilized to violate human rights and supporting non-democratic regimes.

⁹⁷ Mark T. Gilderhus, "An Emerging Synthesis? U.S.-Latin American Relations since World War II" in Michael J. Hogan (ed.), *America in the World: The Historiography of American Foreign Relations since 1941*, (New York: Cambridge University Press, 1995), p. 445

⁹⁸ See Stephen G. Rabe, *Eisenhower and Latin America: The Foreign Policy of Anti-communism*, (Chapel Hill: University of North Carolina Press, 1988)

opposing to long-standing demands to create a development bank for Latin America.⁹⁹ As Zahniser and Weis argued, new ideas emerged on how to foster economic stability and achieve political stability in the region. By 1956, foreign policy towards Latin America had become more flexible on economic issues, such as tariffs and international commodity price support, and on assistance with funds oriented towards social welfare projects. In a sense, it can be argued that announcement of official U.S. support of malaria eradication in April 1957 figured within this larger framework of financing of social welfare programs in Latin America. Nevertheless, the main objective remained U.S. leadership in the region.¹⁰⁰ Despite these new orientations and positions, resentment towards the U.S. in Latin America remained strong as Richard Nixon experienced firsthand during his goodwill mission in 1958. Steps still needed to be taken to convince Latin Americans of the 'benevolence' of their northern neighbour. It is in this context that news arrived about setbacks of anti-malaria operations in several countries in Central America and that the ICA turned to the CDC for personnel and expertise to address this issue.

In August 1959, the PASB¹⁰¹ and the ICA received disturbing information concerning the Nicaraguan malaria eradication activities. This came as a surprise when compared to earlier assessments of the situation in the country. A few months before, local ICA representatives made a glowing description of the progress of spraying operations. In June 1959, a health summary of Nicaragua stated that the first cycle of eradication had been completed. "This was a happy day for the workers in malaria in Nicaragua, because there had existed in international circles some doubts as to the ability of this organization to

⁹⁹ Marvin R. Zahniser & W. Michael Weis, "A Diplomatic Pearl Harbor? Richard Nixon's Goodwill Mission to Latin America in 1958", *Diplomatic History*, Vol. 13, No. 2 (1989), p. 166.

¹⁰⁰ Mark T. Gilderhus, "An Emerging Synthesis? U.S.-Latin American Relations since World War II", p. 447.

¹⁰¹ Sources concerning this event still refer to the organization as the PASB although the official name had changed to PAHO in 1958.

succeed”, explained the ICA representative.¹⁰² The program had not faced many obstacles; the most severe blow noted being the departure of an American engineer consultant assigned by the PASB in May 1959!¹⁰³ Furthermore, a TDL scientist had visited the country and was pleased with improvements made to spraying equipment to increase their performance.¹⁰⁴ On a larger scale, the situation in Nicaragua seemed to echo continental-wide assessments of the progress of malaria eradication activities according to which success was close at hand.¹⁰⁵

After years of DDT application since the early 1950s, high levels of malaria were still registered but the roots of the problem were unclear to both the ICA and the PASB. One of possible culprits identified was increased resistance to DDT, but the extent of the problem in terms of mosquito species and areas affected remained unknown.¹⁰⁶ This issue alarmed the bilateral aid agency and its partner: “The PASB and ICA representatives [...] consider the problem in Nicaragua to be an emergency situation calling for the highest priority action”, wrote the CDC officer.¹⁰⁷ Indeed, the Nicaraguan Ministry of Health considered abandoning its spraying program and international organizations feared the regional consequences of such a modification of strategy. Fears existed over creating a

¹⁰² Patrick J. Sullivan, “Nicaragua, Quarterly Activities – April 1st, to June 30th, June 1959”. Records of the CDC, Bureau of Tropical Diseases, RG 442.74.0610 Box 32, Folder: Nicaragua – 1959, NARA Morrow, Georgia.

¹⁰³ ICA, “Monthly Activities”, May 1959. Records of the CDC, Bureau of Tropical Diseases, RG 442.74.0610 Box 32, Folder: Nicaragua – 1959, NARA Morrow,

¹⁰⁴ Patrick J. Sullivan, “Nicaragua Monthly Activities April 1959”. Records of the CDC, Bureau of Tropical Diseases, RG 442.74.0610 Box 32, Folder: Nicaragua – 1959, NARA Morrow, Georgia.

¹⁰⁵ Donald J. Pletsch, “Progress Toward Malaria Eradication in the Americas with Special Reference to Mexico”, *AJPH*, Vol. 48, No. 6 (June 1958): 713-716.

¹⁰⁶ Memo from Glenn S. Usher, Special Assistant for Medical Activities, CDC, to Chief, CDC, “Malaria in Nicaragua – PASB Request for Assistance”, August 31, 1959. Records of the CDC, Bureau of Tropical Diseases, RG 442.74.0610 Box 32, Folder: PASB Team Report – Central America 1959-1963, NARA Morrow, Georgia.

¹⁰⁷ Memo from Glenn S. Usher, Special Assistant for Medical Activities, CDC, to Chief, CDC, “Malaria in Nicaragua – PASB Request for Assistance”, August 31, 1959.

precedent in Nicaragua leading to other countries following suit.¹⁰⁸ This situation was known by local ICA personnel but deemed rather unproblematic. An ICA *Health Summary* cursory mentioned development of vector resistance and steps taken to address this issue: “A number of villages throughout the country have show resistance to DDT. Plans are now being drawn up to cease spraying operations in these villages and to replace spraying with mass drug therapy.”¹⁰⁹ In higher level discussions, this change in strategy was a fundamental issue and assessment on the situation in Nicaragua differed. Instead of the “happy days” reported after the completion of a cycle of eradication, officials spoke of discouragement emanating from a failure to curb cases of malaria.¹¹⁰

¹⁰⁸ It is interesting to note the parallel between concerns over cascading abandonment of DDT-based campaign and emerging domino theory in foreign policy during the Eisenhower era. Eisenhower first formulated domino theory in public in 1954. This theory stipulated that collapse of a government to Communism would result in similar events in neighbouring states and around the globe. On domino theory, see Cynthia Ann Watson, *U.S. National Security: A Reference Handbook* (Santa Barbara, Calif.: ABC-CLIO, 2002), p. 162-163. Marco Cueto also draws comparisons between the Cold War rhetoric and policy and malaria eradication but does not point to domino theory. Marcos Cueto, *Cold War, Deadly Fevers*, p. 8-9.

¹⁰⁹ Patrick J. Sullivan, “Nicaragua, Quarterly Activities – April 1st, to June 30th, 1959”

¹¹⁰ Memo from Glenn S. Usher, Special Assistant for Medical Activities, CDC, to Chief, CDC, “Malaria in Nicaragua – PASB Request for Assistance”, August 31, 1959. On a more general level, it could be argued that resistance to a U.S./PASB method of eradication and possibility of switching strategy can be reframed in the larger of context of relationships between the U.S. and Nicaragua under Somoza. Recent literature on the subject underline the autonomy and willingness of local actors to ignore U.S. influence in the pursuit of their own interests. See Robert A. Pastor, *Not Condemned to Repetition: The United States and Nicaragua*, Second edition, (Boulder, Colorado: Westview Press, 2002), p. 12-13. A similar view is articulated in Paul Coe Clark, *The United States and Somoza, 1933-1956: A Revisionist Look*, (Westport, Conn.: Praeger, 1992), p.203-205. In depth exploration of this issue of autonomy in the political/economic sphere and its possible spread to the public health arena lies outside the scope of my dissertation. However, there are hints of this in a memorandum from Alexander Langmuir to Robert J. Anderson (CDC Chief), the former underlying administrative issues plaguing the Nicaraguan problem such as relationships between the Ministry of Health, the Special Malaria Service (SISC) and willingness to ignore ICA demands which created tensions. Memo from Chief, Epidemiology Branch, to Chief, CDC, “‘Impending Malaria Epidemic’ –Nicaragua”, September 4, 1959. Records of the CDC, Bureau of Tropical Diseases, RG 442.74.0610 Box 32, Folder: PASB Team Report – Central America 1959-1963, NARA Morrow, Georgia. Another manuscript note also points in the same direction by attributing to Nicaraguan President Luis Somoza the decision to deploy therapeutic measures. Author unknown, “Meeting PASB,ICA + Team”, October 14, 1959. Records of the CDC, Bureau of Tropical Diseases, RG 442.74.0610 Box 32, Folder: PASB Team Report – Central America 1959-1963, NARA Morrow, Georgia.

To prevent the abandonment of established anti-malaria strategies and in order to put programs in Central America (El Salvador, Honduras, Guatemala and Nicaragua) back on track, the ICA and the PASB called on the CDC “to send a team to study the situation, find out what is wrong, and make recommendations as to what should be done about it.”¹¹¹ If for both international organizations this CDC team was about a salvaging regional eradication programs, for some in Atlanta it was an opportunity to intensify relationships with the U.S. foreign assistance apparatus.

As the CDC accepted to render this service, great consideration was given as to the type of individuals and professional background of eventual team members. Acknowledging lack of epidemiological information on Central America, the ICA and the PASB expressed their wishes to see epidemiologists and entomologists be part of this regional survey team. Discussions between the DIH and the CDC Chief went in the same direction and identified Alexander Langmuir as a desirable leader.¹¹² As seen previously, the Chief Epidemiologist had personally led a team of EIS officers in East Pakistan the previous year and was arguably the CDC member with the highest profile. Additionally, high level USPHS and ICA officials perceived the EIS pool of epidemiologists as being free from preconceived ideas about eradication “since they would probably not carry with them any prejudices related to former experiences in the malaria eradication program that older men might have.”¹¹³ Furthermore, in the race to beat development of vector resistance, epidemiology had been relegated to second place, a fact gradually understood by international public health leaders in the

¹¹¹ Memo from Glenn S. Usher, Special Assistant for Medical Activities, CDC, to Chief, CDC, “Malaria in Nicaragua – PASB Request for Assistance”, August 31, 1959.

¹¹² Memo from Horace DeLien, Chief, DIH, to Chief, CDC, “Visit of Dr. Austin Kerr to Puerto and a Team Requested from CDC to Study Anopheline Resistance Problem in Nicaragua”, September 18, 1959. Records of the CDC, Bureau of Tropical Diseases, RG 442.74.0610 Box 32, Folder: PASB Team Report – Central America 1959-1963, NARA Morrow, Georgia.

¹¹³ Memo from Horace DeLien, Chief, DIH, to Chief, CDC, “Visit of Dr. Austin Kerr to Puerto and a Team Requested from CDC to Study Anopheline Resistance Problem in Nicaragua”, September 18, 1959.

Americas. As the chief of DIH summarized: “The problem today exists primarily due to the urgency of the spray program transcended basic studies and evaluation in the field of epidemiology. Today there is little solid epidemiological data and more important, few people trained to carry out such investigations.”¹¹⁴ In this context, it is quite understandable that the Epidemiology Branch and Langmuir were desirable candidates for this mission to Central America. It also denotes a gradual shift in the ICA vision on the role and usefulness of epidemiologists to its U.S. Operation Missions.

Just weeks prior the ICA/PASB request, a survey of bilateral aid missions concerning possible epidemiological support for their public health activities revealed little interest. Out of the 24 U.S. Operation Missions probed, only six expressed a desire and need to supplement their staff with a field epidemiologist, which included only one specifically for malaria related activities in Vietnam.¹¹⁵ Moreover, in trying to fill a “malaria specialist” position in its Washington office, the ICA still primarily looked for sanitary engineers with overseas experiences.¹¹⁶ While the DIH (on behalf of the foreign assistance agency) contacted the TDL and strongly encouraged someone taking this position, the prospect of working in Washington did not entice any of the staff, perhaps as a consequence of the failed negotiations with ICA over the Liberian demonstration project.¹¹⁷

¹¹⁴ Memo from Horace DeLien, Chief, DIH, to Chief, CDC, “Telephone Conversation, Thursday, September 10, 1959, 3:55 p.m.”, September 10, 1959. Records of the CDC, Bureau of Tropical Diseases, RG 442.74.0610 Box 32, Folder: PASB Team Report – Central America 1959-1963, NARA Morrow, Georgia.

¹¹⁵ Memo from Alan W. Donaldson, Assistant Chief, CDC, to Chief, CDC, “Need and Desire for Epidemiologists in U.S. Operations Missions”, August 6, 1959. Records of the CDC, Office of the Chief Files, CDC (Some 1951 but primarily 1959), RG 442.62.A726 Box 2, Folder: Cooperation – International, NARA Morrow, Georgia.

¹¹⁶ Memo from Chief, DIH, to Acting Surgeon General, “Support of ICA”, September 29, 1960. Records of the USPHS, Office of International Health, RG 90.130.65.42.2 Box 15, Folder: Coordination, NARA College Park.

¹¹⁷ Letter from Eugene P. Campbell, Director, Office of Public Health, ICA, to Horace DeLien, Chief, DIH, September 15, 1959. RG 442.62.A726 Box 2, Folder: Cooperation – International, NARA Morrow, Georgia. This folder and the folder Diseases – Malaria contains the search process for a

Leadership in assembling a team however did not fall to Langmuir but rather to CDC Assistant Chief Alan Donaldson. The Chief Epidemiologist, while aware of the situation in Central America, seems to only have played a marginal role in this mission.¹¹⁸ That Langmuir was a secondary actor is hardly surprising when considering the professional background of Donaldson. A parasitologist trained at Johns Hopkins and deployed in the Pacific theatre during WWII, the CDC Assistant Chief had joined the USPHS in 1946 and had traveled overseas as a consultant on the prevention and eradication of malaria.¹¹⁹ Furthermore, as seen previously, Donaldson was an interlocutor on international health activities in the USPHS and the CDC, specifically during the hearings of the Humphrey Subcommittee (chapter 2). Dispatching officers in Central America in assistance to the ICA represented more to Donaldson than putting anti-malaria activities back on track. According to Donaldson, a CDC team would serve two purposes: “A chance to demonstrate what we have to offer before going after a separate contract on a hemisphere or world basis” and “A demonstration of good faith with ICA by providing this degree of service under present [research] contract.”¹²⁰ Furthermore, Donaldson believed, contrary to ICA and PASB desires, that the team should be oriented primarily towards vector resistance and spraying operations with epidemiology and parasitology being of less importance. Therefore, team composition reflected those beliefs and its high importance for CDC’s future in bilateral assistance.

Instead of looking primarily for epidemiologists, Donaldson entrusted group leadership to Herbert Schoof, entomologist and Chief Biologist at the TDL.

possible candidate at CDC and at the TDL in particular. Responses from those contacted for this assignment range from “no (emphatic)” to “does not want but would if ordered” and “not contacted but *might* be receptive.” Manuscript note, October 19, 1959.

¹¹⁸ In the discussions for this mission, only one document comes from Langmuir, although it is quite conceivable that he was kept informed about the situation.

¹¹⁹ “Dr. Alan W. Donaldson Dies”, *AJPH*, Vol. 68, No. 12 (December 1978), p. 1237.

¹²⁰ Alan W. Donaldson, “Malaria in Nicaragua”, 1959 (From penned notes of Alan W. Donaldson), Records of the CDC, Bureau of Tropical Diseases, RG 442.74.0610 Box 32, Folder: Nicaragua – 1959, NARA Morrow, Georgia.

Additional members included Griffith E. Quinby (epidemiologist at the TDL Wenatchee Field Station, Washington) and Marion M. Brooke (parasitologist and malariologist, Laboratory Branch). Contrary to the wishes of the ICA, these two members had been tied to previous malaria programs either during the days of the Tennessee Valley Authority or MCWA wartime activities. A final member was Robert L. Kaiser, an EIS officer in training and the first sacrificed “if this is too rich for ICA’s blood”, an indication the of Donaldson’s vision of this assignment.¹²¹ Indeed, he looked for experienced CDC personnel tied to insecticides and their application rather than younger epidemiology oriented officers. Finally, none were left out as this group traveled to Central America.

The team arrived on November 4th 1959 and spent a month visiting Nicaragua, El Salvador, Guatemala and Costa Rica recommending that further standardized epidemiological and entomological studies be made, advance training be given to local personnel and better coordination be made between spraying operations and disease prevalence. Aside from these conclusions which emphasized epidemiology and entomology (incidentally areas of CDC expertise), and not uncharacteristically, political elements were left out of the final report. However, the significance of this mission derives from the expectations of CDC leadership. In a confidential letter to Herbert Schoof, Alan Donaldson congratulated him on the work done and also inquired on the prospects of offering similar services to the ICA. The Assistant Chief explained: “Quite apart from the technical aspects involved, I am sure you are aware that we here in the Executive Office, looked upon the recent trip of the team to Central America as a pilot demonstration of a type of service which CDC as an organization [...] might provide on a continuing basis to ICA if mutually agreeable long-term and continuing arrangement for financial support could be negotiated.”¹²² More

¹²¹ Alan W. Donaldson, “Malaria in Nicaragua”, 1959.

¹²² Letter from Alan W. Donaldson to Herbert Schoof, January 4, 1960. Records of the CDC, Bureau of Tropical Diseases, RG 442.74.0610 Box 32, Folder: Nicaragua – 1959, NARA Morrow, Georgia.

specifically, Donaldson sought input on the “worthwhileness (sic)” of the mission, “the need and type” of future CDC for malaria eradication and “the appropriateness and value” of similar CDC field team activities for other international health issues.¹²³

For Schoof, his agency could provide solutions to malaria eradication both in the field and in the offices of international organizations (WHO and ICA). During his evaluation mission in Central America, he noted a lack of experience at country level which “extends into upper levels of international agencies which are responsible for making decisions on program activities” and further adding “This request for a CDC team to assist in Central America is a step forward.”¹²⁴ Furthermore, the CDC could assist ICA operations on team basis by offering technical support to eradication programs but expansion of international health activities (malaria, sanitation, rabies, etc.) in Atlanta might create staffing problems which might be handled with the creation of a “Foreign or International Aid Section.”¹²⁵ Finally, Schoof exposed a fundamental division within CDC activities which might hinder field operations. As exposed above, the TDL conducted research into insecticides and related equipment but had almost no experience in assuming operational leadership in field activities as seen in the case of the Liberian project. Schoof argued: “Unfortunately, personnel trained in the different phases of malaria control procedure is limited in number. I doubt that those individuals primarily concerned with research would look with favor on work of this type as a continuing assignment.”¹²⁶ Therefore, he stressed the necessity of providing experience in international assignments for young CDC members to build up expertise. Only through inclusion of trainees in teams could the Atlanta agency build its operational capabilities in malaria eradication and

¹²³ Letter from Alan W. Donaldson to Herbert Schoof, January 4, 1960.

¹²⁴ Letter from Herbert F. Schoof to Alan W. Donaldson, February 5, 1960. Records of the CDC, Bureau of Tropical Diseases Alan W. Donaldson, RG 442.74.0610 Box 32, Folder: Nicaragua – 1959, NARA Morrow, Georgia.

¹²⁵ Letter from Herbert F. Schoof to Alan W. Donaldson, February 5, 1960.

¹²⁶ Letter from Herbert F. Schoof to Alan W. Donaldson, February 5, 1960.

make to the ICA a credible offer for a long-term collaboration and expansion of CDC international health activities paid for by foreign assistance funds.

5.9 East Pakistan vs. Central America

Importance for the CDC leadership in the mission to Central America and its potential in entering a long-term partnership with the ICA begs the question of why this event attracted more attention than a similar mission a year earlier in East Pakistan. When comparing the profile of team members who went to Asia to control smallpox and cholera with those sent to evaluate malaria eradication in four Latin American countries, it is clear that Alexander Langmuir as Chief Epidemiologist possessed more clout and influence than Hebert Schoof, director of the Biology Section at the TDL. Furthermore, a larger team had accompanied Langmuir (seven members) than Schoof (four member teams). To find an explanation, we must look towards commitments, timing, context and hierarchy.

Building on wartime experience, Rockefeller Foundation interests and United Nations specialized agencies involved (WHO, UNICEF, PASB), malaria eradication had more ties with Washington than with Moscow. Indeed, when considering the diseases involved, the United States had not committed to fighting variola as the Soviet Union did when it suggested its eradication in 1958 at the World Health Assembly. As D.A. Henderson stated, the U.S. owned malaria eradication and the USSR was associated with smallpox eradication.¹²⁷ As exposed above, these institutional ties gradually led to the creation of a malaria bureaucracy within successive U.S. bilateral aid agencies. The expertise developed and concentrated in Savannah and (to a lesser extent) Atlanta was called upon to supplement ICA/USOM efforts, especially as problems encountered in the field

¹²⁷ Interview with D.A. Henderson by Paul O'Grady, July 12, 2008.
<http://globalhealthchronicles.org/smallpox/record/view/pid/emory:16rdc>, accessed June 1st, 2010.

