



The Peace Corps' Contributions to the Global Smallpox Eradication Program



Peace Corps

About the Office of Strategic Information, Research, and Planning (OSIRP)

It is the mission of OSIRP to advance evidence-based management at the Peace Corps by guiding agency strategic planning; monitoring and evaluating agency-level performance and programs; conducting research to generate new insights in the fields of international development, cultural exchange, and Volunteer service; enhancing the stewardship and governance of agency data; and helping to shape agency engagement on high-level, governmentwide initiatives.

Front Cover: Peace Corps Volunteers Robert Steinglass and Doug Arbuckle administering the smallpox vaccine in Mille, Ethiopia, in 1974.

Photo: Steinglass, personal collection.

Dedication

This report is dedicated to the memory of Dr. Donald Ainslie “D. A.” Henderson (September 7, 1928—August 19, 2016), a seminal figure in the field of smallpox eradication. The Peace Corps is deeply appreciative of having had the opportunity to correspond with Dr. Henderson about the contributions of Peace Corps Volunteers and returned Volunteers within the context of the global eradication program. His charismatic leadership, tireless energy, and unflagging devotion to this program inspired countless public health workers around the world, including many of the returned Peace Corps Volunteers interviewed for this report.

Acknowledgments

In 1806, approximately 10 years after Dr. Edward Jenner conducted the first documented experiment with smallpox vaccination, laying the foundations of modern medicine, President Thomas Jefferson wrote to the English physician and scientist. Jefferson acknowledged the importance of this discovery, extending “a portion of the tribute of gratitude due to you from the whole human family. Medicine has never before produced any single improvement of such utility. Future nations will know by history only that the loathsome small-pox has existed and by you has been extirpated.”¹

“Future nations will know by history only that the loathsome small-pox has existed and by you has been extirpated.”

– Pres. Thomas Jefferson to Dr. Edward Jenner

The prediction that future generations would know of smallpox through history alone has indeed come true. Yet when the Peace Corps was founded by President John F. Kennedy more than 150 years after Jefferson wrote those words to Dr. Jenner, smallpox still existed in dozens of countries and continued to cause millions of deaths every year.² For much of the 20th century, even countries like the United States, which had successfully eliminated the disease within its borders, were still susceptible to periodic outbreaks from imported cases. One such incident in New York City in 1947 began with a single infected visitor from Mexico. The outbreak was quickly contained so that there were only 12 new patients and two deaths, but that success came at the enormous cost of vaccinating 6 million people.³

In the late 1960s and 1970s, Peace Corps Volunteers and returned Peace Corps Volunteers (RPCVs) played a role in bringing the final chapter in the global story of smallpox eradication to a close. This report is dedicated to capturing their stories, which so vividly bring to life President Kennedy’s vision of what the Peace Corps could be and what its mission might achieve in the context of global partnerships. In the words of the Peace Corps’ founding Director, Sargent Shriver, “The Peace Corps represents some, if not all, of the best virtues in this society. It stands for everything that America has ever stood for. It stands for everything we believe in and hope to achieve in the world.”⁴

¹ “From Thomas Jefferson to George C. Jenner, 14 May 1806,” National Archives.

² Jonathan Roy, *Smallpox Zero*, Introduction.

³ D. A. Henderson, *Smallpox*, 19.

⁴ Sargent Shriver, speech at the 35th Anniversary of the Peace Corps, March 1, 1996.

Peace Corps Director Carrie Hessler-Radelet provided the initial impetus for this research project. Karen Van Roekel, chief of strategic planning and data management in the Peace Corps' Office of Strategic Information, Research, and Planning (OSIRP), served as lead investigator for this study and author of this report. The other Peace Corps staff who contributed to developing the study plan and conducting interviews included Shelley Smith, chief of programming and training in the Office of Global Health and HIV (OGHH); Melissa Silverman, former director of Communications; Danielle Porreca, former program specialist in OSIRP; Travis Johnson, former program specialist in OGHH; and Jessy Libbing, former administrative assistant in the Director's Office. Samuel Ludwig, writer-editor in OSIRP, served as co-author of the Conclusions and as the senior editor for this publication. He received support from Laura Pirocanac in the Office of Overseas Programming and Training Support (OPATS); Lien Galloway in the Office of the General Counsel; and Michael Johnson, Bernard Chang, and Alex Snyder in the Office of Communications. Kristy Schlenker and Chris Praley (OSIRP staff) and Qing Feng (former OSIRP intern) provided support on the review of administrative data and the development of maps for this report. Jane Debruijn provided graphic design and layout services. Dr. Cathryn L. Thorup, director of OSIRP and the agency's performance improvement officer, provided encouragement and support for this project from its inception through to its completion, and offered substantive comments throughout the manuscript review process.

The Peace Corps wishes to thank Dr. Stan Foster, whose early career in the Epidemic Intelligence Service (EIS) at the Centers for Disease Control and Prevention (CDC) included caring for Peace Corps/Bolivia Volunteers. Dr. Foster worked at CDC for 30 years focusing on smallpox eradication and monkeypox surveillance and in its Combating Childhood Communicable Disease Project (CCCD). For 20 years following his retirement from CDC, he was a professor at the Rollins School of Public Health at Emory University. The Peace Corps also thanks the late Dr. D. A. Henderson, to whom this report is dedicated. Dr. Henderson served as chief of disease surveillance programs at CDC from 1960 to 1965 and chief of the Smallpox Eradication Programme in the World Health Organization (WHO) from 1966 to 1977. He was awarded the National Medal of Science in 1986 and the Presidential Medal of Freedom in 2002. Both men graciously offered their insights for this report, helping to frame the contributions of Peace Corps Volunteers and returned Volunteers within the context of the global eradication program.

For many of these men and women, their story was one of pioneering work in the farthest corners of remote lands to eradicate a disease that had killed millions of people and left millions of others permanently scarred or blinded.

Most importantly, the Peace Corps thanks the many RPCVs who reached back more than 40 years in time to reconstruct the stories of their service in support of this enormous human achievement. They shared their stories through interviews with the Peace Corps, oral histories documented by CDC and Emory University in the Global Health Chronicles online, and correspondence with the author. For many of these men and women, their story was one of pioneering work in the farthest corners of remote lands. They chose to take on this challenge to serve the cause of peace and development. They chose to work tirelessly in a major global program to eradicate a disease that had killed millions of people and left millions more permanently scarred or blinded.

The *esprit de corps* that united the men and women who worked to eradicate smallpox led them to coin the phrase, “Order of the Bifurcated Needle,” in honor of the technology used in the final years of the program. As Dr. Mirta Roses-Periago, then-director of the Pan American Health Organization (PAHO), said in 2010 in her closing address for the 30th anniversary of the global eradication of smallpox,

Sixty million people should be with us here today. They should be giving a thunderous standing ovation to Dr. D. A. Henderson and all the members of the Order of the Bifurcated Needle for saving their lives over these 30 intervening years since the defeat of that horrible scourge of humanity, smallpox.

– *Dr. Mirta Roses-Periago* (“Smallpox Eradication After 30 Years,” D1)

“In 1966, the global burden of smallpox was estimated at 10 million cases and 2 million deaths per year. Global smallpox eradication, achieved in October 1977, required country-specific partnerships of national and international resources. As described in this report, Peace Corps and returned Peace Corps Volunteers contributed significantly to national eradication programs in more than 20 countries.

In three of these limited resource countries (Afghanistan, Ethiopia, and Zaire), Peace Corps Volunteers and their national partners made major and perhaps critical contributions to the achievement of smallpox eradication. Peace Corps scopes of work varied in these three countries. In Afghanistan, female Peace Corps teams were key to overcoming female cultural resistance to vaccination. In Ethiopia, where the government reported 722 smallpox cases, Peace Corps-Ethiopian national teams identified 26,000 smallpox cases in the first year. In Zaire, where the rural health system was barely functional, Peace Corps-Zaire teams were essential in establishing an effective surveillance and containment system.

This report captures in a unique way the logistic, epidemiologic, management, and cultural challenges of fieldwork. It also serves as an excellent resource for future generations of individuals considering the challenges, risks, and benefits of partnering with nationals in addressing developmental barriers to well-being.