(resistance, operations, data handling, surveillance, etc.) accumulated. Also, the TDL, through its R&D activities, had become important in this big public health endeavour. Thus, a point of entry for malaria existed within the bilateral assistance apparatus which CDC leaders could seek to exploit for expansion into international health activities, which was not the case with smallpox.

Secondly, the difference in character of the missions is another element of explanation. Fundamentally, the assistance mission in East Pakistan was intimately tied to an exceptional situation of an epidemic. Such services offered less opportunity to build a durable program of international health because of the unforeseeable character of smallpox outbreaks. As Langmuir exposed, EIS missions overseas were essentially on ad hoc basis with no differentiation between domestic and international calls for assistance. On the other hand, malaria eradication was envisaged as medium-term commitment on the part of the United States. The foreseeable character of U.S. investments both in terms of funds and personnel made it more attractive for Donaldson to build on malaria instead of smallpox. Estimates predicted that completion of eradication was still years away thus guaranteeing a steady flow of monetary resources from the ICA to the CDC.

Finally, we must look at hierarchy and concentration of personnel. As presented above, Alan Donaldson was more familiar with malaria than with smallpox because of his professional experience, including in overseas contexts. Additionally, in his position of Assistant chief, Donaldson sought to establish close ties with the ICA to facilitate CDC expansion in international health.¹²⁸ The foreign assistance agencies possessed the legal authority to operate abroad, something that the CDC, as a division of the USPHS, lacked. Also, for the CDC, the TDL was an asset both as an argument and as a resource if a long-term contract

¹²⁸ Memo from Glenn S. Usher to Chief, CDC, "Negotiations for continuing arrangement with ICA", with manuscript note by Alan W. Donaldson, November 10, 1959. Records of the CDC, Office of the Chief Files, CDC (Some 1951 but primarily 1959), RG 442.62.A726 Box 2, Folder: Cooperation – International, NARA Morrow, Georgia.

with the ICA was to be negotiated. Indeed, Donaldson could point to Savannah as an increasingly important site for malaria eradication because of its R&D activities. These were crucial to counter developing vector resistance to insecticides and could potentially convince the ICA to call upon the CDC to offer support for programs around the globe. While Schoof acknowledged the reluctance of researchers to take on operational responsibilities, this same personnel could offer training and experience to other CDC members (epidemiologists for instance) unfamiliar with technical aspects of malaria eradication (spraying schedule, insecticide formulations, etc.) Contrastingly, there were no such infrastructures and intellectual resources for smallpox. There were few CDC members who had witnessed the disease firsthand (The Langmuir team in 1958 in East Pakistan and D.A. Henderson in Argentina the year before). Lastly, the United States had not seen a case of smallpox since 1949. Taken as a whole, it becomes clear that malaria offered more opportunities than smallpox to increase CDC presence in bilateral assistance programs.

5.10 Conclusion

The CDC's initial involvement in bilateral assistance and malaria was shaped by lack of expertise in health matters within foreign aid agencies. Exemplified by Justin Andrews's report destined to the Iranian government and the Department of State, the CDC parasitologist readily combined political and epidemiological factors in his encouragement for initiation of malaria control activities in Iran. This type of latitude however disappeared from the CDC's involvement in bilateral aid as the ICA increasingly collaborated with technically-oriented personnel, mainly hailing from the TDL in Savannah. U.S. commitment to eradication, field reports of vector resistance and introduction of new chemicals in the fight against malaria by the TDL explain the emergence of the of ICA-CDC axis of collaboration. In addition to the funding of R&D activities in Savannah, the

bilateral aid agency sought to broaden its reliance on the TDL by proposing operational autonomy in exchange of experts and knowledge. Failed negotiations over a public health program for Liberia highlighted the limits of CDC involvement with the ICA. However, it also revealed to the CDC's leaders possibilities for its international health activities. Indeed, the bilateral assistance agency had not only funds to cover expenses but also had the legal authority to operate overseas. Thus, international public health programs supported by the ICA and oriented towards technical solutions such as the large malaria eradication program or the smaller scale rural Liberian trypanomiasis control program favoured the CDC and the TDL in particular. To some CDC and ICA leaders, the TDL represented a logical locus to build-up international health services and enter in closer cooperation, especially for malaria eradication. As problems mounted in Central America, the ICA and its partner in eradication looked to the CDC to provide clues and answers to salvage failing spraying programs in the region. Dispatch of an evaluation team for the ICA had the potential of becoming a template to channel foreign aid funds from Washington to Atlanta and create a durable pathway into international health. A subtle shift occurred however, while CDC leadership still primarily looked at insecticide experts as their basis for participation, the ICA gradually considered that obstacles to eradication needed an epidemiological solution. The final report shared this conclusion recommending further epidemiological studies in addition to other investigational activities with longstanding association with eradication: entomology, parasitology and sanitary engineering. The changes in these relations as the U.S. entered the 1960s will constitute the next part of this exploration of bilateral health assistance and the CDC.

Chapter 6: Bilateral Foreign Assistance part 2: Malaria, the USAID and Field Epidemiologists (1961-1972)

6.1 Introduction

In the previous chapter, I have begun the examination of the CDC's growing involvement in international health through bilateral development assistance with collaboration with the International Cooperation Administration (ICA) during the 1950s. The public health agency's early participation in bilateral health assistance is marked by a separation of political and technical aspects of international health and concentration of cooperation around insecticides expertise of the Technical Development Laboratories (TDL). As the decade came to a close, the ICA started to look for other types of expertise, especially for its most important health program: malaria eradication. Field epidemiologists joined in to evaluate operations and make recommendations to counteract arising problems in the field. As we have seen, CDC leaders also sought to capitalize on the needs of the ICA to intensify its relationship with the foreign aid agency beyond R&D activities and take a more active part in malaria eradication.

In this chapter, I continue mapping CDC involvement in bilateral health assistance as the United States entered in the 1960s and the United States Agency for International Development (USAID) replaced the ICA. During this new decade, the CDC expanded its activities through bilateral aid as field epidemiologists took a prominent role in USAID programs during the 1960s. The focus will be less on contextual elements explaining the detachment of CDC personnel in specific countries and more on the negotiations at upper level management, the diverging organizational cultures and values in international health, and the relations between the field and headquarters staff of both institutions. In other words, I am exploring the making of international health by looking at what happened in Atlanta and Washington but also in the field.

I demonstrate that the CDC and its partners in the USPHS Office of International Health aimed at taking the lead of U.S. involvement abroad in fighting communicable diseases, especially malaria. However, closer collaboration resulted in increased tension as epidemiologists, at the helm of programs financed by the USAID but implemented by the CDC, adopted a work style based on flexibility, which was at odds with previous international health practices and culture. This was most evident in the malaria eradication program where ICA/USAID had directed operations for nearly ten years during which a 'malaria bureaucracy' established itself in Washington, and USAID field personnel developed particular attitudes and habits towards health work abroad. As malaria eradication programs ran into difficulties, divergent views regarding the objectives of U.S. contributions to this endeavour became all the more apparent as political considerations trumped epidemiological necessities. More generally, I show that the CDC had a poor opinion of its USAID counterpart but at the same time understood that connections with the USAID were necessary in order to provide not only opportunities but also significant monetary resources which allowed it to deploy its personnel in the field. This was true in the cases of the Global Malaria Eradication Program and the Smallpox Eradication and Measles Control Program in West Africa. The 1960s was a decade when the CDC faced limits and learned about the political aspects involved in international health work through bilateral assistance, but the public health agency would nonetheless leave its mark.

This chapter begins with a brief overview of bilateral assistance during the 1960s, starting with the creation of the USAID and a presentation of the tools utilized by the Kennedy administration to project its influence in the developing world. Continuing negotiations over malaria eradication constitutes the next section, as I explore the bureaucratic and policy trajectories leading to the CDC taking over this program. This highlights the manoeuvres of CDC leaders and field teams to emphasize epidemiology and epidemiology-based strategies as solutions to

national eradication programs which were making little progress. This section also demonstrates a shift in the axis of collaboration from the TDL in Savannah to the CDC's Atlanta headquarters. I continue my analysis by focusing on the CDC's expansion into other bilateral aid program, as the USAID entered into new health-related programs. I concentrate on immunization programs for a number of diseases such as polio and measles. This part of the chapter emphasizes the links between domestic activities and international services provided to bilateral aid programs. Additionally, exploration of the upper-level relationships allows comparison between the West African Smallpox Eradication and Measles Control Program and the Global Malaria Eradication Program.

From Atlanta and Washington, I turn to the field to briefly survey how relations between the CDC and the USAID played out in the field as CDC officers assigned in Africa developed strategies to deal with the bilateral assistance agency. I also examine the views of USAID field personnel towards the CDC and its stewardship of the malaria eradication program. The following three sections present elements affecting USAID/CDC collaboration in malaria eradication as both organizations clashed on funding, distribution of resources between countries and programs and the principles guiding development assistance. A final element of discord analyzed is the eradication versus control debate opposing the USAID and the CDC. This chapter ends with the further development of the program in Atlanta and conclusions about the future of malaria eradication published by CDC epidemiologists in 1972 in the first issue of the *International Journal of Epidemiology*.

This detailed analysis shows diverging views and objectives of both agencies in their engagement in international health. From an institutional standpoint, the CDC aimed at using the resources and authority of the USAID to build its international health activities and provide experience to its members. In the field, public health issues (reduction of malaria transmission, immunization, etc.)

were the main focus and an end in itself for CDC field epidemiologists. On the other hand, the USAID only reluctantly delegated responsibility to the CDC in the hope that the political objectives behind malaria eradication could be still realized. For the USAID, recourse to the CDC was a means to save funds and still reap the benefits of eradication despite mounting difficulties. In sum, this chapter demonstrates a variety in points of view on the means to achieve malaria eradication and the ultimate ends of the program, but it also illustrates the limits of international public health work when guided by political calculations.

6.2 Bilateral Assistance: The 1960s

As the Kennedy administration came into office, the structure of bilateral foreign assistance underwent legislative and administrative reforms in the midst of significant efforts to renovate how the U.S. would project its influence in the Third World. Among the measures taken were the creation of the Peace Corps which attracted young Americans interested in volunteer work abroad and the announcement of the Alliance for Progress with Latin American countries aimed at improving relations and countering Cuba's influence in the wake of its Revolution. Peaking these reforms and new programs was the adoption of the Foreign Assistance Act in 1961 which created the U.S. Agency for International Development. This new agency enjoyed greater autonomy from the Department of State, de-emphasized the "trade not aid" focus of the Eisenhower presidency, consolidated all types of foreign assistance (except military) under one roof and emphasized human resources development.¹ USAID policies and forms of

¹ Memo from the Surgeon General (Luther L. Terry), to Secretary HEW (Abraham A. Ribicoff), "Relationship of the Public Health Service, Department of Health, Education and Welfare, with the proposed Agency for International Development", June 30, 1961. Records of the USPHS, Office of International Health, RG 90.130.65.42.2 Box 15, Folder: Coordination, NARA College Park. Michael E. Lantham, *The Right Kind of Revolution. Modernization, Development, and U.S. Foreign Policy from the Cold War to the Present* (Ithaca, NY: Cornell University Press, 2011), p. 42.

assistance were marked by provision of economic and technical aid.² In terms of activities, programs were grouped under five basic categories: food and nutrition, education and human resources, selected development problems, and, from the mid-1960s onward, population planning.³

If the passing of the Foreign Assistance Act and the creation of the USAID did not entail any fundamental changes in the form of aid provided to developing nations, in the early 1960s, the reorganization of the bilateral assistance apparatus preoccupied those responsible for international health activities in the USPHS. In the late 1950s, after years of tensions between the Division of International Health (DIH) and the ICA over policy formulation and human resources recruitment and allocation, a working relationship emerged. In 1961, the USPHS formulated several strategies about personnel utilization and maintaining its role in international health activities to be carried out by the new agency.⁴ Of more immediate concern for the CDC and its participation in bilateral health programs was the fate of the malaria eradication program. As seen in the previous chapters, CDC Assistant director Alan Donaldson had counted upon his agency providing survey teams to ICA-funded programs on a continued contractual basis to expand into international health. This represented a diversification of CDC activities in bilateral health and malaria-related activities beyond training, supplying audiovisual material, and research and development of insecticides. In sum, it would put CDC boots on malarial grounds paid by the ICA.

With the foreign assistance apparatus undergoing an overall reorganization culminating with the creation of the USAID, the status of USPHS/CDC

² Marcos Cueto, "International Health, the Early Cold War and Latin America", *CBHM/BCHM*, Vol. 1, No. 25 (2008), p. 29.

³ David Porter, *U.S. Economic Foreign Aid: A Case Study of the United States Agency for International Development* (New York: Garland Publishing, 1990), p. 73.

⁴ Memo from the Surgeon General (Luther L. Terry) to Secretary HEW (Abraham A. Ribicoff), "Relationship of the Public Health Service, Department of Health, Education and Welfare, with the proposed Agency for International Development", June 30, 1961,

participation in malaria eradication became uncertain. Over the years, the ICA had relied on loaned USPHS personnel (not from the CDC in particular) to assist in program implementation across the globe. If administrative authority and responsibility however remained firmly within the bilateral assistance bureaucracy, the malaria program nonetheless offered possibilities for the USPHS to play a more proactive international role, at least on technical issues. The creation of a new foreign aid agency along with unknown commitments to malaria eradication preoccupied the DIH. “We have no assurance as to the stability of the program nor the future plans of AID in the whole field of malaria eradication” wrote James Watt, head of the DIH.⁵

These concerns were probably well-founded as malaria eradication was a program synonymous with the Eisenhower era. Furthermore, Kennedy publicly showed interest in African affairs during his tenure as Senator and the presidential campaign as colonial tensions mounted in the 1950s: he continually criticized Eisenhower’s African policy, he was appointed as head of the newly created subcommittee on Africa of the Senate Foreign Committee, and referred to Africa 479 times in the three months of his Presidential campaign. As he came into office, Kennedy appointed several influential Liberals to positions related to Africa in the Department of State.⁶ Since its inception, the malaria eradication program had left Africa out because of difficulties to implement spraying strategies and the uncertain success of achieving time-limited elimination of the disease. Therefore, a shift of bilateral health resources and priorities towards the African continent and its newly independent countries was a distinct possibility.⁷

⁵ Memo from James Watt, Chief, DIH, to the Surgeon General, “Malaria Eradication Program Vacancies”, March 6, 1962. Records of the USPHS, Office of International Health, RG 90.130.65.42.2 Box 15, Folder: Diseases, NARA College Park.

⁶ Gerald E. Thomas, “The Black Revolt: The United States and Africa in the 1960s” in Diane B. Kunz (ed.), *The Diplomacy of the Crucial Decade: American Foreign Policy during the 1960s* (New York: Columbia University Press, 1994), p. 325.

⁷ Marco Cueto, *Cold War, Deadly Fevers: Malaria Eradication in Mexico, 1955-1975* (Baltimore: Johns Hopkins University Press, 2007), p. 44.

Surprisingly however, it appears that the Chief of the DIH was misinformed of the new Administration's intentions for malaria eradication in particular. In March 1961, Kennedy had announced the Alliance for Progress, a massive assistance program destined to Latin American countries to "accelerate economic growth and social progress."⁸ The Charter of Punta del Este, which launched the program, referred to the improvement of health and specifically to malaria "for which effective techniques are known."⁹ What remained unknown was whether U.S. participation would be made through bilateral assistance or channelled primarily through multilateral organizations such as the WHO or the PAHO.

What further complicated the USPHS' position in regards to the future of the program and its participation were pressures on the part of the USAID for additional personnel to staff its malaria eradication activities. With no guarantees of the program still being on USAID's agenda, USPHS leaders found that personnel recruitment and assignment responsibilities had become "unrealistic." Protection of its investments in light of unclear commitment to malaria eradication on the part of the development agency prompted action on the part of the DIH. Its leadership took upon itself to prepare a counterproposal which would alter the balance of power between the USAID and the USPHS. James Watt explained: "The counterproposal, in brief, is that the PHS offer to negotiate with AID for *full authority and responsibility* for the AID component of the world-wide malaria eradication program."¹⁰ At this point however, no

⁸ William O. Walker III, "Mixing the Sweet with the Sour: Kennedy, Johnson, and Latin America" in Diane B. Kunz (ed.), *The Diplomacy of the Crucial Decade: American Foreign Policy during the 1960s* (New York: Columbia University Press, 1994), p. 50-51.

⁹ *The Charter of Punta del Este, Establishing the Alliance for Progress with the Framework of Operation Pan America*, August 17, 1961, Yale Law School, Lillian Goldman Law Library, The Avalon Project: Documents in Law, History and Diplomacy, http://avalon.law.yale.edu/20th_century/intam16.asp, accessed June 29, 2011.

¹⁰ Memo from James Watt, Chief, DIH, to the Surgeon General, "Malaria Eradication Program Vacancies", March 6, 1962. Emphasis added.

comments specified whether the CDC should be the organization taking over this important program.

6.3 USAID, USPHS and the MEP

The DIH was not the only agency forced to take action on malaria eradication. The USAID also needed to evaluate its participation in light of three considerations: the U.S. government commitment to world-wide eradication, a Congressional mandate to increase recourse to domestic agencies for international programs, and finally the DIH proposal to transfer operations to the USPHS. Despite those elements, the USAID malaria bureaucracy remained unconvinced about delegating authority to another agency. Explaining this reluctance is a persistent deep faith in their potential windfall: “The [Malaria] Committee believes that the malaria eradication program could be one of AID’s greatest successes. It also recognizes that further improvement can be made in the program and that, given increased administrative support, it could be carried forward with greater effectiveness within AID.”¹¹ Accordingly, the Committee charting the future of USAID involvement in the malaria eradication program recommended maintaining a central staff in Washington to carry out policy-making, coordinate efforts on the ground and continue administering the program as a whole. Furthermore, it closed the door on sharing or delegating authority as this would infringe on political and economic grounds: “AID should

¹¹ Action memorandum from Malaria Program Committee, to the Administrator, “To review AID management eradication program”, Attachment I, May 3, 1963. Records of the CDC, Office of the Chief Files 1963-64, RG 442.66.A813 Box 4, Folder: Cooperation 2-2 AID, NARA Morrow, Georgia. In reviewing its previous efforts, it seems that USAID forgot (or was unaware of) the political justifications of malaria eradication as clearly exposed by Justin Andrews in the Iranian case: “In view of the history of malaria eradication efforts, it may be reasoned that the program is not an integral part of our country assistance strategy. Congressional history would indicate that the program was undertaken more in a “humanitarian” spirit *without the political repercussions or benefits*. If this is so, then proposals as to “what countries should be assisted” could be developed by PHS and approved jointly by State/AID/PHS (and WHO).” Action memorandum from Malaria Program Committee to the Administrator, “To review AID management eradication program”, Attachment II, May 3, 1963, p. 1.

maintain responsibility for the scope and size of malaria eradication program in each country as an element of the over-all economic assistance program.”¹² These recommendations are reminiscent of the division of labour between political and technical issues in health-related bilateral assistance presented in the previous chapter. Some aspects however were designated as potentially transferrable to the USPHS such as technical assistance, training, evaluation and coordination with the WHO/PAHO malaria eradication programs. The USAID Malaria Committee appeared ready to delegate more technical aspect as well as some administrative responsibilities (personnel assignment, commodity procurement, budget formulation, etc.) and to coordinate more closely with the USPHS by means of an interdepartmental committee to centralize planning and define long-range U.S. objectives.¹³

As the USAID and the DIH searched for ways to preserve malaria eradication on the agenda and define their respective roles and responsibilities, the CDC remained in the dark as to the final outcome of these negotiations. CDC Assistant Chief Donaldson confided to a USAID official: “The ultimate role of the PHS in global eradication of malaria remains to be determined – and this decision will not be forthcoming soon. There are a lot of wheels turning[.]”¹⁴ In this fluid context, evaluation of USAID-supported programs remained a niche for CDC personnel in bilateral assistance. Based upon the conclusions of the Malaria Eradication Committee and prior experience, the USAID made overtures to an increased CDC participation in malaria eradication. The bilateral assistance agency now proposed that the CDC take over responsibilities for evaluations of various national programs. Furthermore, the USAID retained the same model of

¹² Action memorandum from Malaria Program Committee to the Administrator, “To review AID management eradication program”, May 3, 1963.