A major institutional benefit of the Peace Corps smallpox program was the large number of Volunteers who chose public health as a career and went on to hold important public health leadership positions in the United States and globally.”

– *Stanley O. Foster MD, MPH, OBN*

CDC Smallpox Epidemiologist: Nigeria (1966–1970),
Bangladesh (1972–1976), and Somalia (1977)
Emeritus Professor of Global Health
Rollins School of Public Health
Emory University

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List of Acronyms

CDC	Centers for Disease Control and Prevention
EIS	Epidemic Intelligence Service
MOH	Ministry of Health
OSIRP	Peace Corps' Office of Strategic Information, Research, and Planning
PAHO	Pan American Health Organization
PCV	Peace Corps Volunteer
RPCV	Returned Peace Corps Volunteer
USAID	United States Agency for International Development
WHO	World Health Organization

Executive Summary

This is the story of a remarkable group of Peace Corps Volunteers and returned Peace Corps Volunteers (RPCVs) in the 1960s and 1970s. At a time when the world was on the verge of eradicating smallpox—a disease that had killed, disfigured, or blinded millions of people for millennia—some of these individuals joined the fight as Peace Corps Volunteers in remote corners of Afghanistan, Zaire (now known as the Democratic Republic of the Congo), and Ethiopia. Some of them built off of their earlier experiences as Peace Corps Volunteers in Africa, rededicating themselves to a second round of service as employees of the Centers for Disease Control and Prevention (CDC) in a major program to eradicate smallpox in 20 countries in West and Central Africa. Others later continued the struggle against smallpox as staff or consultants of the World Health Organization (WHO) in Nepal, India, Bangladesh, Pakistan, Indonesia, Yemen, Botswana, Kenya, Sudan, and Somalia.

The smallpox warriors trekked across the mountains of Nepal, Ethiopia, and Afghanistan; the deserts of Niger, Mali, Sudan, and Somalia; the tropical savannas and hills of Togo and Benin; the flooded plains of Bangladesh; and the jungles of Zaire and Gabon.

“There was no stopping us.”

– Dr. Rafe Henderson

While this story is told from the perspective of the Volunteers and RPCVs in this program and the international “smallpox warriors” who worked side by side with them, one cannot overstate the critical role of the extensive network of national personnel in the countries described in this report—ministers of health, program directors, field supervisors, vaccinators, and laboratory and administrative staff, among many others. Reflecting back on the contributions of national personnel, Dr. D. A. Henderson wrote in *Smallpox—The Death of a Disease*, “A number of them sacrificed other careers and opportunities, and some even gave their lives.”¹

The smallpox warriors persevered in the face of tremendous challenges: civil wars and military coups, sometimes with bullets whizzing by their homes (Ethiopia, Bangladesh, Nigeria, Mali); a boating accident (Bangladesh); overturned vehicles (Niger); famine (Ethiopia); a hyena attack (Ethiopia); and even a door falling off of an airplane en route to an outbreak (Niger). They trekked across the mountains of Nepal, Ethiopia, and Afghanistan; the deserts of Niger, Mali, Sudan, and Somalia; the tropical savannas and hills of Togo and Benin; the flooded plains of Bangladesh; and the jungles of Zaire and Gabon. As Dr. Rafe Henderson, deputy director of the CDC/USAID West and Central Africa Smallpox Eradication/Measles Control Program and later an assistant director-general of WHO, said simply, “There was no stopping us.”²

1 D. A. Henderson, *Smallpox*, 104, © 2009, Prometheus Books.

2 Rafe Henderson, “Oral History,” *Global Health Chronicles*.

Study Design

The purpose of this research project was to document, describe, and analyze the Peace Corps' contributions to the global smallpox eradication campaign led by WHO from the perspective of the individuals who participated as Volunteers and/or RPCVs from the late 1960s through the 1970s. This study refers to people who engaged in smallpox eradication work during their Peace Corps service as "Volunteers" and to individuals who contributed to smallpox eradication efforts after their service as "returned Peace Corps Volunteers" or "RPCVs." Volunteers include those who were assigned to smallpox eradication as their full-time project for all or part of their service as well as a small number who contributed to the work as a secondary project (e.g., teachers who worked in smallpox eradication during their summer break). RPCVs include those who transitioned directly or shortly after their Peace Corps service to other positions overseas (e.g., as contractors or staff with WHO or CDC). Although the term "RPCV" is generally used by the Peace Corps to refer to individuals who have completed their service abroad and returned to the United States, the term more accurately reflects a return to action than a return home for the individuals in this report.

This study is based on an extensive review of relevant literature, a variety of interviews and correspondence, and Peace Corps records. The literature review provided the necessary background to understand the role of Volunteers and RPCVs within the overall global Smallpox Eradication Programme managed by WHO. Sources include published works by WHO, CDC, and key players in the global eradication program.

In telling this story, the Peace Corps drew from more than 20 "oral histories" on the Global Health Chronicles' website—a collaborative effort between CDC and Emory University. The Peace Corps aspect of the story was then brought to life through the words and first-hand accounts of those who participated in this enormous effort. Since no central listing of Volunteers or RPCVs who had participated in the smallpox program was available, the research team identified select RPCVs as key informants—including current and former staff from CDC, WHO, and the Peace Corps—for individual and group interviews. Several of these individuals then reached out to other RPCVs in their networks who offered additional stories and photographs to enrich this report.

All names mentioned in this report were confirmed and cross-referenced through the literature review, the Global Health Chronicles, interviews conducted by Peace Corps staff, correspondence with the RPCVs, and/or Peace Corps administrative data, including Volunteer description-of-service records. It is possible that there are Volunteers who were not captured in this research despite the agency's best efforts to create a comprehensive list.

For a complete list of the published and unpublished sources used to compile this report, please refer to the Bibliography.³ Appendix A provides a glossary of terms that emerged from the literature review as central to smallpox eradication work; Appendix B contains a copy of the interview guide that was used by the Peace Corps; and Appendix C provides a list and, when available, the online locations of the photographs reprinted in this report.

Structure of the Report

This was originally conceptualized as a single case study, but it became clear as the research progressed that each country program originated in a unique way. Furthermore, the Peace Corps Volunteers' and RPCVs' level of involvement and specific roles in smallpox eradication varied by country and by whether they were working with the Peace Corps, CDC, or WHO at the time.

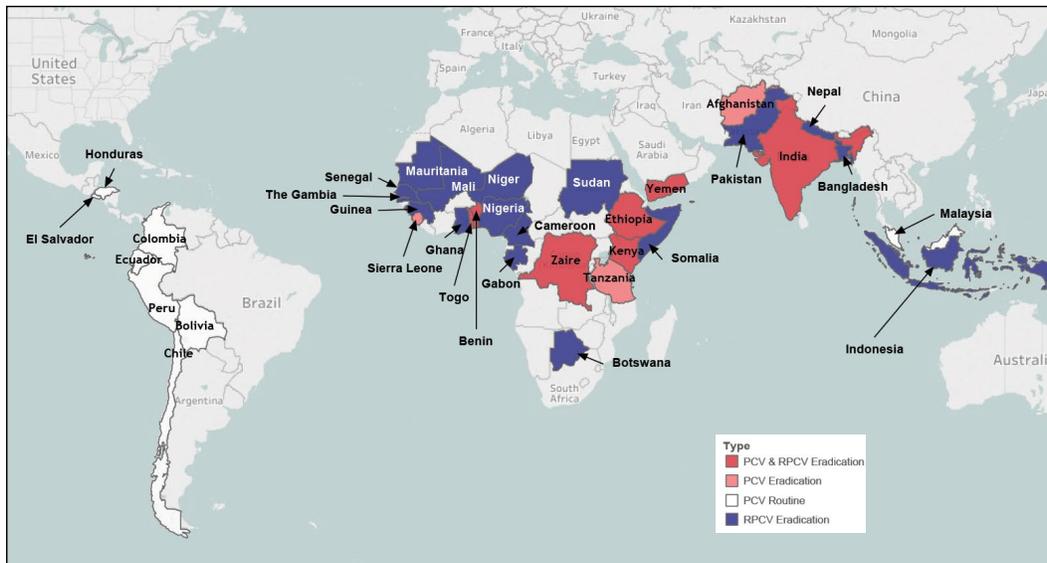
The Peace Corps' contributions to smallpox eradication are contextualized in Chapter 1, with background information on the disease and its history, advances in its prevention, and a broad overview of the global eradication program led by WHO. This chapter also includes brief descriptions of five countries (Tanzania, Botswana, Sudan, Indonesia, and India) where Volunteers and RPCVs played a role in smallpox eradication. These short vignettes provide an introductory glimpse into the roles of Peace Corps Volunteers and RPCVs in smallpox work, which is then expanded in later chapters where more detailed information was available.