¹³ The proposed committee would include representatives from USAID, USPHS, Department of State/International Organizations, Department of Agriculture and the Department of Defence. Action memorandum from Malaria Program Committee to the Administrator, “To review AID management eradication program”, May 3, 1963.

¹⁴ Letter from Alan W. Donaldson to Lee Howard, July 26, 1963. Records of the CDC, Office of the Chief Files, RG 442.66.A813 Box 4, Folder: Cooperation 2-2 AID, NARA Morrow, Georgia.

a four member, multi-disciplinary teams and included additional countries such as Iran, Ethiopia, Nepal and India. During these negotiations, the CDC agreed to establish a pool of people from different branches (epidemiology, entomology, operations, administration and laboratory) from which eventual team members would be recruited.¹⁵ By September 1963, plans for a CDC-USAID collaboration focusing on the supply of evaluation teams to assess and make recommendations of country programs were progressing rapidly.¹⁶

Aside from recommendations from the USAID's Malaria Committee, it appears that ever mounting problems in the field contributed to secure a role for the CDC in epidemiology-focused evaluation teams. For instance, the CDC detailed an officer to a multinational team in the summer of 1963 to assess the National Malaria Eradication Project of Thailand as it switched from control activities to eradication operations.¹⁷ Of more immediate concern to the USAID and more impactful on the CDC was the situation in Central America. As the situation remained troubled in the four countries visited in 1959 (Guatemala, El Salvador, Nicaragua and Honduras), the USAID needed expertise to evaluate the progression of eradication activities and also needed recommendations on a whole range of issues: administration, operations, funding, research, etc. In

¹⁵ Author unknown (presumably Alan W. Donaldson), manuscript notes, not dated. Attached to letter from Edward O'Rourke to Dr. James Watt, August 19, 1963. Records of the CDC, Laboratory Branch – General Files, RG 442.67.A311 Box 2, Folder: Cooperation – Foreign Governments 1963-64, NARA Morrow, Georgia. Among the pool of CDC personnel were Donald Millar, Philip Brachman, Don Schilessman, D.A. Henderson, David Sencer and Marion Brooke.

¹⁶ Letter from Alan W. Donaldson to Roy Fritz (Division of Malaria Eradication, WHO), September 16, 1963. Records of the CDC, Office of the Chief Files, 1963-64, RG 442.66.A813 Box 4, Folder: 2-5 Cooperation World Health Organization, NARA Morrow, Georgia. Prior to his posting at WHO, Roy Fritz was director of malaria eradication activities at USAID.

¹⁷ Lee M. Howard, John W. McDowell, Richard F. Peters and B.A. Rao, *Report of an Assessment of the National Malaria Eradication Project of Thailand*, June-July 1963. Records of the CDC, Office of the Chief Files, 1963-64, RG 442.66.A813 Box 4, Folder: Cooperation 2-3 Foreign Governments, NARA Morrow, Georgia.

1963, as was the case four years earlier, resolving this problem was a matter of urgency.¹⁸

The role of epidemiologists was to be central. Assessments of the program in Central America made by the USAID pointed to inadequate epidemiological studies and the necessity to clearly delineate areas under intensive spraying operations (attack phase) from those under surveillance (treatment of clinical cases). For the USAID, this had financial consequences as its responsibilities were limited to funding the expensive attack phase while the surveillance activities of subsequent phases fell under the host country's authority.¹⁹ Epidemiologists from the CDC could provide a clearer and more precise map of malaria to identify "hard core foci" and "fringe and doubtful areas of transmission" effectively leading to a reduction of USAID's financial burden in countries under investigations. Additionally, the development agency and local governments felt the increase in expenditures resulting from persisting malaria transmission. For the USAID, these augmentations in costs went against the original justification of U.S. involvement in this endeavour since it was "anticipated that the expenses of the campaign would decline sharply and the need for international and bilateral assistance reduced substantially or even dispensed with completely. This has not been the case."²⁰ Similarly, the USAID noted growing impatience and disillusionment on the part of Latin American governments as the expected

¹⁸ Letter from Edward O'Rourke (Deputy Director, Health Services, Office of Human Resources and Social Development) to Dr. James Watt, August 19, 1963. Records of the CDC, Office of the Chief Files, 1963-64, RG 442.66.A813 Box 4, Folder: Cooperation 2-2 AID, NARA Morrow, Georgia.

¹⁹ As a reminder, malaria eradication rested upon four phases: preparatory, attack, consolidation and maintenance. Letter from Edward O'Rourke (Deputy Director, Health Services, Office of Human Resources and Social Development) to Dr. James Watt, August 19, 1963. Records of the CDC, Laboratory Branch – General Files, RG 442.67.A311 Box 2, Folder: Cooperation – Foreign Governments 1963-64, NARA Morrow, Georgia.

²⁰ USAID, *Some Background Information on Malaria Eradication Programs, Central America*, Document not dated (attached to letter from Edward O'Rourke to Dr. James Watt, August 19, 1963), p. 1. Records of the CDC, Laboratory Branch – General Files, RG 442.67.A311 Box 2, Folder: Cooperation – Foreign Governments 1963-64, NARA Morrow, Georgia.

short-term expenditures of eradication seemed to surpass the perpetual costs of malaria control.²¹

Associated with expenditure issues was the realization that eradication by either exclusive reliance on spraying or through strategies combining residual insecticides and mass chemotherapy as experimented in Nicaragua were failing. As the USAID conceded, “The USAID advisors generally agree that the campaigns in the Central American countries have reached an impasse with no hope of a breakthrough by continuing with present methods and procedures.”²² In addition to reducing USAID expenses, epidemiological and entomological investigations could provide the basis for a modification in strategy resulting from a better knowledge of field conditions. Delimitation of hard core and fringe areas of malaria transmission, suggested USAID officials, had the potential of concentrating efforts in problematic areas. Indeed, adapting strategies to significantly reduce and eliminate areas of persistent transmission could result in the disappearance of malaria in peripheral regions. Moreover, a more selective method offered the opportunity of achieving eradication with smaller budgets. Such a precise method, the USAID acknowledged, necessitated a “high order of epidemiological know-how”, precisely the kind of expertise available in Atlanta.²³

Finally, epidemiological investigations demonstrated to Third World governments that international organizations and USAID, sponsoring eradication, were still active in finding ways to shore up the program and protect prior investments. It became a way to gain precious time as weapons in the fight against malaria to counter accumulating reports of technical obstacles such as insecticide resistance, irritability and modifications in biting habits were losing their potency. As the PAHO noted in its eleventh *Report on the State of Malaria Eradication in the Americas*,

²¹ USAID, *Some Background Information on Malaria Eradication Programs, Central America*, p. 2.

²² USAID, *Some Background Information on Malaria Eradication Programs, Central America*, p.2.

²³ USAID, *Some Background Information on Malaria Eradication Programs, Central America*, p. 3.

While waiting for a perfect new insecticide, or a perfect long-lasting antimalarial drug, these technical problems demand a care selection and usage of all classical anti-malaria methods and a high degree of sophistication in planning and execution than routine operations in the areas where these problems are lacking. Solutions already exist, but *better insecticides* and *better methods* of using existing insecticides are being *intensively sought*.²⁴ While some new chemicals had been developed such as DDVP by the TDL or used in limited areas (malathion for example), these were still being tested in the case of the former or had some serious disadvantages (short-term effects, costs, etc.), despite their effectiveness, in the case of the latter.²⁵

In such a context of traditional insecticides (DDT and dieldrin) losing their effectiveness in some areas and expensive and unproven alternative methods (malathion, larviciding, mass drug therapy), selectiveness in field operations seemed to offer the best way to circumvent the failures of residual spraying. Epidemiological and entomological investigations were the foundations of a strategy resting upon the tailoring of attack procedures to the specificities of each locality and of vector characteristics. In effect, this epidemiological/entomological map of malaria meant continued usage of DDT in areas where it was still effective and application of more expensive methods to areas of continued transmission and existing vector resistance. For the PAHO, the co-sponsor of the CDC team lead by Herbert Schoof in 1959, this strategy increased the complexity of spraying operations and justified “operational

²⁴ PAHO, *Report on the State of Malaria Eradication in the Americas. XI Report*, August 8, 1963, p. 5. Records of the CDC, Bureau of Tropical Diseases, RG 442.74.A610 Box 52, Folder: Cooperation 2-5, Malaria Eradication (WHO) CY 1963, NARA Morrow, Georgia. Emphasis added.

²⁵ In the case of DDVP, it was undergoing extensive field trials in Upper Volta since 1960 and Haiti since 1962 to assess its effectiveness against malaria and other disease vectors. These were conducted by CDC personnel of the TDL under a R&D contract with USAID.

research in order to ascertain the cheapest and best way to select, plan and execute the relatively expensive selective measures.”²⁶

The tailoring of insecticides and methods to meet the epidemiological realities of malaria in specific areas was not an entirely new proposition. Rather, detailed investigations represented a “return to old-fashion malariology.”²⁷ For Donaldson, such a strategy should be promoted by the U.S. and international organizations dictating the implementation of malaria eradication. Furthermore, “old-fashion malariology” offered a means to surmount obstacles in the field: “Special problems have halted eradication efforts, but these could be solved more quickly by careful field studies of the ecology and epidemiology of malaria and the application proved effective by operational field research.”²⁸ Stressing epidemiological and ecological studies, as Donaldson suggested, essentially shifted the focus from insecticides effectiveness, spray team performance and R&D to other factors which could explain the failing campaigns in Central America. These types of studies revealed other issues possibly affecting eradication that fell outside of technical innovation activities. For instance, the “Epidemiology Team” approach might reveal the significance of socioeconomic factors such as population movement in border areas, living habits of local populations, alteration of dwellings, cooperation between spray teams and the general population, etc. These teams also included in their evaluations entomological investigations beyond measuring resistance to residual

²⁶ PAHO, *Report on the State of Malaria Eradication in the Americas. XI Report*, August 8, 1963, p. 40.

²⁷ Memo from Alan W. Donaldson, Acting Chief, CDC, to Charles L. Williams Jr., Chief, DIH, “Agenda Items 23 and 27 of XIV Meeting of the Directing Council, VX Meeting of the Regional Committee of the World Health Organization of the Americas”, September 5, 1963. Records of the CDC, Bureau of Tropical Diseases, RG 442.74.A610 Box 52, Folder: Cooperation 2-5, Malaria Eradication (WHO) CY 1963, NARA Morrow, Georgia. Emphasis added.

²⁸ Memo from Alan W. Donaldson, Acting Chief, CDC, to Charles L. Williams Jr., Chief, DIH, “Agenda Items 23 and 27 of XIV Meeting of the Directing Council, VX Meeting of the Regional Committee of the World Health Organization of the Americas”, September 5, 1963. Here Donaldson astutely emphasizes operational field *research* as under the Public Health Service Act, the USPHS was allowed to directly assign personnel overseas for research purposes without doing so under the auspices of other organizations (USAID, WHO, etc.).

insecticides to concentrate on the vector itself: biting and resting habits, relation with outdoor transmission, etc.²⁹ Finally, the epidemiological approach to field activities influenced how Donaldson viewed the eradication activities in the Americas. As he recommended positions to the U.S. delegates at PAHO's annual meeting, Donaldson argued that efforts should be applied in the whole region without regards for national boundaries. While he understood this as a difficult problem to overcome, failures could be attributed in part to the migration of people and mosquitoes from endemic to malaria-free areas and to a general lack of international cooperation.³⁰

By the fall of 1963, Alan Donaldson had positioned the CDC in an advantageous position in regards to malaria eradication and the USAID. As seen in the previous chapter, an axis of collaboration had emerged during the 1950s between the ICA and the TDL mainly around R&D activities in Savannah. By the end of the 1950 and the early 1960s, a second line of cooperation was developing primarily around epidemiological evaluations of USAID-supported programs. In the context of diminishing effectiveness of existing insecticides, intensive research to find new compounds and mounting problems, field-oriented epidemiology, and to a lesser extent entomology, offered ways to implement a new strategy based on selectiveness, tackle questions that insecticide research did not explore and keep eradication operations alive until a technological *deus ex machina* would put the program back on track.

Expansion into evaluation services situated the CDC at both ends of the eradication spectrum. Upstream, its TDL was a major resource in providing new or improved chemicals and spraying equipment; while downstream the CDC

²⁹ USAID, *Some Background Information on Malaria Eradication Programs, Central America*, Document not dated (attached to letter from Edward O'Rourke to Dr. James Watt, August 19, 1963), p. 4.

³⁰ Memo from Alan W. Donaldson, Acting Chief, CDC, to Charles L. Williams Jr., Chief, DIH, "Agenda Items 23 and 27 of XIV Meeting of the Directing Council, VX Meeting of the Regional Committee of the World Health Organization of the Americas", September 5, 1963.

epidemiological teams measured the results of campaigns, investigated failures and obstacles to the ultimate goal of total eradication. It is perhaps paradoxical that one group, epidemiologists, explored the very limits of a campaign based upon residual insecticides by including socioeconomic factors in their evaluation while another group, TDL scientists, sought to revitalize spraying through R&D which excluded those social aspects. Nevertheless, in September 1963 Donaldson summarized the CDC's involvement with the USAID and malaria eradication to a WHO official: "Since my return, I have become involved rather deeply in discussions at the Washington level with PHS and AID personnel regarding utilization of CDC resources on a planned (rather than catch-as-catch-can) basis in the malaria eradication program. At the moment, this related primarily to CDC's providing assistance in the difficult problem of evaluating country programs – progress made, technical and/or administrative problems, and recommendations for change if indicated."³¹ His concluding thoughts foreshadowed future CDC involvement with the USAID and malaria eradication in the last seven years of the program: "This won't always be easy, but in the long run I think the dividends will justify the extra efforts."³² With the CDC successfully expanding its international health activities by providing evaluation services to the USAID and an emerging recognition that epidemiology offered a potential strategy to eliminate residual foci of malaria transmission at a lower cost, basis for greater involvement in the global campaign were in place, provided that the CDC and the USAID forge an agreement deemed acceptable to both parties. Exploration of this process is the focus of the next section.

³¹ Letter from Alan W. Donaldson, Deputy Chief, CDC to Dr. P.M. Kaul, Assistant Director-General, WHO, September 16, 1963. Records of the CDC, RG 442.66.A813 Box 4, Office of the Chief Files 1963-64, Folder: Coordination 2-5 World Health Organization, NARA Morrow, Georgia.

³² Letter from Alan W. Donaldson, Deputy Chief, CDC to Dr. P.M. Kaul, Assistant Director-General, WHO, September 16, 1963.

6.4 Beyond Evaluation: Taking over Malaria Eradication? (1964-1966)

On March 3rd 1966, the USPHS and the USAID signed a *Participating Agency Service Agreement* (PASA) which officialised the transfer to the CDC of almost all aspects of bilateral assistance to malaria eradication programs in 18 countries.³³ This section explores the negotiations and motivations behind the USAID seemingly relinquishing the program and its transfer to Atlanta under the leadership of the CDC. The road which led to this agreement began in 1964 when the USPHS and the CDC defined an ambitious plan to step up their international health activities and concurrently the USAID revised its own role in malaria eradication.

In the international health office of the USPHS, the possibility of extending participation in malaria eradication beyond providing evaluation and R&D services to the USAID by obtaining full administrative control of field implementation became the goals, and the CDC figured squarely within those plans. In the reshuffling of responsibilities put forward, the foreign assistance agency would essentially retain presentation to Congress for appropriations and final approval of budget. A long list of activities targeted for transfer included assisting the USAID in developing country goals for malaria eradication, field project implementation, acquisition of USAID malaria employees and their conversion into CDC employees, recruitment and management of personnel overseas, purchase of commodities and taking over of joint WHO-USAID training facilities (notably the Malaria Eradication Training Center in the Philippines). For the CDC, this would be an important increase in international health activities dwarfing all previous participation in overseas programs. Furthermore, this plan emphasized great autonomy for CDC field personnel as operations were to be directed from Atlanta but nonetheless implicated the USAID in policy guidance of

³³ USAID initially supported 18 programs but reduced this number to 15 countries in the second half of the 1960s.

the program.³⁴ Thus, in this view, the USAID would become a source of funds for the CDC by making available overhead costs to cover field, headquarter and training expenses, reimbursing services rendered and face Congress to defend the program and obtain appropriations. Moreover, it was figured that such as transfer of responsibilities amounted to the termination and abolition of the central Malaria Eradication Branch in Washington and decentralization of points of collaboration to the Regional Bureaus' (Latin America, Africa, etc.) health staff.³⁵ This plan became a basis for negotiation for the USPHS/CDC in wresting leadership for malaria eradication programs from the USAID. By March 1964, this major increase in international health involvement on the part of the USPHS/CDC figured on the horizon. CDC Deputy Chief Alan Donaldson summarized the situation: "No one knows how deeply the USPHS may become involved in the worldwide malaria eradication program – but bets are that it will be more rather than less. So anyone who knows something about it may be in an advantageous spot (or vice versa!)"³⁶

CDC field evaluation teams also participated in the offensive to assume further responsibilities and involvement. As CDC officers returned to Central American countries (El Salvador, Guatemala, and Nicaragua) to measure progress and determine outlooks of national programs between January and March 1964 to provide USAID with a comprehensive assessment, they recommended that "if bilateral support for the program is to be continued, the supporting agency should provide capable technical advisors to review and guide program directors

³⁴ *Possible Arrangements for Greater Coordination between AID and PHS for the World-Wide Malaria Eradication Program*, undated, p. 1. Records of the CDC, RG 442.66.A813 Box 4, Office of the Chief Files 1963-64, Folder: Cooperation 2-2 AID, NARA Morrow, Georgia.

³⁵ *Possible Arrangements for Greater Coordination between AID and PHS for the World-Wide Malaria Eradication Program*, undated, p. 2.

³⁶ Letter from Alan W. Donaldson to Dr. George R. Healy (USAID, Health Services), March 9, 1964. Records of the CDC, RG 442.66.A813 Box 4, Office of the Chief Files 1963-64, Folder: Cooperation 2-2 AID, NARA Morrow, Georgia.

and operations."³⁷ Moreover, CDC officers emphasized the need to continually review epidemiological and entomological data arising from field operations but in the same breath pointed to the lack of qualified personnel in epidemiology to analyze such information. Therefore, steps advantageous for the CDC were suggested as the final report to the PAHO pointed out that: "The present shortage of trained competent epidemiologists requires that either PAHO or the United States assure the supply of the shortfall in this professional category."³⁸ It is clear that the USAID lacked the resources to implement such recommendations and an agreement with an agency possessing this expertise was needed if the U.S. remained committed to the goal of eradication in Central America. As the USPHS was defining an ambitious outline for its participation in bilateral malaria eradication programs and the CDC braced for a major increase in its international health activities, the USAID also began to reassess its own role.

The push on the part of the USPHS/CDC to obtain more responsibilities coincided with the USAID's re-examination of its own position. If a year earlier the Malaria Eradication Committee (Watson Committee) recommended that the USAID retain significant authority and responsibilities to negotiate with host governments for the scope and size of the program and policy-making and suggested contracting out technical assistance, administrative guidance and training (among others) to the USPHS, much hesitancy remained on a number of issues and reasons supporting the transfer of the program. A basic concern emanated from contextual changes during 1963 and 1964. Internal USAID documents state that while the Watson Committee's recommendations were basically sound, "they predated current critical re-analysis of AID program

³⁷ Memo from Lee M. Howard (Chief, TCR/MEB, USAID) to Dr. Philip R. Lee (Director, TCR/HR, USAID) "Central American Malaria Eradication Assessment", April 10, 1964, p. 5. RG 442.66.A813 Box 4, Office of the Chief Files 1963-64, Folder: Cooperation 2-2 AID, NARA Morrow, Georgia. Underlined in the original.

³⁸ Memo from Lee M. Howard (Chief, TCR/MEB, USAID), to Dr. Philip R. Lee (Director, TCR/HR, USAID), "Central American Malaria Eradication Assessment", April 10, 1964, p. 6.

activities in light of Congressional criticism and the President's economy policy."³⁹ USAID administrators were searching for ways to reduce spending which original suggestions to enter in a contract with the USPHS did not offer. Rather, keeping administrative, negotiation and policy-making activities under USAID's roof would increase personnel in Washington and cancel out all savings expected from transferring the program. Consequently, options included turning over the entire malaria program over to the WHO unless "AID [...] wants to be identified with completion of programs in all 18 [...] countries."⁴⁰ However, final recommendations echoed those of the USPHS arguing for the USAID retaining responsibilities in reviewing proposed annual funding and evaluation of overall political and economic implications of malaria eradication programs in host countries and in relation with U.S. contributions to international organizations. Furthermore, malaria eradication as a development program was gradually losing importance and could thus be sacrificed to focus on more important areas. As an USAID official observed: "I believe this is one of the peripheral discreet activities which AID might well contract of in total in order to concentrate on more significant development activities and to save considerable (sic) in staff time."⁴¹ Thus, at the same time that the CDC and the USPHS were making efforts to obtain evermore responsibilities in sustaining U.S. efforts in bilateral support to malaria eradication, the USAID seemed willing to part with this program which

³⁹ It is unclear to what the author referred to when pointing to Congressional criticism but it is plausible that William Hall considered the recommendations of the Humphrey Subcommittee which pushed for a delegation of responsibility from the USAID to domestic agencies. As for Johnson's economic policy, the memo probably refers to the War on Poverty and the Economic Opportunity Act specifically. This was part of Great Society social programs aiming at reducing inequalities and ending poverty in the U.S. Memo from William O. Hall to Dr. John Hillard (USAID), "Response to your Memo of February 10 Re 'Transfer of Responsibilities for the Malaria Eradication Programs from AID to PHS'", March 10, 1964, p. 1. Records of the CDC, RG 442.66.A813 Box 4, Office of the Chief Files 1963-64, Folder: Cooperation 2-2 AID, NARA Morrow, Georgia.

⁴⁰ Memo from William O. Hall to Dr. John Hillard (USAID), "Response to your Memo of February 10 Re 'Transfer of Responsibilities for the Malaria Eradication Programs from AID to PHS'", March 10, 1964, p. 2.

⁴¹ Memo from William O. Hall to Dr. John Hillard (USAID), "Response to your Memo of February 10 Re 'Transfer of Responsibilities for the Malaria Eradication Programs from AID to PHS'", March 10, 1964, p. 3.

faced increasing difficulties in the field. Examination of internal USAID documents reveals that concerns over management, necessity of saving funds in light of Congressional pressure, the CDC's willingness to accept more responsibilities and shifting priorities in international development, in addition to the persistence of malaria where eradication operations had been undertaken, all played a role in launching discussions on transferring the program.

Gradually, the CDC learned through informal channels that the USAID had undertaken intensive studies of the operational and management aspects of the worldwide malaria eradication program. The Watson Committee had invited Donaldson to present CDC capabilities and competencies in epidemiology, entomology and other fields related to eradication. If the CDC remained in the dark as to the details of the recommendations, signs of the USAID reaching out to conclude an agreement, but not at the expense of all activities, were filtering back to Atlanta: "it is our [CDC] understanding that under such an agreement AID would retain a significant degree of authority and responsibility [...], and further that AID would maintain a central staff composed of professional technical and administrative competence."⁴²

By 1965, USAID leadership coalesced around the idea of turning the program over to the CDC as Administrator David E. Bell contacted Surgeon General Luther Terry in August to announce the transfer of malaria eradication to the USPHS/CDC in a context of new policy directives guiding USAID actions in health-related programs. Under a general agreement between the Department of Health Education and Welfare and the USAID, both parties agreed to cooperate in the implementation of all health programs in developing countries, but in fact malaria eradication was the only program delegated to a domestic health

⁴² Manuscript of memo from Deputy Chief, BSS, to Surgeon General, "World-wide Malaria Eradication Program", 1964. RG 442.66.A813 Box 4, Office of the Chief Files 1963-64, Folder: Cooperation 2-2 AID, NARA Morrow, Georgia.

agency.⁴³ For this program in particular, the USAID envisioned a three year collaboration (1966-1969) amounting to \$70 million for 15 countries receiving bilateral assistance. USAID officials estimated that during this period good progress could be made as “eight of the 15 programs now underway are expected to be completed insofar as requirements of A.I.D. assistance are concerned.”⁴⁴

In October 1965, the USAID and the USPHS (on behalf of the CDC) began preparation of a PASA defining the respective roles and authority regarding the transfer of the malaria eradication program.⁴⁵ Sources on these discussions are either unavailable or were destroyed; it is therefore hard to determine whether divergent views plagued the negotiation process. Nevertheless, on March 3rd 1966 the USAID and the USPHS signed the PASA officially designating the CDC as responsible for the implementation and administration of program activities. The CDC also acquired all USAID employees working in malaria eradication and authority to redeploy funds, personnel and commodities with concurrence of AID/Washington and after consultation with affected countries or regional organizations. Furthermore, this agreement obligated the CDC to establish a full-time headquarters staff to “provide overall direction and administration of the program and to maintain continuing liaison with AID.”⁴⁶ While it remains unknown if inter-agency negotiations were contentious, interpretations of the PASA, among other issues explored below, severely afflicted USAID-CDC

⁴³ Interview with David J. Sencer by author, October 26, 2010.

⁴⁴ Letter from David E. Bell to Luther L. Terry, August 18, 1965. Records of the CDC, Bureau of Tropical Diseases – Country Files – 1969-1970, RG 442.74.1370 Box 26, Folder: Background on M.E. Policy Paper 1969, NARA Morrow, Georgia.

⁴⁵ Memorandum for the record by S.W. Simons, “Telephone Conversation with Dr. Lee Howard Re Transfer of Malaria Program to PHS”, October 19, 1965. Records of the CDC, Bureau of Tropical Diseases, RG 442.74.A610 Box 52, Folder: Cooperation 2-2, Federal Government (other than DHEW) CY 1963, NARA Morrow, Georgia.

⁴⁶ *Participating Agency Service Agreement between the Agency for International Development and the Public Health Service, U.S. Department of Health Education, and Welfare for the Administration of the Malaria Eradication Program*, signed March 3, 1966, p. 2. Records of the CDC, Epidemiology Branch – Foreign Quarantine Program Files – Possible Historic Reference, RG 442.72.A2051 Box 1, Red Binder, NARA Morrow, Georgia.

relationships. Before continuing with malaria eradication, the examination of another important program carried through bilateral assistance by the CDC allows to compare and identify similarities and divergences along program lines at both office and field levels.

6.5 Negotiations over Immunization: Child and Maternal Care

As the newly created USAID established its hold over all civilian aspects of foreign assistance to developing countries, new areas of investment appeared on the bilateral aid agenda. Dr Philip R. Lee, USAID's new director of health services, reviewed all types of programs ranging from "impact medical care programs" to longer range assistance in the development of national health plans and medical education. More precisely, he emphasized that during a period of roughly 20 years, U.S. health-related assistance generally focused on public health in various forms: administration, vital statistics, nutrition, environmental health, training, and of course malaria eradication. However, in 1963 a change in priorities was emerging with emphasis being given to problems of maternal and child health, nutrition, health manpower and population. As USAID's Director of Health Services explained, this modification in emphasis was "not yet reflected in the AID-supported programs in individual countries."⁴⁷ Efforts however were taking place to translate these new objectives into actual operations.

For the USAID, increased focus on maternal and child health meant, among other projects, attacking diseases striking younger segments of the population such as polio and measles. For the former, collaboration with the CDC was consequent as Alexander Langmuir and EIS officers had participated in the Francis field trials in 1954, and the agency had traced back an infected batch to the Cutter

⁴⁷ Philip R. Lee, *United States Overseas Assistance in Health Services through the Agency for International Development*, September 6, 1963, p. 2. Records of the CDC, Laboratory Branch – Manuscripts, RG 442.66.A582 Box 2, Folder: Meetings, NARA Morrow, Georgia.

Laboratories after cases of polio following inoculation were reported in 1955.⁴⁸ In the early 1960s, CDC epidemiologists, at the request of the USAID, assisted Jordan, British Guyana and the Dominican Republic in conducting surveys and setting up immunization programs.⁴⁹ As presented in Chapter 3, vaccination against measles was another area of USAID interest. Taking over NIH activities, CDC epidemiologists conducted surveys and explored the feasibility of mass measles immunization in West African countries after a trial campaign in Upper Volta (Burkina Faso).

Involvement in measles vaccination derived not solely from the NIH withdrawing and the USAID difficulties in supporting these programs but also from new domestic responsibilities. In 1962, the CDC acquired an important mandate under the Vaccination Assistance Act. As historian James Colgrove argued, this piece of legislation was crucial as it created a “permanent presence within the CDC that would provide leadership to vaccination” in the United States.⁵⁰ Prior to this, the USPHS considered vaccination programs to be the responsibility of local and State health departments. While measles had been left outside legislation when first passed in 1962, provisions existed to include other diseases. Review of the Vaccination Assistance Act in 1965 brought the topic of mass measles immunization to the fore with hopes of eradicating the disease in the U.S. as the CDC launched such a campaign in 1967.⁵¹ As Colgrove demonstrates, the CDC met considerable obstacles in achieving this result. Nevertheless, as the USAID sought to enlist a partner for its African immunization campaign against measles,

⁴⁸ Elizabeth Etheridge, *Sentinel for Health: A History of the Centers for Disease Control*, (Berkeley: University of California Press, 1992), p.67-80. Paul A. Offit, *The Cutter Incident: How America's First Polio Vaccine Led to the Growing Vaccine Crisis* (New Haven, Conn.: Yale University Press, 2005)

⁴⁹ Memo from Philip R. Lee to James Watt, OIH, “Summary of A.I.D. Agreement with Public Health Service, FY 1965”, August 6, 1964. Records of the CDC, Laboratory Branch – General Files, RG 442.67.A311 Box 2, Folder: Collaboration – Foreign Governments – 1963-1964, NARA Morrow, Georgia.

⁵⁰ James Colgrove, *State of Immunity: The Politics of Vaccination in Twentieth-Century America*, (Berkeley: University of California Press, 2006), p. 146.

⁵¹ For a detailed account of this program and its shortcomings, see James Colgrove, *State of Immunity*, chapter 5.

the CDC was an unavoidable organization because of its domestic experience and role in ensuring the implementation of vaccinations efforts.

Discussions between the CDC and the USAID regarding collaboration in running vaccination programs in Africa met with few obstacles despite differences in the original objectives and diseases targeted. For the USAID, the original aim was measles eradication but it soon learned that this objective was impossible. David Sencer and D.A. Henderson convinced the USAID that measles eradication in West Africa could not be done and that the CDC would not participate in such an effort. This call for assistance became an opportunity for smallpox eradication. The public health agency proposed simultaneous smallpox and measles immunization financed by the USAID under operational leadership of the CDC (Chapter 3). Various accounts of discussions about the West African program and the shape and form of a USAID/CDC collaboration point to the productive negotiations. As David Sencer recalls, USAID's only reaction to inclusion of smallpox and modification of the goal for measles from eradication to control was: "They said ok."⁵² As to the reasons behind this, Sencer points to a different staff in USAID's Washington headquarters charged with immunization programs. Writing to a colleague in 1965, D.A. Henderson evoked a similar atmosphere: "We are presently engaged in rather lengthy discussion with the AID with respect to a coordinated program of smallpox eradication for West Africa. [...] Thus far, the discussions have been quite fruitful and we are all most hopeful that the proposed program will serve in a major way to provide substantial support to WHO eradication scheme."⁵³ When interviewed about these discussions however, Henderson recounted that the USAID rejected the CDC proposal for the West African Smallpox Eradication and Measles Control Program (SMP) and that it was only after being submitted for review at a higher level that the program

⁵² Interview with David J. Sencer by author, October 26 2010.

⁵³ Letter from D.A. Henderson to George I. Lythcott, September 10, 1965. Records of the CDC, Epidemiology Branch – Bacterial Disease Section Correspondence (1961-1965), RG 442.67.A730 Box 4, Folder: Foreign Correspondence – General 1964-65, NARA Morrow, Georgia.

was finally approved.⁵⁴ In any case, readiness of the USAID to collaborate on immunization dissipated earlier fears when the CDC drafted plans to initiate smallpox eradication in South America. As seen previously, D.A. Henderson and other USPHS officials considered the jet injectors trials in Brazil as a first step to initiate a hemispheric eradication program but legal and policy obstacles stood in the way.

In January 1965, the CDC reluctantly considered cooperating with the bilateral aid agency: "AID could be approached for funding but the administrative difficulties and uncertainties are such that it would be preferable to handle this as a direct operation."⁵⁵ USPHS and CDC officials most likely based their conclusions on the strained relationships surrounding the malaria eradication program and the technical problems affecting the nascent measles immunization campaign in West Africa. The rather smooth (and quick) negotiations over a different public health illustrate that CDC/USAID relationships cannot be considered monolithically. USAID hesitancy, if not outright resistance, to turn over the malaria eradication program to the CDC appears to be absent from the discussions leading to the West African SMP. CDC leaders and officers were however apprehensive in approaching the bilateral aid agency to support the growth of international activities in Atlanta.

During the West African SMP, few issues marred collaboration between CDC headquarters and the USAID Washington office: "At the front office level, we did not have too many problems with USAID. The collaboration was something that we knew about on a day-to-day basis, but it was not something that gave us

⁵⁴ Interview with Donald A. Henderson by author, August 18, 2010.

⁵⁵ Memo from Deputy Chief, Bureau of State Services signed by David J. Sencer, Assistant Surgeon General, to Surgeon General "Smallpox Eradication in the Americas", January 14, 1965. Records of the OASH, Office of International Health, RG 514.130.71.3.3 Box 6, Folder: Diseases Smallpox Eradication in the Americas, NARA College Park. An attached route slip indicates that the document is a rewrite by David Sencer at the request of Paul Q. Peterson, Deputy Chief of the Bureau of State Services to CDC Chief James Goddard.

problems.”⁵⁶ Furthermore, the USAID was primarily interested in measles as this disease matched its new emphasis on child health whereas smallpox immunization was not directly associated with younger segments of the population. The inclusion of a second vaccine into an immunization program in addition to measles shots was thus a small price to pay to secure CDC expertise and leadership in Africa.

Maintaining cooperation required time and efforts. Don Millar, director of the SMP, understood this aspect: “The relationships with USAID were absolutely critical. They required daily maintenance because somebody was calling them everyday from Congress.”⁵⁷ Replacing D.A. Henderson who departed for Geneva to head the WHO’s own smallpox eradication program, Millar brought with him the ability to understand USAID rules, restrictions and obligation towards Congress, something that his predecessor was less comfortable with. “I became really sympathetic with USAID and the things they had to cope with” explains Millar. Moreover, he credits some of his USAID counterparts in saving the program from being shut down in the late 1960s.⁵⁸ From 1966 until the early 1970, the CDC had obtained responsibility for two important international health programs through negotiations with the USAID. But how did this play out in the field?

6.6 In the Field

The acquisition of malaria eradication and direct involvement in smallpox eradication share a basic commonality of bringing the CDC and the USAID into closer direct relationship for a longer period of time than previous short-term

⁵⁶ Interview with David J. Sencer by Victoria Harden, July 7, 2006.
<http://globalhealthchronicles.org/smallpox/record/view/pid/emory:15nbq>, accessed June 4, 2009.

⁵⁷ Interview with Don Millar by author, November 17, 2010.

⁵⁸ Interview with Don Millar by author, November 17, 2010.

field assignments.⁵⁹ Obviously, there are basic differences between the SMP and malaria eradication as one program was designed in Atlanta while the other had been implemented since its inception out of the ICA/USAID. In addition to the different organizational origins, there are respective distinctiveness of an immunization program versus a vector eradication program in terms of manpower, operations and characteristics of each disease. In this section, we leave behind the high level discussions to focus on the field interactions between CDC field epidemiologists and USAID representatives.

As the CDC prepared to expand the measles immunization program into a broader operation covering West Africa in 1964-65, officers dispatched on the African continent to survey field situation in each country came into closer contact with USAID field personnel. These CDC epidemiologists reported their impression of USAID staff as they understood that establishing good relationships with the USAID and having good knowledge of individuals assigned to country programs were crucial for the success of the program. Traveling across West and Central Africa to secure commitments of the local authorities and set the stage for the arrival of EIS and operations officers, CDC representatives experienced firsthand how interagency relationships could play out during the SMP. Generally, the first letters from Africa depict either a positive or a neutral image. For instance, Rafe Henderson wrote to D.A. Henderson: "The AID/Mali staff we have so far met have been outstanding. Peter Daniells, head of the AID Mission is particularly impressive. Allison is more directly concerned with us, and is a 26 year old with a law degree doing his first overseas duty – he has been helpful and enthusiastic."⁶⁰ Bob Woodson, another EIS officer, voiced a similar view in Guinea: "I must say I've been most impressed

⁵⁹ Here I am excluding R&D contracts for malaria eradication as this type of activity is removed from the field and USAID expected knowledge and equipment resulting from its investment in the Technical Development Laboratories.

⁶⁰ Letter from Rafe Henderson to D.A. Henderson, October 29, 1965. Box A 2006.025.04, Records of the David J. Sencer CDC Museum, Centers for Disease Control and Prevention, Atlanta, Georgia.

with what I've seen of the AID program here. A rather young fellow, Pete Dickerson, has previously been the main go-between for the measles program and has built up an excellent relationship with the Chef des Grandes Endémies here, Dr. Alecault. His relationship is quite different from that of the other AID people we have met elsewhere, which was distant and formal.”⁶¹ At the other end of the spectrum, other staff stirred very negative reactions. In Benin, Rafe Henderson met with Stanley Clark, a veteran of the Foreign Service, who while being cordial also remained “aloof from real involvement” in the SMP. Rafe Henderson’s poor opinion ran deep:

With Stanley Clark, it is difficult to separate personal feelings from objective evaluation. He is a man who has many years in the foreign service (sic), and who by reputation (borne out of our experience) is a rigid administrator who can follow the book superbly, but who will not stir beyond its bounds. He obviously feels that the measles-smallpox business is our affair and not his, and I’m afraid he will do little to forewarn us of any impending difficulties. He unfortunately possesses a pettiness of character which has earned our personal dislike, and I gather this and past embassies have shared our view. We encountered 2 situations where he attempted to distort matters to make it appear as though we have made an error which he then was obliged to correct. We are afraid that his tendency to aggrandize himself may be a real hinderance (sic) to us.⁶²

Resulting from these survey missions to prepare the SMP were guidelines to define CDC-USAID relations during field operations. The *Manual of Operations*

⁶¹ Letter from Bob Woodson to Dr. MacKenzie and Leo, November 17, 1965. Box A 2006.025.04, Records of the David J. Sencer CDC Museum, Centers for Disease Control and Prevention, Atlanta, Georgia.

⁶² Letter from Rafe Henderson to D.A. Henderson, November 14, 1965. Box A 2006.025.04, Records of the David J. Sencer CDC Museum, Centers for Disease Control and Prevention, Atlanta, Georgia.

reminded CDC officers to keep USAID personnel informed of plans, progress and problems arising during the campaign as “AID officers will be expected to exercise the same degree of surveillance and objective evaluation regarding the measles/smallpox program as over any other AID project.” Therefore, the *Manual* concluded: “Their advice and assistance should be sought as appropriate.”⁶³ Aside from these rudimentary instructions, CDC planners only had few ideas on how to deal with USAID’s administrative structures and policies in the field. Instead of suggesting strategies to resolve administrative problems, the *Manual* instructed CDC officers to communicate with their superiors: “As you encounter and resolve the problems in your respective areas, you should let the Regional Project Office know just how you developed the workable solution. This information can then be disseminated through-out the project area to assist others who face similar situations.”⁶⁴ Thus, rather than provide field epidemiologists and operations officers (USPHS public health advisers responsible for logistics) with comprehensive means to deal with the USAID, the CDC emphasized individual problem-solving: “There is no doubt that when you first report to your post you will encounter a myriad of perplexing administrative problems. Solutions to these problems will depend largely on your own imaginative approach to them.”⁶⁵ David Sencer summarized CDC’s general approach during the SMP: “We had good leadership and our philosophy was to get good people and let them do the work.”⁶⁶

Just as the immunization campaign started, tensions between CDC and USAID field personnel soon emerged. CDC officers chafed under USAID bureaucracy as

⁶³ CDC, *West and Central Manual Smallpox Eradication/Measles Control Program. Manual of Operations*, October 1, 1966.
<http://globalhealthchronicles.org/smallpox/record/view/pid/emory:15j4k>, accessed May 17, 2009, p. II-4.

⁶⁴ CDC, *West and Central Manual Smallpox Eradication/Measles Control Program. Manual of Operations*, October 1, 1966, p. VIII-A-1.

⁶⁵ CDC, *West and Central Manual Smallpox Eradication/Measles Control Program. Manual of Operations*, October 1, 1966, p. VIII-A-1.