After this initial overview, the more in-depth country case studies are divided into categories. Chapter 2 examines the three countries (Afghanistan, Zaire, and Ethiopia) where Volunteers worked in smallpox eradication as the focus of their Peace Corps service. Chapter 3 explores CDC's program in West and Central Africa, where

³ The Peace Corps received permission to use all quotations, graphs, and photographs reprinted in this report. All material from CDC and the Global Health Chronicles, unless otherwise indicated, is offered to the public and researchers free of charge. Copyrighted materials appearing in this publication (designated as ©) have been reproduced with the express written permission of the copyright holder.

Volunteers and RPCVs contributed to eradication efforts in 13 of the program's 20 countries. Special attention is given to the cases of Benin, Gabon, Mali, Niger, Togo, and Nigeria where the RPCVs played major roles. Lastly, Chapter 4 discusses five countries (Nepal, Bangladesh, Yemen, Kenya, and Somalia) where RPCVs joined WHO as short-term contractors or staff after their Peace Corps service. The overarching findings are summarized in the Executive Summary and described in more detail in the Conclusions.

Figure 1: Map of Countries Where Peace Corps Volunteers and/or RPCVs Contributed to Smallpox Immunization and to the Global Eradication Program⁴

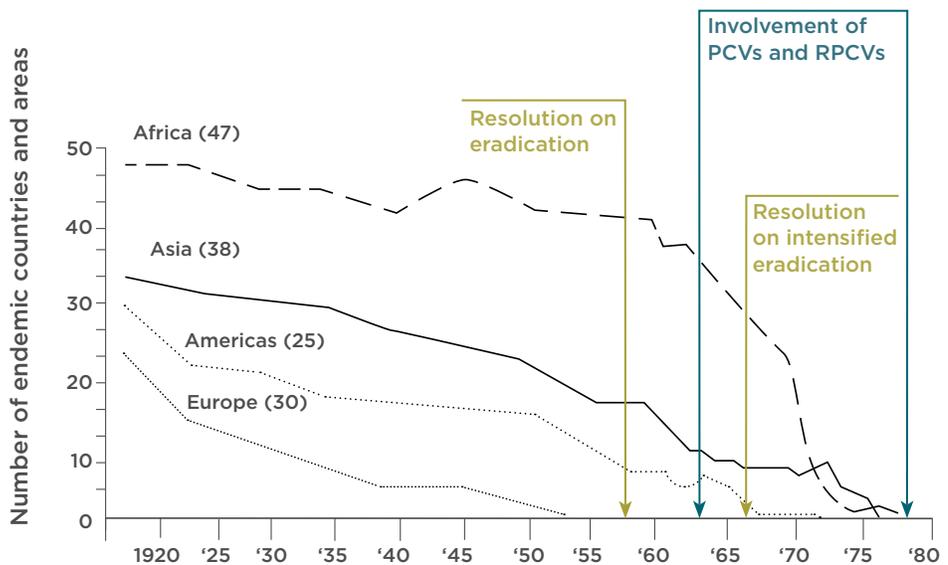


4 The Peace Corps' *Third Annual Report* (1964) describes Volunteers working in smallpox eradication within the context of national immunization programs in eight countries—Malaysia, Chile, Honduras, Bolivia, Peru, Colombia, Ecuador, and El Salvador. These Volunteers were not able to be identified or interviewed for this report, so there are no case studies focused on their work, but their service is recognized by including them in this map. This report focuses on the work of Volunteers and RPCVs in 27 countries that specifically targeted smallpox eradication after the launch of the global program led by WHO.