⁶⁶ Interview with David J. Sencer by Victory Harden, July 7, 2006, accessed June 4, 2009.

the approach designed in Atlanta created clashes. While CDC staff favoured autonomy and flexibility, USAID personnel was more concerned with administrative details. Bureaucratic procedures hindered field operations and CDC officers found various ways to cope with this situation.⁶⁷ For instance in Upper Volta (Burkina Faso), William White Jr. simply ignored USAID requirements and concerns. As he recalls: “I think the other challenge was being able to deal with USAID infrastructure [...] I generally had a style of ignoring a lot of the paperwork and a lot of things they were concerned about. [...] I didn’t pay a whole lot of attention to the USAID and embassy bureaucracy.”⁶⁸ Another officer, Bob Baldwin, dispatched in Cameroon explains his arrival in a context of political infighting between the USAID and the CDC over which agency received credits for the whole campaign. Too add to this situation, his USAID liaison scrutinized his work: “I had the AID Mission Director, who was really a good guy, but a stickler for detail, and questioning everything that we did.”⁶⁹ In some instances, strained relationships deteriorated to the point of necessitating mediation from SMP leaders. Rafe Henderson has sketchy memories of such an event in Chad involving USAID and CDC staff:

There was something going on with USAID and our staff there that I apparently was trying to mediate. Again, I don’t remember the details of that. I do remember that there was a general problem when we from CDC came into the West African countries, and we were masters of the universe, and there was nobody about to tell us what to do, certainly neither USAID nor the embassy. We had a mission. We were going to get our stuff done.

⁶⁷ John Hopkins, *The Eradication of Smallpox: Organizational Learning and Innovation in International Health*, (Boulder, Colorado: Westview Press: 1989), p. 56.

⁶⁸ Interview with William J. White Jr. by Kata Chillag, July 14, 2006.
<http://globalhealthchronicles.org/smallpox/record/view/pid/emory:1591f>, accessed June 1, 2009.

⁶⁹ Interview with Bob Baldwin by Melissa McSegging Diallo, July 13, 2006.
<http://globalhealthchronicles.org/smallpox/record/view/pid/emory:156mg>, accessed June 1, 2009.

And so that was a general tension that I do recall.⁷⁰

Generalization of relationships in the field however is impossible. In Nigeria for example, William Foege remembers a productive and cordial USAID representative who facilitated immunization operations.⁷¹ However, the focus of CDC epidemiologists was on the diseases and immunization rather than on the administrative concerns of the development agency.

Aside from strains arising from CDC field staff's difficulties in dealing with USAID bureaucracy and administrative procedure, another source of contention was the focus of the campaign. As seen previously, the SMP originates from an ailing measles campaign launched by the USAID. Inclusion of smallpox eradication in the campaign, while readily accepted in Washington, created additional problems and resentment. "It should also be said that the marriage of smallpox and measles was a major barrier between USAID and CDC", recalls Stanley Foster, "USAID felt they had been conned. This was really the basis of the angst between USAID and CDC because essentially USAID paid the bill."⁷² For the USAID, the main concern was measles while smallpox figured higher on the CDC's order of priorities.⁷³ Difference in focus could result in lack of support from USAID country personnel as Jean Roy experienced in Benin: "USAID was not so supportive, but they weren't too keen on the smallpox part, but they were keen on the measles part of the campaign."⁷⁴ As the campaign ended in 1971, smallpox had been eradicated in West Africa and rates of measles had decreased

⁷⁰ Interview with Ralph "Rafe" Henderson by Victoria Harden, July 7, 2006, accessed June 2, 2009.

⁷¹ Interview with William H. Foege by author, September 23, 2011.

⁷² Interview with Stanley O. Foster by Victoria Harden, July 17, 2006.

<http://globalhealthchronicles.org/smallpox/record/view/pid/emory:15nd0>, accessed June 2, 2009.

⁷³ Interview with William H. Foege by Victoria Harden, July 13, 2006.

<http://globalhealthchronicles.org/smallpox/record/view/pid/emory:15jvg>, accessed May 27, 2009.

⁷⁴ Interview with Jean Roy by Victoria Harden, July 13, 2006.

<http://globalhealthchronicles.org/smallpox/record/view/pid/emory:15n9k>, accessed June 4, 2009.

significantly, and in one case (Gambia) vaccination had completely interrupted transmission, despite strained inter-agency collaboration.

If CDC officers engaged in the SMP worked in tense context in regards to CDC/USAID relationship in the field, the situation on the ground in the malaria eradication program was probably worse. In terms of personnel involved, operations during the SMP were carried out by staff recruited specifically for the program with USAID serving (at least on paper) as administrative support. For malaria eradication however, the CDC acquired USAID malaria eradication employees who for almost a decade had develop a certain lifestyle and approach in carrying out international health activities. An aspect readily pointed out were the living conditions of USAID's malaria personnel which enjoyed superior housing and other luxuries far above what any local public health officials could afford. As one informant explained, the U.S. malaria staff assigned overseas "had servants, they had drivers, their recompense was certainly very substantial" and these were advantages "were important to many of them."⁷⁵ Sencer also noted how these living conditions created tensions when the CDC took over the malaria eradication program: "We wanted to bring them home but they fought tooth and nails because living like kings."⁷⁶ In Thailand, for instance, the USAID malaria eradication director enjoyed a "big house, a swimming pool, five or six servants, etc."⁷⁷ These employees lived in compounds separated from the local population and this USAID practice is described by a CDC member as having contributed to the "Ugly American" phenomena.⁷⁸ Comparatively, as the CDC prepared for the

⁷⁵ Interview with anonymous informant by author, November 12, 2010.

⁷⁶ Interview with David J. Sencer by author, October 26, 2010.

⁷⁷ Interview with David J. Sencer by author, October 26, 2010.

⁷⁸ Interview with Don Millar by author, November 17, 2010. Interview with anonymous informant by author, November 12, 2010. A novel published by William J. Lederer and Eugene Burdick in 1958, *The Ugly American* tells the story of the struggle between the U.S. and communist forces in the fictional country of Sarkhan. As the United States is losing influence to the benefit of the Soviet Union, the authors attribute this to the arrogance and insensitivity to local cultures and language of U.S. delegates and advisors in foreign settings. Lederer and Burdick argued for sending foreign aid workers more sensible to local customs and involvement in projects

SMP, officers received cultural training, and for those assigned to former French colonies language courses.⁷⁹ While living conditions of families of SMP workers were similar to those of USAID malaria eradication officers⁸⁰, those responsible for vaccination and logistics had a different experience. Working in Nigeria, William Foege recollects his reality in West Africa: “It’s an interesting experience to live overseas, and many people find it a great experience, because they have servants and they get privileges that they wouldn’t have in the States. We didn’t quite have that experience, having started out in a village, where living was very difficult, and much of your day was consumed in just boiling water. We didn’t have electricity, so we couldn’t even have a fan to help deal with the heat.”⁸¹ Contrasting conditions of USAID and CDC personnel engaged in health work abroad highlights one aspect of the cultural divide between the two organizations when it came to field operations.

As second area of tension revolving around experience and competence emerged as the CDC took over the malaria eradication program. In the field, former USAID employees responded badly to the transfer of the program under

benefiting local populations to counter rising Communist influence in Asia. William J. Lederer and Eugene Burdick, *The Ugly American* (New York: Norton, 1958).

⁷⁹ Interview with Billy G. Griggs by Victoria Harden, July 7, 2006.

<http://globalhealthchronicles.org/smallpox/record/view/pid/emory:15n65>, accessed June 2, 2009.

⁸⁰ Billy Griggs explains that CDC followed embassy regulations on living conditions as it simplified everyday tasks despite opposition on the “Ugly American” grounds: “During the training session, because of the cross-cultural problems they were going to be facing, we tried to give some insight into the things, the do’s and don’ts, or at least, “Think twice before you do it” type things. And I remember very vividly, one of the wives who had been aghast at the thought of having a cook, a nanny for the kids, a gardener, and a night-watch person, and maybe a small boy for the kitchen, depending on how many kids they had. This was the typical number of servants a family would have. She didn’t want that. But when she got to Africa, she was very unhappy because she was in an apartment. (We lived by the ground rules that the American embassy had, that folks with no children and single people were usually put in flats and apartments. If possible, families with children were given a house with a yard.) So when Don [Millar] and I got to Yaounde, this woman was very unhappy because she was in an apartment when other folks had houses. So the uptightness (sic) about the ugly American with hiring the people and going to the market and sending the local hire to the market to buy food and whatnot, and not shopping for themselves, soon became a thing of the past. People realized that they just couldn’t cope with that kind of activity.” Interview with Billy G. Griggs by Victoria Harden, July 7, 2006, accessed June 2, 2009.

⁸¹ Interview with William H. Foege by Victoria Harden, July 13, 2006, accessed May 27, 2009.

the responsibility of newcomers in international health. “They figured we were a bunch of kids that didn’t know what we’re doing”, tells Sencer. “Their attitude was ‘I’ve been working in malaria for 25 years in India and you’re not going to send some young kid in here to tell me what to do.’”⁸² Epidemiologist Robert Scholtens also noted disinclination on the part of the field staff: “I know there was reluctance with the field staff because it was their show. It was their way of life.”⁸³ Moreover, administrative issues (such as delay in payment of salaries) and inclusion of performance evaluation stirred suspicion and discomfort among malaria field staff.⁸⁴ As the three year agreement between the two agencies was nearing its end, malaria field staff had few kind words for their new employer. “A comparison between the AID operation and the NCDC operation of the malaria programs for those of us who served both agencies would place AID in a more favourable light on all counts – administrative and technical – with the one exception of having more NCDC stress on epidemiology” wrote the chief of malaria advisor in Ethiopia, “Frankly, I feel that if a poll were taken today of the overseas NCDC/MP [malaria program] personnel that 75% would vote to return to the AID operation[.]”⁸⁵

If former USAID employees had a poor view of their CDC supervisors, similar opinions also existed in Atlanta. As epidemiologists took leadership of the program, as presented below, criticism over the technical background of ex-USAID specialists surfaced. A shift in the professional background of personnel in malaria programs occurred in the 1960s as staff with a medical background gradually took over entomologists and sanitary engineers in leading operations.⁸⁶ For the CDC staff charged with administering U.S. contributions to malaria

⁸² Interview with David J. Sencer by author, October 26, 2010.

⁸³ Interview with Robert Scholtens, November 11, 2010.

⁸⁴ Interview with anonymous informant, November 12, 2010.

⁸⁵ Letter from Lawrence T. Cowper to Robert E. Kaiser, May 8, 1969. Records of the CDC, Bureau of Tropical Diseases – Country Files – 1969-1970, RG 442.74.1370 Box 26, Folder: Background on M.E. Policy Paper 1969, NARA Morrow, Georgia.

⁸⁶ Interview with Robert G. Scholtens by author, November 11, 2010.

eradication, country programs were staffed by a minority of technically competent personnel and a majority of employees of questionable technical qualifications.⁸⁷ As a whole, field staff either in the malaria eradication program or the SMP had poor views of the USAID and the CDC. Former USAID malaria employees resented progress assessment, the change in lifestyle and the inexperience of their new supervisors entailed by the transfer of the program to Atlanta. CDC officers engaged in measles control and smallpox eradication in West Africa chafed under USAID regulations and bureaucracy seeing these as obstacles to their objectives. Tensions in malaria eradication were not circumscribed to the field as divergence over the direction also affected USAID/CDC relationships in the U.S.

6.7 Cultural Clashes in Malaria (1966-1970)

Acquisition of the malaria eradication program was the most important increase of the CDC's engagement in international health. It represented a challenge not only in terms of making progress in eliminating the disease in the 15 countries receiving bilateral assistance, but also bridged different organizational worldviews and cultures. Obtaining responsibilities for U.S. participation in the largest international health endeavour challenged the CDC, as confided by its Chief: "We are faced with the monumental task of trying to take over the Malaria Eradication Program with all the problems of which I am sure you are well aware", wrote Sencer.⁸⁸ Despite these difficulties, resources from the USAID would fuel organizational growth in Atlanta for its international health activities: "With our taking over the malaria program, we hope to be able to increase both

⁸⁷ Interview with anonymous informant by author, November 12, 2010.

⁸⁸ Letter from David J. Sencer to Edward S.C. Mau (Health Administration Advisor, USAID), April 5, 1966. Records of the CDC, Bureau of Tropical Diseases, RG 442.74.A610 Box 52, Folder: Cooperation, 1 Consultant Services (Except Personnel) CY 1965-66, NARA Morrow, Georgia.

field and headquarter staff.”⁸⁹ This augmentation in staff is reflected in the organizational blueprint designed to manage malaria eradication from Atlanta.

To house malaria eradication in Atlanta, the CDC created an “Operations Branch” grouping an “Office of Branch Chief”, a “Research and Development Section” and finally a “Training Section”. The CDC appointed Robert Kaiser, an epidemiologist who had travelled as a trainee to Central America in 1959 to assess local malaria programs, as chief of this new division to replace Donald Schliessmann who had retired after a year as head of the program.⁹⁰ Three regional evaluation offices (Near East-South Asia-Africa, Far East, and Western Hemisphere) also new creations, became responsible for ongoing assessment to determine progress and or problems with field operations. Furthermore, the CDC established two research stations (in Thailand and Central America) in addition to administering the Malaria Eradication Training Center in Manila in collaboration with the local government and the WHO.⁹¹ In terms of size and scope of growth of international health activities, entrusting leadership to an epidemiologist with a medical background rather than to a representative of the TDL indicates that the CDC focused on problems beyond vector resistance and insecticides to rather place emphasis on evaluating progress and pursue on its earlier recommendations of carefully delineating problem areas and applying selective measures. Thus, a shift that had begun in the late 1950s concerning CDC contributions in bilaterally-assisted eradication programs from research and development to epidemiology as an axis of USAID-CDC collaboration was confirmed with the appointment of Kaiser and Robert Scholtens as Deputy Chief of the malaria eradication branch in Atlanta.

⁸⁹ Letter from David J. Sencer to Edward S.C. Mau (Health Administration Advisor, USAID), April 5, 1966.

⁹⁰ Elizabeth Etheridge, *Sentinel for Health*, p. 181. Although originally trained as a sanitary engineer, Schliessmann was also an EIS graduate of the first cohort in 1951.

⁹¹ CDC, *Malaria and Yellow Fever Eradication Operations Branch*, March 7, 1966. Records of the OASH, Office of International Health, RG 514.130.71.3.7 Box 14, Folder: Diseases Malaria OIH-70, NARA College Park.

The accord which officialised the CDC's entry as a major actor in the largest international health program of 1950s and 1960s also planted the seeds of discord with the USAID. The *PASA* stipulated respective spheres of authority and defined other administrative procedures such as commodity procurement, reimbursement of services rendered and matters related to personnel (payroll, promotions, etc.) Furthermore, USAID requested that the USPHS assume responsibility for the management of the malaria eradication which included all program planning and implementation and coordination with other agencies (WHO, UNICEF, etc.). Still located within USAID prerogatives were matters related to funding and foreign policy. The agreement, as the CDC discovered, did not provide *carte blanche* to implement malaria eradication operations and left the basic structure of USAID system and values untouched. CDC-USAID relationships thus deteriorated over a wide number of issues: interpretations of the *PASA*, a misunderstanding of the structure of bilateral assistance to levels of funding and basic philosophical divergences. The years during which U.S. bilateral assistance to malaria eradication operated out of Atlanta were plagued by difficulties that I will dissect below.

A year after the signature of the *PASA*, CDC leaders complained that while the USAID agreed on paper to relinquish operational and planning aspects of the program, the foreign aid agency effectively retained control on these activities. Among the problems identified figured the lack of a uniform policy, as priority and support for malaria eradication programs varied "largely according to the views of the individual Missions." This affected, Sencer argued, the level of support, numbers and types of U.S. technicians assigned and methods of operations. Furthermore, he deplored the lack of a single point of authority in the USAID to enforce decisions binding all country missions. More broadly, the CDC Chief accused USAID personnel in the field and at headquarters of not accepting the *PASA* "either philosophically or operationally." As he explained to the Surgeon General: "We have assiduously tried to resolve these problems with

the assistance of OIH, but we have reached the point where we believe very strongly that malaria eradication cannot be achieved unless administrative changes are consummated that will give the PHS the essential program authorities and control.”⁹² At the core of these problems, according to the CDC, were four interwoven issues related to USAID bureaucratic procedures and organization, foreign assistance philosophy, conflicting worldviews and fundamental U.S. objectives with regards to malaria.

6.7.1 Funding

A first area of CDC irritation was the amount, the administration and the type of bilateral funds for malaria eradication. As it took over the program, CDC officials discovered that USAID’s bureaucracy did not earmark funds for malaria eradication in its overall budget which hindered planning and implementation. For Sencer, real control of malaria eradication necessitated clear labelling of appropriations: “We believe that this [essential program authorities and control] can be accomplished if funds for the malaria eradication program are clearly identified in the AID budget[.]”⁹³ This complaint resulted from the CDC’s closer involvement with the USAID bureaucracy and distribution of funds at the country level. In administering bilateral assistance, the USAID relied upon Mission Directors assigned to each country. These officials wielded considerable power as they distributed funds between all bilaterally-supported programs. As one ex-USAID malaria worker explained to Robert Kaiser: “In the field, the Mission Director is ‘Boss’ and I mean Boss.”⁹⁴ Having obtained responsibilities in malaria

⁹² Memo from David J. Sencer, Director, NCDC, to the Surgeon General, “Problems requiring resolution for effective PHS administration of the Malaria Eradication Program under the PASA with AID”, February 6, 1967. Records of the CDC, Office of Chief Files 1967-1969, RG 442.71.A831 Box 6, Folder: Diseases and Projects – Malaria Eradication Program, NARA Morrow, Georgia.

⁹³ Memo from David J. Sencer, Director, NCDC, to the Surgeon General, “Problems requiring resolution for effective PHS administration of the Malaria Eradication Program under the PASA with AID”, February 6, 1967.

⁹⁴ Letter from Lawrence T. Cowper to Robert E. Kaiser, May 8, 1969.

eradication formerly carried out in USAID'S Washington Malaria Eradication Branch, CDC officials, presuming central management of the program, were either unaware of lines of authority in bilateral assistance or minimized the influence of Mission Directors on malaria eradication activities. In addition, Mission Directors powers in negotiating the distribution of funds with host countries further complicated matters for CDC implementation. This situation, the CDC argued, created variations between countries that interfered with implementation: "In absence of consistent or uniform AID policy, a report stated, each Mission controls resources sets priorities, and establishes funding levels and policy for support of country program" thus constituting a violation to the transfer of authority for malaria eradication as stipulated in the *PASA*.⁹⁵ Also, the CDC failed to anticipate the competition with other development programs, believing eradication was protected from such considerations. Exposing the CDC viewpoint, the Surgeon General wrote to his USAID counterpart,

Under this [U.S. commitment to malaria eradication] circumstance, it seems to us inappropriate for the funds needed to accomplish the objectives to be placed in competition with other demands for funds at a level different that at which the commitment has been made. Competition for funds there must be, of course, but the competition in the case of a disease eradication program should occur at the Government level where the commitment was made, namely, the U.S. national level. The existing pattern of country Mission

⁹⁵ Memo from Malcolm H. Merrill (Director, Health Services, AID) to William H. Stewart (Surgeon General) through Charles L. Williams Jr. (Director, OIH) "Problems affecting Malaria Eradication *PASA*", March 28, 1967, Attachment #1, p. 1. Records of the OASH, Office of International Health, RG 514.130.71.3.7 Box 14, Folder: Diseases Malaria OIH-70, NARA College Park. ROCAP stands for Regional Office Central America and Panama.

funding makes it difficult to carry out a successful eradication campaign.⁹⁶

By arguing for reservation of funds for malaria eradication, CDC officials sought to circumvent the authority of Mission Directors and effectively centralize all decision making concerning the allocation of funds and their distribution according to the needs of eradication activities specifically of the 15 countries receiving bilateral support and escape competition with other development projects. In other words, the CDC wanted to take the power to make decisions out of the hands of Mission Directors and figuratively take eradication out of international development. In response to these accusations, the USAID simply pointed out that malaria eradication fell under regulations of the Foreign Assistance Act which precluded transfer of control of funds to another agency as cited in the *PASA*.⁹⁷

6.7.2 Manpower

The second complaint related to funding concerned delays in budget approval on the part of the USAID which precluded CDC distribution of funds to the 15 country programs under its responsibility and plan for staffing patterns for future years. According to the CDC, it found itself: “in a most difficult position to make recommendations of FY (fiscal year) 1968 and FY 1969.”⁹⁸ Furthermore, the CDC Malaria Eradication Office argued that budget limitations affected the development of headquarters staff and regional evaluation activities. Soon after signature of the *PASA*, budgets and staffing levels became one the first issue

⁹⁶ Letter from William H. Stewart to William S. Gaud (USAID), May 4, 1967, Records of the OASH, Office of International Health, RG 514.130.71.3.7 Box 14, Folder: Diseases Malaria OIH-70, NARA College Park.

⁹⁷ Memo from Malcolm H. Merrill (Director, Health Services, AID) to William H. Stewart (Surgeon General) through Charles L. Williams Jr. (Director, OIH), “Problems affecting Malaria Eradication *PASA*”, March 28, 1967, Attachment #1, p. 1.

⁹⁸ Memo from Malcolm H. Merrill (Director, Health Services, AID) to William H. Stewart (Surgeon General) through Charles L. Williams Jr. (Director, OIH), “Problems affecting Malaria Eradication *PASA*”, March 28, 1967, Attachment #1, p. 3.

tarnishing USAID-CDC relations. A major difference between the CDC and the USAID emerged in evaluations of manpower necessary to deploy effective eradication strategies. In assuming responsibility of the program, CDC leaders argued that limitations on staff would hurt eradication programs unless to USAID gave in to the CDC's demands and provided double the staff it initially determined.⁹⁹ As it turned over the program to its CDC counterpart, the USAID malaria branch estimated that 61 people were needed to staff the 15 country programs receiving bilateral assistance. A similar exercise conducted by the CDC concluded that 117 malaria related professionals were needed to: "[...] permit the PHS to assume its responsibilities for administration of the Malaria Eradication Program in these countries [India, Central America, ROCAP] consistent with the spirit of the PASA."¹⁰⁰

The USPHS Office of International Health informed, on behalf of the CDC, Lee Howard (USAID director of malaria eradication): "The Public Health Service cannot assume any responsibility or accountability for malaria eradication in the above areas under the restricted conditions imposed by the above USAID Missions."¹⁰¹ In addition to an important difference in field personnel, headquarter staff originally estimated at 12 by the USAID during PASA negotiations leaped to 43 as the CDC took over the program.¹⁰² If the USAID had anticipated savings by transferring the program to Atlanta, CDC manpower needs negated one of the objectives behind relinquishing operational and administrative responsibilities. On the other hand, and as Sencer had predicted,

⁹⁹ Memo from Dr. Charles L. Williams to James Watt, "Summary of meeting with Dr. Lee Howard and Dr. Sencer re 1967 Funding of Malaria Eradication Program", November 25, 1966. Records of the OASH, Office of International Health, RG 514.130.71.3.7 Box 14, Folder: Diseases Malaria OIH-70, NARA College Park.

¹⁰⁰ Letter from Charles L. Williams (OIH) to Lee M. Howard (USAID), November 25, 1966. Records of the OASH, Office of International Health, RG 514.130.71.3.7 Box 14, Folder: Diseases Malaria OIH-70, NARA College Park. ROCAP stands for Regional Office Central America and Panama.

¹⁰¹ Letter from Charles L. Williams (OIH) to Lee M. Howard (USAID), November 25, 1966.

¹⁰² Memo from Malcolm H. Merrill (Director, Health Services, AID) to William H. Stewart (Surgeon General) through Charles L. Williams Jr. (Director, OIH), "Problems affecting Malaria Eradication PASA", March 28, 1967, Attachment #1, p. 7.

acquisition of malaria eradication activities would bolster field and headquarter personnel as the USAID generally accepted the CDC's staffing demands.¹⁰³ To defend itself against criticism of budget limitations and delays, USAID officials pointed to Congress as being responsible for cuts in the foreign aid appropriations, especially for Fiscal Year 1966 (July 1st 1966 to June 20th 1967). The USAID maintained that the CDC failed to fully understand the position of the foreign aid agency in regards to Congress: "AID feels that PHS should distinguish between AID recognition of PHS technical recommendations in future years, in view of present Congressional voting record on AID appropriations."¹⁰⁴ In short, the CDC was simply insensitive, in the USAID's opinion, to political factors influencing bilateral assistance programs.

6.7.3 Self-help

A third area also related to funding and the Mission Director's authority in determining priorities which affected relationships was whether assisted countries received malaria eradication funds through grants or loans. More than simply a matter of type of funding, changes in the nature of assistance revealed basic philosophical divergences on the objectives of malaria eradication and on working atmosphere of CDC personnel assigned to country programs. In March 1967, the CDC argued that the USAID had unilaterally decided to convert grants into loans in a number of countries without consulting the Surgeon General.¹⁰⁵

¹⁰³ In this document, USAID argued that USPHS recommended 248 personnel for malaria eradication and with the bilateral aid agency finally approving 154. It is not clear if this figure included headquarter personnel. Memo from Malcolm H. Merrill (Director, Health Services, AID) to William H. Stewart (Surgeon General) through Charles L. Williams Jr. (Director, OIH), "Problems affecting Malaria Eradication PASA", March 28, 1967, Attachment #1, p. 1, 2, 7.

¹⁰⁴ Memo from Malcolm H. Merrill (Director, Health Services, AID) to William H. Stewart (Surgeon General) through Charles L. Williams Jr. (Director, OIH), "Problems affecting Malaria Eradication PASA", March 28, 1967, Attachment #1, p. 3.

¹⁰⁵ Memo from Malcolm H. Merrill (Director, Health Services, AID) to William H. Stewart (Surgeon General) through Charles L. Williams Jr. (Director, OIH), "Problems affecting Malaria Eradication PASA", March 28, 1967, Attachment #1, p. 3.

As countries needed to approve of staffing levels for malaria eradication submitted by Mission Directors, a switch in the nature of the funding implied that recipient nations were indebting themselves to pay the salaries of U.S. experts. For example in Panama, the President opposed financing the services of a CDC technician with loan funds.¹⁰⁶ Therefore, the CDC found its staffing proposals rejected on the grounds of being too expensive for developing countries. But in addition, this created an uncomfortable working environment as great disparities characterized salaries of U.S. technicians and top-level national personnel resulting in resentment on part of foreign health authorities.¹⁰⁷ Consequently, this resulted in an “Ugly American” phenomenon associated with the bilateral agency which the CDC sought to avoid (albeit not being always possible) in its international health activities as seen above.

More profoundly however, the grant vs. loan debate exposed different objectives in malaria eradication. USAID policy required placing emphasis on loans instead of grants wherever possible according to the self-help principle. Accordingly, the USAID stressed the development of the capabilities to conduct eradication rather than the achievement of this goal. Therefore, officials of the foreign aid agency maintained that the objective of malaria eradication, albeit being supported by international organizations and bilateral agencies, was a collection of national programs. This view was clearly stated by the USAID to CDC’s Chief of malaria eradication: “[Lee Howard] strongly emphasized the fact that malaria eradication is a national responsibility, not an AID or PHS responsibility. In a malaria eradication program, the controlling group is the country itself. The malaria eradication program is not a U.S. program. It is

¹⁰⁶ Telegram, “Malaria Eradication Loan No. 542-L-023”, November 2, 1967. Records of the OASH, Office of International Health, RG 514.130.71.4.1 Box 16, Folder: Diseases Malaria Eradication (Panama), NARA College Park.

¹⁰⁷ CDC, Draft of *Participating Agency Service Agreement between the Agency for International Development and the Public Health Service, U.S. Department of Health, Education and Welfare for the administration of the Malaria Eradication Program*, June 23, 1967, p. 5. Records of the OASH, Office of International Health, RG 514.130.71.3.7 Box 14, Folder: Diseases Malaria OIH-70, NARA College Park.

basically a national program with international help in which the U.S. has a key but not a determinant role.”¹⁰⁸

6.7.4 A Geopolitical vs. an Epidemiological World

In the 1950s, the ICA viewed the eradication programs as a whole with national program essentially linked and having mutual impact as seen by the examination of the consequence of Nicaragua considering abandonment of spraying and fears over its possible regional consequence. During the following decade, the USAID considered failures within national boundaries and affecting populations of those countries, and not on a regional or global scale. This was in line with the self-help approach: “The self-help principle is a basic facet of A.I.D. assistance under the Foreign Assistance Act. In this context the primary responsibility for success in malaria eradication as in the War on Hunger is primarily with the host governments, not with the U.S. government. If some assisted countries fall short of achieving the goals, their people regrettably will face hunger and malnutrition or possibly malaria.”¹⁰⁹ Obligations of the USAID were now to the self-help principle, responsibility on the shoulders of national (developing country) governments and achieving eradication, despite all obstacles and the impact on other health services, a secondary concern. In other words, malaria eradication in the eyes of the USAID was no longer a worldwide program (aside from Africa) but instead one of many development schemes financed by the host countries. Kaiser however differed from this view on U.S. obligations: “We must be aware that our decision to pledge support to these nations enables them to carry out an endeavour which they, without our assistance, would probably not attempt.

¹⁰⁸ Memo for the record by Robert E. Kaiser, “Meeting to discuss revised PASA for Malaria Eradication Program, August 7, 1967”, August 22, 1967, p. 1. Records of the OASH, Office of International Health, RG 514.130.71.3.7 Box 14, Folder: Diseases Malaria OIH-70, NARA College Park.

¹⁰⁹ Letter from William S. Gaud (USAID) to William H. Stewart (Surgeon General), May 26, 1967, p. 1. Records of the OASH, Office of International Health, RG 514.130.71.3.7 Box 14, Folder: Diseases Malaria OIH-70, NARA College Park.

Therefore, we share as partners in their commitment to this goal.”¹¹⁰ But shifting from grants to loans added an additional difficulty by creating difficult working conditions in the field and revealing philosophical divergences.

As the USAID replaced the ICA, budgeting procedures underwent modifications which limited flexible use of funds for malaria eradication. During discussions with his counterpart, Kaiser discovered that specific sums for malaria eradication no longer existed and budgeting for programs was done by generalized items such as technical assistance, capital assistance, etc. for each country and region.¹¹¹ With loans determined for each country and malaria eradication funds diluted into broader budgetary items, the CDC found it impossible to redistribute malaria funds between and within the 15 bilaterally supported countries.¹¹² These limitations hindered the CDC’s strategy resting upon the delineation of areas of sustained transmission and the concentration of efforts in those regions. USAID’s funding structure was thus unresponsive to field situations and affected program planning as the Surgeon General explained: “[...] it should be emphasized that the biological variables necessitate needs for flexibility in deploying or redeploying resources to meet emergency situations affecting transmission of malaria.”¹¹³

In a sense, this was a clash in worldviews. USAID budgeting and financing procedures operated according to nation-states boundaries with sums attributed to each mission with concordance with host governments. Consequently, malaria

¹¹⁰ Memo from Robert E. Kaiser to Director, OIH, “NCDC/MEP View on the Status of U.S.-supported Malaria Eradication Programs”, September 12, 1967, p.2. Records of the OASH, Office of International Health, RG 514.130.71.3.7 Box 14, Folder: Diseases Malaria OIH-70, NARA College Park.

¹¹¹ Memo for the record by Robert E. Kaiser, “Meeting to discuss revised PASA for Malaria Eradication Program, August 7, 1967” August 22, 1967, p. 2.

¹¹² CDC, Draft of *Participating Agency Service Agreement between the Agency for International Development and the Public Health Service, U.S. Department of Health, Education and Welfare for the administration of the Malaria Eradication Program*, June 23, 1967, p. 3-4.

¹¹³ Letter from William H. Stewart to William S. Gaud, March 3, 1967. Records of the OASH, Office of International Health, RG 514.130.71.3.7 Box 14, Folder: Diseases Malaria OIH-70, NARA College Park.

eradication and other development programs competed for funds in geographic areas under the responsibility of Mission Directors. CDC objectives in achieving maximum flexibility in deployment of funds and personnel responded primarily to epidemiological data. Epidemiologists in Atlanta saw the world of malaria according to a different map. When it assumed the program, CDC sought to ‘re-territorialize’ malaria on a map on which limits of areas of transmission were more important than national boundaries. Funds and personnel were to be able to travel from one place to another according to epidemiological factors rather than development priorities in a given nation. In this vision of malaria eradication, resources were to be attributed to problem areas, regardless of national boundaries, and redeployed depending on situations of epidemics or persistent transmission. Obligations were to eradication rather than national governments engaged in this program. In short, the USAID viewed malaria eradication through a geopolitical lens whereas the CDC perceived it through an epidemiological lens.

Addressing these issues became a priority a year after the CDC had obtained the responsibility for the program. Meetings took place in March 1967 to address major issues (seen above) and minor divergences plaguing CDC-USAID relationships.¹¹⁴ As the CDC communicated its viewpoint on *PASA* provisions, the USAID argued that problems resulted from simple misconceptions about the agreement on the part of its public health counterpart.¹¹⁵ In addition, USAID officials regarded the CDC as un-experienced partner when it came to bilateral health assistance: “I recognize that it poses some difficulty for an agency before it acquires the facility and accustoms itself to deal with our system of country-to-country consultation and agreement at the Mission level, particularly if an

¹¹⁴ Other problems raised by CDC covered communication delays and alleged censorship by USAID, coordination with WHO, PAHA and UNICEF.

¹¹⁵ Memo from Malcolm H. Merrill (Director, Health Services, AID) to William H. Stewart (Surgeon General) through Charles L. Williams Jr. (Director, OIH), “Problems affecting Malaria Eradication *PASA*”, March 28, 1967, p. 1.

agency is accustomed to direct operations.”¹¹⁶ Obviously, the USAID believed that the CDC was experiencing a learning curve and would eventually adapt to the existing bilateral aid procedures. On the other hand, Sencer saw the issue of interagency collaboration in a more serious manner: “It is quite obvious that your staff sees the problems in a different light than ours, and I feel that nothing will be gained by further dialogue on the subject. In all fairness, however, I must say that we cannot accept at face value many of the statements made by your staff[.]”¹¹⁷ Both parties agreed on negotiating a revised agreement to clarify responsibilities.

Discussions over operational control of the program and respective spheres of authority unfolded over several months. The CDC discovered that the USAID remained firm in its administration of funds and control of operational aspects. In the summer of 1967, the foreign aid agency changed its position and advocated that it still retained operational control of the malaria eradication program contrary to earlier claims and the provision of the *PASA*.¹¹⁸ This fact was especially apparent in negotiations over USAID management of funds. In a meeting in August 1967, Kaiser failed in convincing the USAID to lump all amounts determined for malaria eradication to facilitate their attribution to the problem. Indeed, USAID Administrator William S. Gaud remained insensitive to the CDC’s pleas: “At various occasions during the discussion, it was repeated that Mr. Gaud, *although he has the legal prerogative to designate the lump sum amount of money available for malaria within AID, would not do so*. It was stated

¹¹⁶ Letter from William S. Gaud (USAID) to William H. Stewart (Surgeon General), May 26, 1967, p. 2.

¹¹⁷ Letter from David J. Sencer to Malcolm H. Merrill (Director, Health Services, AID), March 31, 1967. Records of the CDC, Office of Director Files, 1967-1968, RG 442.71.A831 Box 6, Folder: Programs and Projects - Malaria Eradication Program, NARA Morrow, Georgia.

¹¹⁸ Memo from James F. Kelly (Assistant Secretary, Comptroller) to Mr. Donald F. Simpson (Assistant Secretary for Administration), Mr. Shelton B. Granger (Deputy Assistant for International Affairs), Mr. John H. Kelso (Executive Officer, PHS), “Malaria Eradication and Smallpox Eradication and Measles Control Programs”, July 31, 1967. Records of the OASH, Office of International Health, RG 514.130.71.3.7 Box 14, Folder: Diseases Malaria OIH-70, NARA College Park.

that PHS would have to work within the present system, and that if PHS thought it could not work within this system, PHS should not compromise but go higher than the AID administrator.”¹¹⁹ Furthermore, the foreign aid agency remained unresponsive to CDC concerns over grants/loans. As it faced severe curtailment, Howard informed the CDC that cuts obliged making maximum use of loan funding regardless of impacts on working environment and program planning.¹²⁰

During this time, Robert Kaiser and his colleagues also realized that their USAID counterparts, namely Lee Howard and Mel Griffith, still strived at influencing field operations: “Their was [a] focus of theirs and I know Bob Kaiser recognized [...] was that Lee Howard and Mel Griffith wanted essentially to continue to control the operational and technical aspects of this thing that USAID had been responsible for years. [...] They wanted to have the fig leaf of CDC but they wanted to continue [to control] the program.”¹²¹ Tensions between Howard and Griffith and CDC officials reached a boiling point which prompted action on the part of the USAID which dispatched top-level managers to review this issue. This investigation agreed with the CDC’s contention that the USAID’s malaria staff had undue influence on the program. After this major clash with the foreign aid agency: “it was recognized that USAID had attempted to exercise an inappropriate control over CDC functions. USAID as a result, its influence was attenuated in regards to the technical direction of the program” as a former member of CDC malaria eradication branch explained.¹²² Reassignment of Howard and Griffith to other duties, as the *PASA* neared its termination, did little to improve relationships.

¹¹⁹ Memo for the record by Robert E. Kaiser, “Meeting to discuss revised *PASA* for Malaria Eradication Program, August 7, 1967”, August 22, 1967, p. 2. Emphasis added.

¹²⁰ Letter from Lee M. Howard to James E. Banta (Director, OIH), December 14, 1967. Records of the OASH, Office of International Health, RG 514.130.71.3.7 Box 14, Folder: Diseases Malaria OIH-68, NARA College Park.

¹²¹ Interview with anonymous informant by author, November 12, 2010.

¹²² Interview with anonymous informant by author, November 12, 2010.

6.8 Politics and/of Eradication

More than a year after both parties agreed to revise the interagency agreement, progress remained slow in mending the broken cooperation.¹²³ At the core of this problem lied increasing divergence between foreign policy objectives as viewed by the USAID and the necessities of eradication as understood by the CDC. During the previous decade, malaria eradication and U.S. foreign policy objectives had merged almost seamlessly as investments in combating the disease became a facet of enlisting allies in the Cold War, fighting Communist influence in troubled areas, and showing U.S. goodwill towards developing nations. As seen in the previous chapter, Justin Andrews readily associated tackling malaria in Iran with U.S. and the Shah's political objectives of reducing Tudeh influence in rural areas and encouraging popular support for the reigning monarchy.¹²⁴ With field operations directly conducted by ICA/USAID employees from 1958 to 1966, it appears that tensions between political and public health aspects of malaria eradication were either non-existent or only voiced internally. The USAID staff understood and accepted the various ways through which bilateral assistance was provided and distributed among projects within recipient countries. Transfer of authority from a primarily political organization to a health agency, coupled with mounting obstacles in the field, revealed the inconsistencies in the association of political efforts with eradication activities.

This trend further reinforced as the proposed CDC strategies to manage resources and salvage national programs clashed with the USAID's bureaucratic procedures. If Andrews understood political elements favouring U.S. involvement in malaria eradication, twenty years later CDC officials only gradually realized that the USAID gave predominance to political factors rather

¹²³ Memo from Robert E. Kaiser to Chief Malaria Advisors, "AID-PHS Relationships", May 8, 1969. Records of the CDC, Bureau of Tropical Diseases - Country Files – 1969-1970, RG 442.74.1370 Box 26, Folder: Background on M.E. Policy Paper 1969, NARA Morrow, Georgia.

¹²⁴ For the a broader background of links between the Cold War and malaria eradication, see Marco Cueto, *Cold War, Deadly Fevers*, Chapter 2.

than epidemiological data. In August 1968, discussions on a revised *PASA* had reached a standstill in a context of confusion as to the future of the program: “The apparent lack of resolve of either agency in taking the necessary drastic steps required to correct this poor situation stems, in my opinion, from one simply point: neither AID nor PHS has firmly decided what its own policy is in worldwide malaria eradication.”¹²⁵

Analysis by CDC’s Malaria Eradication Branch exposed basic organizational differences: for the USAID, the program figured among the tools of foreign policy but the agency lacked technical resources for its implementation; for the CDC, malaria eradication was a problem of a mainly technical nature, but it did not have the necessary authority and autonomy to carry out the work in the most efficient manner. The author of this analysis concluded: “Thus NCDC/MEP has to accommodate itself with a mongrel solution which, from the standpoint of efficiency, is bad rather than good.”¹²⁶ This assessment however was rather tame as frustrations with the USAID escalated within CDC’s upper echelons in the following months.

In the closing months of 1968, John R. Bagby Jr. (CDC Deputy Director) summarized all irritants resulting from the CDC obtaining responsibility for malaria eradication. His assessment strongly criticized predominance of foreign policy orientations and the influence of Mission Directors to the detriment of achieving eradication, to which the U.S. was committed since the late 1950s:

[T]he overwhelming preponderance of the difficulty associated with the PHS’s malaria work is the product of AID simply being what

¹²⁵ Memo from Andre J. Lebrun (Assistant Chief, Malaria Eradication Program) to Chief, Malaria Eradication Program, “White House Conference on Worldwide Malaria Eradication”, August 30, 1968. Records of the CDC, Office of Director Files, 1967-1968, RG 442.71.A831 Box 6, Folder: Programs and Projects - Malaria Eradication Program, NARA Morrow, Georgia.