Findings

Smallpox was eradicated by the global program managed by WHO, supported by CDC, and implemented by countless host country governments. Although progress was made in a series of individual countries with some support by Peace Corps Volunteers as early as 1964, the complete eradication of a human disease for the first time in history required a truly global effort. These intensified efforts began when the World Health Assembly voted in 1966 to approve the Smallpox Eradication Programme.

Figure 2: Timeline to Global Eradication



Reprinted with permission from D. A. Henderson, *Smallpox*, 56, © 2009, Prometheus Books. Adapted to include the Peace Corps' involvement.

In many ways, joining the global smallpox program presented unique challenges for the Peace Corps. The smallpox program did not lend itself to the typical Peace Corps approach of placing Volunteers in a single community where they could interact and collaborate with a stable group of host country individuals over the course of two years. It nonetheless exemplified what the Peace Corps does best: grassroots work at the “last mile” of development, building meaningful connections with individuals and communities at the local level.

These Volunteers and RPCVs crisscrossed large expanses of their countries in search of smallpox cases. In difficult conditions, they modeled organizational approaches and encouraged their counterparts to see that the goal of eradication was within their grasp.

Their story emerges as a tale of human connections, adventurous spirit, innovative thinking, political savvy, and, occasionally, even a bit of luck. The Volunteers and RPCVs who participated in this effort used the knowledge and skills that they had acquired through their Peace Corps training and service to adapt to different cultures. Their sense of purpose and dogged determination led them to overcome seemingly insurmountable challenges.

National and international colleagues alike appreciated the contributions of the Peace Corps Volunteers and RPCVs who joined them in this effort. As Sileshi Taye, a counterpart of Volunteer Vince Radke, recalled some 40 years after their work together in the Ethiopian Ministry of Health:

Mr. Vince Radke and I worked on [the] Smallpox Eradication Program when I was working at Mizan Health Center as a sanitarian. Mr. Radke's enthusiasm and commitment was always contagious, and he totally supported the professional staff and the local people to be protected from that deadly disease, smallpox. Mr. Radke, we will never forget [you] and acknowledge the sacrifice you paid in that remote jungle of the wild southwest of the country. I wish you all the best, and without you and your compatriot Americans and others, the eradication of smallpox wouldn't be easy and true.

– *Sileshi Taye* (LinkedIn posting, accessed on April 9, 2013.)

Dr. Donald Ainslie (D. A.) Henderson, chief of WHO's Smallpox Eradication Programme from 1966 to 1977, spoke of their perseverance:

If Volunteers had not been available, I can say that we certainly would not have made the progress we did. ... The countries were large; the personnel needs were great; and the comparatively small Peace Corps groups could only do so much. All of them, however, traveled many, many miles under the most difficult of circumstances.

– *Dr. D. A. Henderson* (email to author, January 9, 2014)

This relentless determination—personified by the Volunteers time and again—was needed in tracking smallpox to some of the most remote corners of the world, and, as this report will show, it was essential in accelerating the final stages of global eradication. While it is impossible to quantify the precise impact of the Volunteers and RPCVs, their support meant that fewer people contracted this disease, fewer were disfigured or blinded, and fewer died.

In addition to the personal attributes and skills that the Volunteers and RPCVs brought to bear in this battle, this study underscores a number of programmatic factors that contributed to success:

- ▶ Effective technical leadership, management, and supervision of the overall program
- ▶ An effective network of mutual support and esprit de corps
- ▶ Clear expectations regarding the nature of the work, role, and required performance
- ▶ Effective training in the use of data in decision making
- ▶ Availability of human and financial resources
- ▶ Reliance on public health concepts and technology that did not require medical expertise

This program showed what groups of Volunteers can accomplish when they are working within a program that trains and guides their work and provides them with a sense of purpose. All of these personal attributes and programmatic factors were channeled to achieve the goal that had been declared by some to be unachievable: the global eradication of smallpox.

To accomplish this goal, many of the Volunteers and RPCVs in the close-knit community of smallpox warriors worked directly under the guidance of extraordinary leaders in public health, including Dr. D. A. Henderson of WHO and Dr. Stan Foster of CDC. A number of the key figures in smallpox eradication went on to join other major public health initiatives, including guinea worm eradication (Dr. Don Hopkins), the Expanded Programme on Immunization (Dr. Rafe Henderson), and polio eradication (Dr. Ciro de Quadros). The interaction with Volunteers and RPCVs that these leaders had in WHO's Smallpox Eradication Programme led them to reach out to RPCVs in their subsequent work, launching a number of careers in public health based on strong mutual respect.