¹²⁶ Memo from Andre J. Lebrun (Assistant Chief, Malaria Eradication Program) to Chief, Malaria Eradication Program, “White House Conference on Worldwide Malaria Eradication”, August 30, 1968.

it is; an organization whose primary goal is political, having pronouncedly committed itself to decentralization of power. In practice this has placed decisions and priorities in the sphere of Mission Directors and support for malaria programs is directly related to the relevant Directors concept of the needs of the countries supporting MEP's. [...] This is not to imply that the AID way of doing business is fundamentally unsound but it is unsuited to the maintenance of sound overseas malaria programs based on projections of longer duration than the usual tenure of Mission Directors and other personnel directly concerned.¹²⁷

Bagby further attacked USAID's commitment to eradication beyond increasing political influence upon recipient countries:

It is evident that AID's prime goal is to produce political leverage for the U.S. and secondarily, *if necessary*, to produce useful work which ameliorates the effects of malaria; the humanitarian aspects and the demonstrable economic benefits of freeing underdeveloped communities from the thrall of malaria are not always remembered. The basic question about AID/PHS malaria relationship is – what is the goal of malaria work overseas? Is it a political one? If NCDC on the other hand does have program responsibility which are not simply supplying technical judgement and technical field personnel to the producer of a political product, then it should play a fundamental role in responding to the following questions

¹²⁷ Draft memo from John R. Bagby Jr. to Dr. Leo Gehrig (Director, OIH), "AID PHS Involvement in Malaria Work", November 15, 1968, p. 1. Records of the CDC, Office of Director Files, 1967-1968, RG 442.71.A831 Box 6, Folder: Programs and Projects - Malaria Eradication Program, NARA Morrow, Georgia.

which have a bearing on policy determination.¹²⁸

In conclusion to his recriminations, Bagby maintained that if his agency was to be engaged in essentially a USAID political program in which foreign policy issues dominated humanitarian and epidemiological aspects, other arrangements needed to be negotiated:

This entire discussion [...] cannot come to a reasonable conclusion, from our point of view, until there is a forthright explanation of the goal of the overseas malaria effort. A more measured appraisal of the evidence of the past two years and a half convinces us that the AID's interest in malaria work will, and perhaps must necessarily, take a back seat to the demands of the larger AID effort in a country – and that the character of the malaria program – under prevailing circumstances – will invariably be determined by AID. If NCDC is being asked to buttress such an AID effort with its technical know-how and to accept responsibility for success or failure, then means other than those presently applied should be used.¹²⁹

When the CDC took over malaria eradication, the agency appeared unprepared to deal with the political aspects of bilateral assistance: “We simply did not understand the culture of organizations such as USAID [which] had been participating in the running of overseas programs and everything that it meant”, explains a CDC member, “I think we were very naïve about that.”¹³⁰ A generation earlier, politics and eradication were mutually reinforcing arguments: foreign policy goals meant supporting eradication in developing countries, and conversely malaria eradication activities bolstered local governments aligned

¹²⁸ Draft memo from John R. Bagby Jr. to Dr. Leo Gehrig (Director, OIH), “AID PHS Involvement in Malaria Work”, November 15, 1968, p. 2. Emphasis added.

¹²⁹ Draft memo from John R. Bagby Jr. to Dr. Leo Gehrig (Director, OIH), “AID PHS Involvement in Malaria Work”, November 15, 1968, p. 10.

¹³⁰ Interview with anonymous informant by author, November 12, 2010.

(aside from India) with the U.S. In the late 1960s, politics and eradication were on a crash course as the CDC argued that policy issues obscured the goal of malaria work abroad and impinged on strategies designed in Atlanta. A final clash further soured USAID/CDC relations: control or eradication.

6.9 Control or Eradication

The issue of control versus eradication divided USAID and CDC staff as field evaluations revealed little progress being made in eliminating areas of sustained transmission. Surprisingly, even though USAID seemed at times unsure as to the goals of eradication (public health or political), it remained committed to the elimination of the disease. By contrast, the CDC argued for a switch to control resulting from its field assessments. It is worth noting, however, that loss of faith in eradication in Atlanta was a gradual process as the main supporter of this goal and architect of CDC involvement in bilateral assistance, Alan Donaldson, believed that technical solutions in the form of new insecticides, improvements of formulations and spraying schedules would overcome problems of “resistance.” In fact, Donaldson doubted such reports: “I have an impression - - perhaps unjustified - - that in certain areas insect resistance may be used as a smoke screen to cover poor administration and execution of the program.”¹³¹ The TDL in Savannah also remained committed to eradication as resources flowed from ICA/USAID and WHO for its R&D activities. Serious questioning of the feasibility of eradication remained absent in evaluation reports conducted by the CDC in the late 1950s as the emphasis was put on epidemiologically informed spraying program, as previously explored.

¹³¹ Letter from Alan W. Donaldson to Justin M. Andrews, October 14, 1959. Records of the CDC, Office of the Chief Files (Some 1951 but primarily 1959), RG 442.62.A726 Box 2, Folder: Diseases - Malaria, NARA Morrow, Georgia.

Genuine doubt about the feasibility of eradication by the CDC personnel occurred in 1964 as teams of epidemiologists returned to Central America to evaluate progress and suggest a course of action. In its report to the USAID, the survey team not only confirmed that spraying of DDT alone or in combination with drug treatments failed to interrupt transmission, a well-established fact by then, but also expressed its doubts to the USAID as to the feasibility of time-limited eradication. Whereas the CDC proposed epidemiologically-informed strategies in 1963, its epidemiologists did not formulate such recommendations in 1964. "The team did not propose specific methods or approaches to the solution of malaria transmission, except in the context of alternatives to goal of eradication", wrote Lee Howard to his USAID superior.¹³² Rather, the CDC suggested abandoning eradication altogether: "The PHS team has proposed the alternative of control as being the most realistic in view of their observation that the three subject countries have (1) inadequate financial resources, (2) serious technical problems, and (3) shortage of qualified key personnel in international organizations."¹³³ However, Howard opposed such a fundamental change in goal: "Within the context of a time-limited objective endorsed by all major governments in Central America, he maintained, the reversion to control would be a tragedy."¹³⁴ In sum, the USAID criticized the CDC team for putting too much emphasis on the negative aspects and adopting a pessimistic stance as to the future of eradication in Central America.¹³⁵ Mosquitoes and failing insecticides contributed little in reaching this conclusion. Rather than pointing to biological obstacles to eradication, CDC evaluators noted the lack of resources both human and financial as stumbling blocks hampering national programs.

¹³² Memo from Lee M. Howard to Phillip R. Lee, "Central American Eradication Assessment", April 10, 1964, p. 2. Records of the CDC, Office of the Chief Files, 1963-64, RG 442.66.A813 Box 4, Folder: Cooperation 2-2 AID, NARA Morrow, Georgia.

¹³³ Memo from Lee M. Howard to Phillip R. Lee, "Central American Eradication Assessment", April 10, 1964, p. 6.

¹³⁴ Memo from Lee M. Howard to Phillip R. Lee, "Central American Eradication Assessment", April 10, 1964, p. 7.

¹³⁵ USAID, *Comments of ME – PAHO*, May 7, 1964, p. 1. Records of the CDC, Office of the Chief Files, 1963-64, RG 442.66.A813 Box 4, Folder: Cooperation 2-2 AID, NARA Morrow, Georgia.

Within the USPHS apparatus also emerged about eradicating malaria. An internal document painted a bleak future for the program and unending increases in costs for the U.S. “In considering world wide (sic) eradication of malaria it seems clear that realization of this goal within the next years is highly unlikely”, the report stated.¹³⁶ Estimation of the costs involved to support programs until achievement of eradication was, at best, pure speculation considering technical, administrative and socio-economic obstacles and inclusion of additional countries and of Africa in this endeavor. In short, even if massive sums were made available, eradication was at best a decade away.¹³⁷ These uncertainties had little influence at the time of the *PASA* signature but eventually resurfaced under CDC’s tenure of malaria eradication.

Soon after obtaining responsibility for the program and although it favored control, the CDC found itself in the position of defending eradication in the context of slow progress towards the ultimate goal. In 1967, Kaiser adopted an optimistic tone: “With presently available techniques, malaria has disappeared from sizable areas of the world; therefore based on this evidence, one cannot conclude that malaria eradication efforts will never be successful in the present U.S.-supported program.”¹³⁸ The CDC also rose to the barricades when a veteran of malaria eradication proposed the elimination of U.S. bilateral support to national campaigns. A former member of the Rockefeller Foundation and collaborator to the PAHO, J. Austin Kerr spent much of his career combating vector borne diseases such as yellow fever and malaria. Over the years, he had defended the concept of eradication while acknowledging the obstacles laying in

¹³⁶ USPHS, *National Goals in the Social Field – International Eradication of Malaria*, 1965, p. 2. Records of the USPHS, Office of International Health, RG 90.130.67.29.5 Box 24, Folder: Diseases – Eradication, NARA College Park.

¹³⁷ USPHS, *National Goals in the Social Field – International Eradication of Malaria*, 1965.

¹³⁸ Memo from Robert E. Kaiser to Director, OIH, “NCDC/MEP View on the Status of U.S.-supported Malaria Eradication Programs”, September 12, 1967, p. 1.

front this objective.¹³⁹ After reviewing malaria eradication programs across the globe, Kerr wrote to the Director of the Bureau of the Budget to suggest abandoning the campaign without much impact on malaria levels in developing nations. In line with increasing evidence from the field, he had few good words, qualifying the global enterprise a “noble experiment” based on inadequate knowledge of vector biology compounded by underestimation of administrative difficulties which could be abandoned without much impact. “My conclusion, then is that malaria eradication is a dead horse”, wrote Kerr, “and that the logical thing to do is to bury it and not waste money any more money and effort trying to beat some life back into it.”¹⁴⁰

As a result of the transfer of responsibility, the USAID delegated the CDC to counter-argue what was its own evaluation as to the future of eradication. Sencer, while acknowledging the multiple hurdles to eradication, warned about the dire consequences for recipient countries: “Rather than being a ‘noble experiment’ [...] malaria eradication is a practical endeavor that has eliminated the disease in many areas of the world and has reduced sickness and death caused by malaria to a fraction of its former incidence.”¹⁴¹ Evidence from India, for example, supported Sencer’s claim of the impact of eradication programs: despite not reaching their ultimate goal, malaria decreased from around 75

¹³⁹ For an examination of Kerr’s early career as a Rockefeller Foundation officer in Brazil and Columbia in the 1930s, see Emilio Quevedo V. *et al.*, “Knowledge and Power: The Asymmetry of Interests of Columbian and Rockefeller Doctors in the Construction of the Concept of ‘Jungle Yellow Fever,’ 1907-1938”, *CBMH/BCHM*, Vol. 25, No. 1 (2008): 71-109. Kerr published mostly on yellow fever but also addressed eradication in J. Austin Kerr, “Lessons to Learn from Failure to Eradicate”, *AJPH*, Vol. 53, No. 1 (January 1963): pp. 27-30. He also edited a selection of papers by Fred Soper: J. Austin Kerr (ed.), *Building the Health Bridge: Selections from the Work of Fred L. Soper*, (Bloomington: Indiana University Press, 1970)

¹⁴⁰ Letter from J. Austin Kerr to Charles J Zwick (Director, Bureau of the Budget), August 1968. Records of the OASH, Office of International Health (Correspondence, 1968-1974), RG 514.130.71.3.7 Box 14, Folder: Diseases Malaria OIH-68, NARA College Park.

¹⁴¹ Memo from David J. Sencer to Director, OIH, “Comments on Dr. J. Austin Kerr’s letter to Charles J. Zwick, Bureau of the Budget”, August 29, 1968, p. 2. Records of the OASH, Office of International Health (Correspondence, 1968-1974), RG 514.130.71.3.7 Box 14, Folder: Diseases Malaria OIH-68, NARA College Park.

millions cases in 1947 to a mere thousand in 1960.¹⁴² He also cautioned that where USAID withdrew its assistance (in Ceylon and Central America), malaria had returned to endemic status. Therefore, concluded Sencer, careful consideration of the effects on both public health and economic development should be given before “taking such a drastic step” of cutting off funding for eradication.¹⁴³

Privately however, Kaiser and Scholtens collided with their USAID counterparts on the control/eradication debate. “It was an issue with a lot of people involved and a great deal of individual pride associated with the programs. [...] It just took an incredible amount of time just to have a credible discussion”, recalls Robert Scholtens, “It was whether one was a true Republican or a true Democrat, or a true ‘eradicationist’ or can we trust you and what you are saying.”¹⁴⁴ As the CDC entered the last year of the *PASA*, Scholtens strongly criticized the continual optimistic view of the prospects for eradication of the USAID exposed in a briefing document noting the great accomplishments following U.S. assistance:

The historical review includes numerous examples of how bad things were until malaria eradication came along and then how good they were. It does not necessarily follow that the good resulted solely from malaria eradication efforts. This fallacy in logic is also employed in this section Program Achievements. It speaks of how Ceylon had an excellent program, lost its AID support, and proceeded to get into considerable difficulty – for which it is duly criticized. On the other hand India, which has continued to receive AID support, has its problems under control and the situation is quite alright. There are

¹⁴² Randall M. Packard, *The Making of a Tropical Disease. A Short History of Malaria*, (Baltimore: Johns Hopkins University Press, 2007), p. 175.

¹⁴³ Memo from David J. Sencer to Director, OIH, “Comments on Dr. J. Austin Kerr’s letter to Charles J. Zwick, Bureau of the Budget”, August 29, 1968, p. 6-7.

¹⁴⁴ Interview with Robert G. Scholtens by author, November 11, 2010

rather simplistic views and not really justified by the facts at hand.¹⁴⁵

USAID representatives however remained deaf to CDC suggestions to reassess the goals of bilateral aid for malaria: “We tried to tell USAID headquarters that it wasn’t working. And they said you are pessimists, this is obviously working.”¹⁴⁶ The CDC exposed its position on eradication in a report on future U.S. policy towards malaria eradication in 1969. This document clearly stated that eradication within a time-limited frame had become unrealistic until technical advances or ecological changes reopened the possibility for an all-out confrontation with the disease. “This means, the report concluded, then, that in many of the present U.S.-assisted programs, the immediate goal of eradication should be changed. It also means that, in many parts of the world, man will have to continue to live with malaria for the near term future, but at less disadvantage than before these programs were initiated.”¹⁴⁷ While drafts of this document had included passages on tensions between the USAID and the CDC, these were removed in the final version of the report. This remained a private matter concerning only involved parties despite affecting CDC’s implementation of a more flexible strategy.

6.10 CDC’s Epitaph to Malaria Eradication

As 1969 began, discussions as to the future of CDC/USAID collaboration clearly pointed to the end of the agreement between both organizations. CDC leadership studied four options for future U.S. involvement in assisted

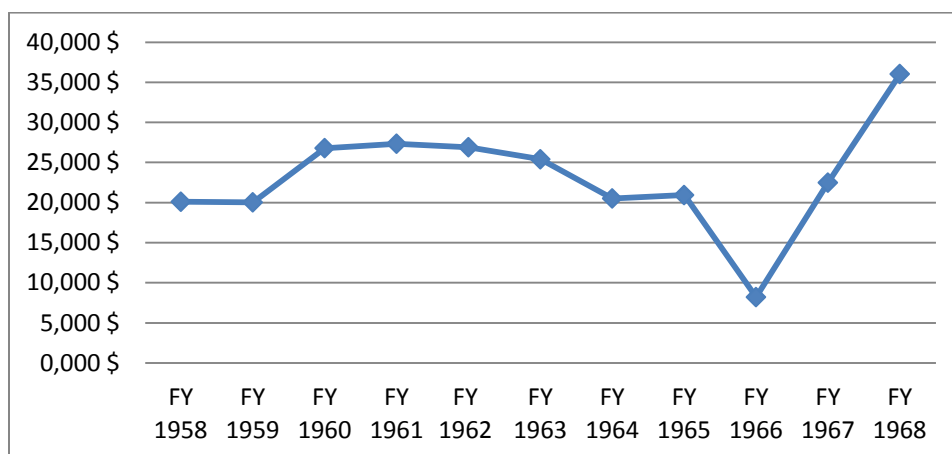
¹⁴⁵ Memo from Robert G. Scholtens to Director, MEP, “Comments on the War on Hunger Briefing Document on the AID Malaria Eradication Program”, September 26, 1969. Records of the CDC, Bureau of Tropical Diseases – Country Files, 1969-1970, RG 442.74.1370 Box 26, Folder: Background on M.E. Policy 1969, NARA Morrow, Georgia.

¹⁴⁶ Interview with David J. Sencer by author, October 26, 2010.

¹⁴⁷ CDC, *Policy Paper for Malaria Eradication*, 1969, p. 2. Records of the CDC, Bureau of Tropical Diseases – Country Files, 1969-1970, RG 442.74.1370 Box 26, Folder: Background on M.E. Policy 1969, NARA Morrow, Georgia.

eradication programs: (I) continue under the existing PASA, (II) return full operational responsibility to USAID, (III) greater decentralization to WHO/PAHO and host countries, (IV) abandon the program altogether. Despite the difficult relationship and divergences between both organizations, Atlanta headquarters favored continuing with option I, provided that the bilateral assistance agency change its methods of operations. This is understandable when considering the important amounts flowing from the USAID to the CDC during the three years covered by the agreement. If not possible, the CDC privileged giving additional responsibilities to the WHO and PAHO rather than return U.S. implementation to USAID.¹⁴⁸ Kaiser also probed field personnel on this question and the few documents available indicate that former USAID employees (now CDC employees) favored either returning under USAID's aegis or mobilizing global resources under multilateral organizations.¹⁴⁹

Chart 6.1: Malaria Eradication Financing in U.S.-Assisted Countries FY1958-1968 (in thousands of dollars)



Source: CDC, *Policy Paper for Malaria Eradication*, 1969

¹⁴⁸ Memo from John R. Bagby Jr. to Director, OIH, "NCDC Comments on 'Briefing Document on the AID Malaria Eradication Program'", May 7, 1969. Records of the CDC, Bureau of Tropical Diseases – Country Files, 1969-1970, RG 442.74.1370 Box 26, Folder: Background on M.E. Policy 1969, NARA Morrow, Georgia.

¹⁴⁹ Letter from Lawrence T. Cowper to Robert E. Kaiser, May 8, 1969. Letter from Dr. Mark S. Beaubien, Chief, PH/ME, to Dr. John E. Kennedy "Personnel Comment on the AID/WHO Malaria Paper", May 20, 1969. Records of the CDC, Bureau of Tropical Diseases – Country Files, 1969-1970, RG 442.74.1370 Box 26, Folder: Background on M.E. Policy 1969, NARA Morrow, Georgia.

With the stated objective of making savings, the bilateral aid agency sought to recuperate control of the program and firmly reinstate political factors and commit to eradication despite all obstacles. CDC's malaria eradication office attempted to contest for the control of the program by questioning assumed economies from transferring back headquarters responsibilities to the USAID, but to no avail.¹⁵⁰ By December 1969, the USAID informed all its field missions of the termination of the *PASA* and the return of malaria eradication headquarters to Washington. It also buried any CDC suggestions to revert to control stating that eradication remained the ultimate goal. Finally, the USAID aimed at bridging the gap between foreign policy/development objectives with eradication which had emerged and criticized by CDC epidemiologists. The USAID was to "maintain the option to support malaria programs which do not currently meet eradication criteria, if the economic, social, or political value of the program merits support."¹⁵¹ Consequently, CDC personnel engaged in the management of the campaign in Atlanta were reassigned and the Office of Malaria Eradication was but a shadow by 1970.¹⁵² This trend was further accelerated as the bilateral aid agency reduced its personnel overseas and assumed a policy of reliance on WHO technical services instead of direct interventions.¹⁵³

Coinciding with the termination of the contract binding the CDC and the USAID came the reassessment of eradication as an ultimate objective by the WHO. In 1969, the World Health Assembly declared that programs should revert to

¹⁵⁰ Memo from Frederick S. Kingma to Dr. Kaiser, "Monetary savings which might be produced by AID's resuming responsibility for Malaria Program operations", August 5, 1969. Records of the CDC, Bureau of Tropical Diseases – Country Files, 1969-1970, RG 442.74.1370 Box 26, Folder: Background on M.E. Policy 1969, NARA Morrow, Georgia.