For all of the Volunteers and RPCVs who participated in the global smallpox program—whether they continued in public health or went on to pursue careers in other fields—contributing to the eradication of a human disease for the first time in history provided an opportunity for tremendous personal growth, fulfillment, and a legacy for the Peace Corps community that transcends time. Some RPCVs recognized the transcendent importance of their work even

as they were undertaking it. As Alan Fiske recalled years later, “You knew what you did mattered—everyone was counting on you: team members and the people who would die if you didn’t stop the spread of smallpox.”⁵ Tony Masso recalled,

I can remember being out under the desert skies [in Niger] with a team of African male health workers ... and I remember saying, “Look at those stars and look at the moon. The American space program was going up there. And here we are, and we’re going to do something just as important. We’re going to wipe a disease off the face of the earth.”

– *Tony Masso* (“Oral History,” Global Health Chronicles)

**Serving the cause
of peace and
development:**

*“You knew what
you did mattered—
everyone was counting
on you: team members
and the people who
would die if you didn’t
stop the spread of
smallpox.”*

– *Alan Fiske*

5 Fiske, email to author, March 3, 2014.

1

Global Context

1.1 Description of Smallpox

“No disease has ever been so instantly recognized or so widely known and feared. Smallpox was hideous and unforgettable. For me, the memory of a ward full of smallpox victims 35 years ago in Dhaka, Bangladesh, is still vividly etched in my mind: anxious, pleading, pock-deformed faces. The ugly, penetrating odor of decaying flesh that hung over the ward; the hands, covered with pustules, reaching out, as people begged for help. Neither water nor food offered comfort; pus-filled lesions covered the insides of their mouths, making it painful for them to even chew or swallow. Flies were everywhere, thickly clustered over eyes half-closed by the pustules. More than half of the patients were dying, and there was no drug, no treatment that we could give to help them.”

– *Dr. D. A. Henderson* (*Smallpox*, 31, © 2009, Prometheus Books)



Baby with smallpox in Ethiopia, early 1970s.

Photo: Kraushaar, personal collection.

Smallpox was unique among viruses in that it infected only humans. Usually, transmission occurred through face-to-face contact when an infected person spoke or coughed, releasing microscopic viral particles into the air. Any susceptible person who inhaled those particles would become the next link in the human chain of infection and was capable of transmitting the virus to others for up to three weeks.¹ Occasionally, contact with clothing or bedding that contained the scabs of smallpox patients also resulted in infection.

About seven to 10 days after the initial infection, the patient would begin to develop a high fever accompanied by a severe headache and backache. Some people became delirious, and children occasionally had convulsions. After two to three more days, a rash would develop as red spots began to appear all over the body, with the greatest concentration on the face, hands, and feet. As these spots grew, they became painful pustules. The denser the concentration of pustules, the more likely it was that the patient would die. Patients who survived beyond the second week were often scarred for life, as the pustules became scabs, dried up, and fell off. In addition to the permanent disfigurement caused by these deep scars, many patients were blinded.

¹ Only susceptible people would transmit the disease. People who had already been successfully vaccinated or who were immune to the disease because they had survived a prior infection were no longer susceptible.

Of the two types of smallpox—*variola major* and *variola minor* (including a related strain known as “alastrim”)—*variola major* was a much more serious disease. It was the dominant form throughout both Asia (with a case fatality rate of about 30 percent²) and West and Central Africa (with death rates estimated at 20 to 30 percent³). By comparison, *variola minor* had an estimated 1 to 2 percent mortality rate in countries such as Ethiopia. Given that it was a milder disease, people suffering from *variola minor* could still travel—spreading the infection—whereas those with cases of *variola major* were usually too ill to be ambulatory.