¹⁵¹ Telegram from AID/W (M.E. Griffith), "AID Policy for Malaria Eradication", December 20, 1969.

¹⁵² Memo from Frederick S. Kingma to Carl S. Crittenden, "Placement of MEP Personnel", January 19, 1970. Records of the CDC, Bureau of Tropical Diseases – Country Files, 1969-1970, RG 442.74.1370 Box 26, Folder: Background on M.E. Policy 1969, NARA Morrow, Georgia.

¹⁵³ Telegram from AID/W, "A.I.D. Policy for Malaria Eradication – Multilateralization of Technical Services", August 8, 1970. Records of the OASH, Office of International Health (Correspondence, 1968-1974), RG 514.130.71.3.7 Box 14, Folder: Diseases Malaria OIH-68, NARA College Park.

control but gave little direction in practical terms.¹⁵⁴ As for the CDC, it continued to review U.S. supported malaria eradication and voice technical suggestions as to the type of insecticides or spraying schedule required to achieve time-limited eradication despite abandonment of eradication by the WHO and national programs.¹⁵⁵ According to Sencer, the USAID was the last of the large sponsor of the global campaign to come around and accept the failure of eradication, thus explaining CDC's compliance with the objectives of the bilateral aid agency.¹⁵⁶ While Kaiser and Scholtens continued to render technical services to the USAID, they also communicated to the epidemiology community the sum of their experience in administering U.S. support to a national program in the first issue of the *International Journal of Epidemiology*. Focusing on the Indian program, the two epidemiologists concluded that while mosquito resistance to DDT developed in some areas and "numerous administrative and operational deficiencies" affected the campaign, these elements were secondary to the competition with other programs: "The problem is one of near-success in an environment with an excess of problems clamoring for attention. As malaria recedes to a low level other pressing health and social problems exert irresistible demands for available resources."¹⁵⁷ The USPHS had complained about competition for funds at the country-level, as seen above, and with the focus on family planning at USAID.¹⁵⁸

In this context of decreasing support for eradication in favor of other programs and persistence of malaria for a number of reasons (political conflict, social

¹⁵⁴ Randall M. Packard, *The Making of a Tropical Disease*, p. 173.

¹⁵⁵ Unfortunately, the USAID Strategy Review Teams reports were destroyed and only 3 were found in the archives concerning Honduras, Costa Rica and Panama. See Records of the OASH, Office of International Health (Correspondence, 1968-1974), RG 514.130.71.4.1 Box 16, Folders: Diseases Malaria Eradication (Honduras), (Costa Rica) and (Panama), NARA College Park.

¹⁵⁶ Interview with David J. Sencer by author, October 26, 2010.

¹⁵⁷ Robert G. Scholtens, Robert E. Kaiser and Alexander D. Langmuir, "An Epidemiologic Examination of the Strategy of Malaria Eradication", *International Journal of Epidemiology*, Vol. 1, No. 1 (1972), p. 20.

¹⁵⁸ Letter from Paul Ehrlich to Leo, document untitled, August 30, 1968. Records of the OASH, Office of International Health (Correspondence, 1968-1974), RG 514.130.71.3.7 Box 14, Folder: Diseases Malaria OIH-68, NARA College Park.

upheavals, lack of sustained efforts, etc.), Scholtens and Kaiser considered the future of the campaign. Their swan song betrayed their training as epidemiologists and what had been the strategy envisioned in Atlanta to rescue ailing eradication. “This (maintaining reduced levels of malaria) will necessitate reorientation of the malaria eradication efforts from that of countrywide comprehensive coverage to more limited epidemiologically oriented programs directed toward the containment of malaria – especially in areas of intense transmission”, proposed the authors.¹⁵⁹ Their conclusion stated a need for considerably more epidemiological knowledge about the disease to develop and apply new antimalaria strategies, but in the meantime, redeployment of eradication services to deliver other needed health measures was the priority. Drawing from their experience in administering bilateral assistance, Kaiser and Scholtens determined, similarly to the WHO, that eradication was in fact a dead horse.

6.11 Conclusion

“They were no success in malaria and we were there to try and pick up the pieces” confided Sencer when asked about the legacy of malaria eradication for the CDC.¹⁶⁰ Such a conclusion on the part of a CDC Chief appointed the same year than the agency obtained malaria eradication is hardly surprising. The main architect behind the CDC obtaining responsibility for the program was Alan Donaldson who had cultivated contacts within the ICA/USAID malaria bureaucracy and lobbied for greater participation, building on research and development in Savannah and evaluation services provided by

¹⁵⁹ Robert G. Scholtens, Robert E. Kaiser and Alexander D. Langmuir, “An Epidemiologic Examination of the Strategy of Malaria Eradication”, p. 23.

¹⁶⁰ Interview with David J. Sencer by author, October 26, 2010.

epidemiologists.¹⁶¹ Furthermore, Sencer is more interested in pointing to the successful smallpox eradication campaign in West Africa, also a result of collaboration with the USAID, than lingering on the dramatic failure of malaria eradication. Concentration of expertise in the South proved insufficient until Congressional pressure to reduce costs and a possible solution to eradication based upon epidemiology offered the promise of achieving this goal convinced USAID to relinquish control of the program. Confiding leadership of malaria eradication to epidemiologists revealed divergences as worldviews collided on administration of funds, allocation of personnel and basic principles guiding U.S. commitment to the elimination of the disease. Clashes also occurred in the field as CDC officers sought to avoid USAID bureaucracy and procedures, while on the other hand USAID employees saw the Atlanta-based agency as an un-experienced newcomer in international health lacking a clear understanding of international development and the basic structure of bilateral assistance. Therefore, involvement in international health through development agencies was more than a simple matter of applying existing knowledge and expertise through the existing bilateral assistance networks. Despite the difficulties, especially in malaria eradication, and to a lesser extent, in the West African Smallpox Eradication and Measles Control Program, the USAID was an unavoidable partner in the construction of international health activities as it provided the funds, the legal authority and the opportunities for the CDC to carve its place on the global scene.

¹⁶¹ Alan W. Donaldson disappears from CDC records around 1966 but is still assistant surgeon general when he is appointed by former USPHS officer Paul Q. Peterson, first dean of the University of Illinois in Chicago School of Public Health, in 1971. Donaldson became the first associate dean and professor of international health. http://www.asph.org/userfiles/UICSPH-History_7.pdf, accessed September 1, 2011.

7. Conclusion

When I started this examination of the CDC's international health activities, my expectations were about finding out more about exotic and strange diseases and following the exploits of a few brave field epidemiologists struggling to contain outbreaks in remote areas of the world. Popular literature starring EIS officers certainly fuelled my view. The sudden apparition of epidemics triggered CDC interventions and these experiences cumulatively led to the public health institution carving its place in the constellation of international health institutions: a sort of pathological determinism that pushed the Atlanta-based agency out of its domestic confines onto the world stage. This, I believed, formed the core upon which the public health agency built its reputation and international health programs. As I learned through my research, the construction of international health in Atlanta happened quite differently. New viruses had little to do with this process. It was rather the existing endemic diseases of the developing world, such as smallpox and malaria, which preoccupied international organizations that provided the building blocks upon which the institution asserted a more prominent international role. However, a story that would single out specific pathologies as determinant factors misses much of the work, opportunities and strategies involved in the development of international health activities in Atlanta and the CDC's engagement with public health problems abroad.

Between 1948 and 1972, the CDC expanded its overseas activities and its relations with major stakeholders and constructed its international credibility. These constitutive years started with the first assignment of a CDC member through bilateral assistance and participation in the scientific committee of the nascent World Health Organization, and ended with the successful eradication of smallpox in West and Central Africa, the modification of the International

Sanitary Regulations guiding the prevention of the global spread of certain infectious diseases and the less than glorious abandonment of malaria eradication. This CDC era roughly coincides with the arrival of Alexander D. Langmuir as Chief epidemiologist in 1949 and his retirement in 1969. The CDC's involvement in these initiatives however resulted from more than the simple application of the expertise available in Atlanta. International health activities at the CDC grew because of both intrinsic and extrinsic factors, covered below, that effectively offered opportunities to deploy personnel overseas. In this institutional emergence, it took more than good science and sound epidemiology; the alignment with key actors of international public health was determinant. This enabled the CDC to deploy its expertise from the U.S. onto the world stage.

The CDC was not a multilateral health organization designed to act and think globally. Nor was it a bilateral aid agency created to further foreign policy goals in various countries. A national health agency such as the CDC faces challenges and obstacles different from those of the aforementioned institutions. By examining the CDC, it became clear that access to developing countries, the crucible of international health, could not be taken for granted. The CDC's leaders deployed strategies and sought to exploit opportunities to transform a still young and peripheral office located away from Washington into a center for applied public health in the U.S. and the world. In this process of affirmation, the creation of the Epidemic Intelligence Service proved determinant in providing an institutional home for field epidemiology and establishing a source of rapidly deployable officers to respond to calls for assistance. These officers became the backbone in the administration and implementation of international programs in the 1960s. Beyond the presence of a certain type of epidemiological expertise in Atlanta, a malleable institutional mission conceptually allowed this agency to envisage an international role for their agency. The polysemy of the motto "we exist to serve the States" enabled those eager to see the CDC expand to assist

foreign states and the federal state in addition to U.S. States. If Justin Andrews, Alexander Langmuir, Alan Donaldson and David Sencer shared an ambition to see the CDC become an international center in the control of communicable diseases, extrinsic factors affected positively and negatively the possibility to achieve this goals.

On the political front, commitment to malaria eradication by Eisenhower and the examination of U.S. participation in international health by the Humphrey Subcommittee proved beneficial to the CDC by creating a demand for insecticide specialists and pressuring technical assistance agencies to make greater use of resources from domestic institutions. On a more general level, the U.S. recognized the value of health in furthering foreign policy goals and bolstering allied governments against communist pressures, and projects in public health became an integral part of development aid and modernization schemes aimed at the Third World. However, battles over the implementation of public health programs and the legal environment erected obstacles to the ambition of an increased international role for the CDC. Consolidation of public health expertise, especially on malaria, under the roof of bilateral aid agencies to the detriment of the U.S. Public Health Service, the CDC's administrative home, led to a decline of influence and effectively closed the possibility for Atlanta to participate in international health program through its parent organization. Additional limits came from the Public Health Service Act (PHSA) which prevented the direct assignment of USPHS officers and management of public health initiatives overseas unless they were related to the protection of the U.S. population. Efforts to remove these legal obstacles in the mid-1960s came to naught, compelling the CDC to rely on what had been its strategy since its inception: simultaneously forging alliances with actors possessing the means, authority and mandate to operate overseas.

Eradication of smallpox in West and Central America figures high among CDC's international achievements, but this represents an end point to a decade-long association between the public health agency and a technology for rapid immunization: jet injectors. Through these devices, the CDC sent field epidemiologists on four continents to test and evaluate the technology for smallpox eradication. What started as a trial in U.S. prisons soon became a means to become involved in vaccination campaigns in Jamaica and in the Tonga Islands. This gave to young field epidemiologists a first taste of international assignments. If this technology opened the doors of these two island nations, it failed in creating opportunities in India. However, under D.A. Henderson, the CDC's Surveillance Section capitalized on emerging interest of the Pan American Health Organization in transforming an innovation into a technological breakthrough. In Brazil, the CDC competed with community-based and traditional vaccination techniques. CDC epidemiologists mobilized the performance categories that highlighted those characteristics that made jet injectors central to any mass immunization campaigns (speed, cost, ease of use and novelty) in order to carve out a place for their agency.

In establishing an association with the jet injection technology, the CDC and Henderson faced legal obstacles and institutional rivals. Whereas D.A. Henderson failed to convince the upper echelons of the USPHS that smallpox eradication in Brazil was a safeguard against the threat of importation in the U.S. (allowing for direct CDC intervention under the PSHA), it was more successful in eliminating a potential rival who also possessed a similar technology. This alliance between the CDC and jet injectors played a key part in USAID's decision to turn to field epidemiologists to salvage a measles campaign in West Africa. As the development agency lacked the expertise to organize and manage an immunization program relying on jet injectors, the CDC stepped in to administer a program spanning over 18 countries. Jet injectors, in conjunction with the Johnson administration's use of technology to meet foreign policy goals,

provided another opportunity for the CDC to return to 'Operation Elephant.' While bifurcated needles replaced the mechanical devices at the end of the 1960s, the CDC had by then established its credentials in eradicating smallpox which facilitated its involvement in the later stages of the campaign in the 1970s.

In its growing involvement in international health, it was inevitable that the CDC would establish ties with the World Health Organization, but until the 1960s relations between the two organizations remained at a relatively low level. Disease surveillance proved to be an area of fruitful collaboration, culminating in the abandonment of quarantine measures in 1969 with the adoption of the new International Health Regulations along the lines of concepts and methods developed by Langmuir. Disease/epidemiological surveillance was already an established function of international health organizations to prevent the spread of disease from colonies to metropolitan countries. Nevertheless, the WHO and British researchers considered the construction of a network of collaborating laboratories as a fundamental element in preventing another deadly influenza pandemic. Concurrent to these European developments, the U.S. had established its own system of monitoring shifts and drifts of influenza strains. Primarily a laboratory-based surveillance system, initial CDC involvement in this worldwide initiative occurred at its Laboratory Branch eventually becoming WHO's International Influenza Reference Center for the Americas as a result of tensions between British and American scientists.

Only peripherally involved in the international surveillance of disease, the Epidemiology Branch took steps in testing their field-based surveillance methods outside the U.S. in East Pakistan in 1958 and in Brazil in 1964-65. In both countries, CDC epidemiologists found few structures and resources to implement disease surveillance. Furthermore, in South America, they found the regional health organization (PAHO) to be rather an ineffective partner in disease surveillance. A growing professional relationship from the mid-1960s between

Karel Raskà, a Czech epidemiologist assigned at the WHO, and the CDC was the determining factor in provoking a rupture in international regime for control of disease.

As I have shown, Raskà had been influenced by “modern concepts” of disease surveillance articulated by Langmuir and sought to enlist the Epidemiology Branch in reforming the International Sanitary Regulations conceived in the 19th century. The Czech epidemiologist became a contact point for Langmuir and his deputy D.A. Henderson within the WHO bureaucracy, giving them an opportunity to promote their candidacy for global endeavours such as smallpox eradication and shape the international health institution into an agent in the strengthening of national surveillance systems. Raskà and Langmuir shared a vision of transforming the WHO into a CDC-type organization which collected and distributed epidemiological information but also acted through providing assistance to member-states. Alignment of the WHO on methods and concepts developed in Atlanta is further confirmed by participation of CDC’s Chief David Sencer in the drafting of the new regulations. What the Epidemiology Branch had been unable to achieve through punctual assistance missions, i.e. inclusion of surveillance in public health practices, became a reality through collaboration with the WHO. Through Geneva, Langmuir successfully vindicated the basic precepts of field epidemiology he had applied in the U.S.

The alliance with bilateral aid agencies was also a vital element in the growth of international health activities in Atlanta. By possessing authority, mandate and funds, these agencies were effective conduits to send CDC members to developing countries, learn about health work abroad and obtaining responsibilities in managing public health programs abroad. As I demonstrated, bilateral assistance agencies were simultaneously associated with foreign policy and humanitarian objectives. The relationship between the CDC and bilateral foreign assistance underwent three phases. In the immediate postwar

environment, the respective roles for development and public health agencies were still fluid. I showed, by close examination of Justin Andrews' mission to Iran in 1948 (CDC's first overseas assignment), that political and epidemiological assessments coexisted. In his report, Andrews openly associated the foreign policy goals of diminishing the influence of the Iranian Communist Party and ensuring the stability of the monarchy with the feasibility of resorting to DDT for malaria control. As the 1950s began, a division of labour between bilateral aid and public health institutions occurred with the former monopolizing political issues associated with development aid and the latter focusing on narrower technical issues.

Rather than limiting possibilities for CDC involvement in international health, this separation of roles favoured greater involvement in international program. This opened a second phase which saw the emergence of an axis of collaboration between the International Cooperation Administration (ICA) and CDC's Technical Development Laboratories (TDL). I have identified three trajectories to explain this unfolding relationship: 1) a shift from malaria control to malaria eradication advocated by leading malariologists and the WHO, 2) the U.S. endorsement of malaria eradication and 3) the development of new insecticides by the TDL, which offered the promise of surmounting problems of vector resistance. While the ICA initially turned to the CDC for research and development, expertise with DDT offered the possibility for the TDL staff to take a more active role in international health in Africa. The examination of negotiations surrounding a project to control sleeping sickness in Liberia in 1957 revealed the limits of translating technical expertise into operational autonomy. While the bilateral aid agency sought TDL expertise with DDT to ensure the success of this public health initiative, ICA managers were unwilling to delegate administrative autonomy to its CDC partner. Another dimension illustrated by the exploration of the Liberian project is the role of DDT in allowing movement from one disease to another. Although the residual insecticide was mainly used for malaria, it offered the

possibility for CDC to address another disease, sleeping sickness, and to set foot in Sub-Saharan Africa. However porous the boundaries between diseases, provided that prevention measures are similar (DDT), administrative obstacles proved more difficult to overcome.

This second phase of CDC-ICA relationships ended with a call for assistance in 1959 to salvage ailing malaria eradication programs in Central America. Deployment of a CDC team in the region happened against a foreign policy backdrop as the second Eisenhower administration aimed at stabilizing the region through support for social welfare programs while maintain U.S. leadership. If the ICA counted upon the CDC to put these campaigns back on rails, this mission was an opportunity for the CDC to demonstrate to the bilateral aid agency what types of services it could provide. However, this experience in Central America revealed the lack of international field experience of the CDC. Association with bilateral assistance would open foreign borders for CDC expertise and personnel and redress this situation. A second facet of this phase was the subtle shift in the locus of international health initiatives at the CDC from the TDL to the Epidemiology Branch, as the axis of collaboration foreign aid agencies.

Coinciding with the creation of the United States Agency for International Development (USAID), the third phase was characterized by field epidemiologists moving to the fore in CDC's involvement in malaria eradication. While the USPHS manoeuvred to obtain, unsuccessfully, full control of U.S. participation in malaria eradication, the CDC carved its niche by providing epidemiological evaluation services to evaluate eradication operations in various countries. On the part of USAID, recourse to CDC's field epidemiologists was motivated by three factors: 1) increased vector resistance, 2) cost reductions and 3) keeping developing countries committed to eradication. CDC evaluations delimited areas where traditional insecticides (DDT and dieldrin) were still effective. As the costs for

eradication continued to mount, more precise epidemiological maps allowed savings by disengaging the USAID from financing the expensive attack phase as countries assumed the costs of the consolidation and maintenance phases. Finally, it demonstrated to nations considering abandoning eradication by residual insecticides that their U.S. backers were active in trying to fix the program.

Closer association between the CDC and the USAID resulted from an accord to turn over operational responsibilities for malaria eradication to the public health agency and delegate authority for the West African Smallpox Eradication and Measles Control Program. Collaboration however proved difficult. As I demonstrated, clashes affected relationships at headquarters and field levels, especially for the malaria program, as field epidemiologists were put in charge of overseeing operations. This was a learning experience for the CDC as it became engaged with international development as practiced by the USAID. Indeed, the public health agency CDC came into contact with the lifestyle and culture of USAID employees assigned to country programs. Furthermore, USAID public health personnel viewed their new CDC superiors as inexperienced and lacking knowledge about the realities of work abroad. At the institutional level, the CDC was increasingly aware that USAID loyalty was to the principle of “self-help” rather than to the elimination of malaria. The diverging goals pursued in malaria eradication by the CDC (disease elimination) and the USAID (development) became incompatible thus plaguing collaboration until the abandonment of the campaign in the early 1970s. Despite all the frustrations and tensions, the alliance with bilateral assistance agencies provided the CDC with access to foreign environments and gave it first hand experience in managing two large-scale international public health programs.

My objective with this thesis was to enrich our understanding of the postwar construction of international health by focusing on a particular type of

institutional actor: the national health agency. I believe this reveals characteristics, issues and problems which are otherwise invisible if we examine other actors such as the World Health Organization. The CDC faced its own obstacles that technical expertise, in this case field epidemiology, could only partly surmount. In their ambition to play an international role, CDC leaders and members forged alliances to gain access to the developing countries where public health programs were being implemented. Finally, I think that the study of these relationships permits a re-examination of particular aspects of certain programs (smallpox eradication through technology, malaria eradication through field epidemiology, etc.) that contributes to a better understanding of their meaning and consequences for other emerging actors of international health such as the CDC from 1948 to 1972.

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