Although smallpox caused the death of countless, nameless, faceless millions, it was the individual cases that often brought home the full horror of this disease in a way that global statistics could not. In his book, *House on Fire: The Fight to Eradicate Smallpox*, Dr. William Foege, who would later go on to lead CDC (1977-1983),⁴ explained how his experience volunteering to be seconded to Peace Corps/India to provide medical services to Volunteers for three months in 1963 helped set in motion his focus on eradicating smallpox: “At an EIS conference, they had announced that the person holding the Peace Corps position in India had taken sick. ... They were looking for a volunteer to go as the Peace Corps [post] physician. This I did, and it turned out to be important in so many ways. I saw global health close up. I saw my first cases of smallpox.”⁵ Dr. Foege attributed this experience to prompting from his mentor, Dr. Charles Houston, the Peace Corps/India country director from 1962 to 1965, who was a well-known cardiologist as well as the leader of the first American Karakoram mountaineering expedition to K2 in 1938.⁶ Dr. Foege explained his mentor’s advice:

Houston made sure that, in addition to taking care of Peace Corps Volunteers, I made rounds at hospitals so I could begin to understand the health problems facing India. This was my first opportunity to see smallpox patients. The experience was life-changing. Textbook descriptions miss the often catatonic appearance of patients attempting to avoid movement ... and the social and psychological isolation imposed by the disease. ... Smallpox separated patients from their loved ones. ... Pustules mixed with pus and blood might cover the face. The smell was

2 D. A. Henderson, *Smallpox*, 34; this number is estimated as 30-40 percent in Foege, *House on Fire*, 35.

3 Foege, *House on Fire*, 7.

4 Dr. Foege would also go on to become the executive director of the Carter Center (1986-1992) and a senior advisor to the Bill and Melinda Gates Foundation.

5 Foege, “Oral History,” *Global Health Chronicles*.

6 Auerbach, “In Tribute to Charlie Houston,” 89-97.

overpowering. Visitors recoiled, and even hospital staff tried to avoid touching the patient. ... Even if patients recovered, they would likely have lifetime facial scars, in which case the social separation in the hospital was simply a harbinger of their future life. I left India with the conclusion that, although many diseases and conditions are tragic, smallpox was in a class by itself for the misery it inflicted on both individuals and society.

– *Dr. Foegel* (*House on Fire*, 23–24, © 2011, the Regents of the University of California)

1.2 History and Geopolitical Impact of Smallpox

Given that smallpox was transmitted from human to human and survivors were immune, the disease only survived in areas with populations that were large enough to sustain the chain of transmission. For hundreds of years, epidemics periodically swept through the same densely populated areas in Egypt, India, Greece, China, and Rome. In Egypt, the body of Pharaoh Ramses V, who died more than 3,000 years ago, provides the earliest known evidence of smallpox: telltale pockmarks on his mummified skin.⁷ The invading army of Alexander the Great encountered smallpox in the Indus River Valley, and the Huns swept into China carrying the virus. In the second century AD, an epidemic raged in the Roman Empire for 15 years, killing an estimated 3 to 7 million people.⁸ Trading caravans from the Middle East, knights of the Crusades, explorers visiting the New World, and the African slave trade—all had one thing in common: the movement of groups of people carrying the virus to new populations.⁹

Once smallpox took hold in a town or city, it struck peasants and royalty alike, sparing no one who had not yet suffered from it. Queen Elizabeth I survived the disease in 1562, but smallpox caused upheavals in the lines of succession in several other monarchies, killing Emperor Joseph I of Austria, Queen Mary II of England, King Louis XV of France, King Luis I of Spain, and Tsar Peter II of Russia, among others. In Europe in the 1800s, an estimated 400,000 deaths per year and one-third of the cases of blindness were caused by smallpox.¹⁰

⁷ D. A. Henderson, *Smallpox*, 38, and Jonathan Roy, *Smallpox Zero*, 3.

⁸ D. A. Henderson, *Smallpox*, 38.

⁹ Jonathan Roy, *Smallpox Zero*, 4–10; Ogden, *CDC and the Smallpox Crusade*, 3; Breman, “A Miracle Happened There,” 2; and Shurkin, *The Invisible Fire*, 59, 104.

¹⁰ D. A. Henderson, *Smallpox*, 40.

Smallpox contributed in no small measure to the conquest of the Americas, where tribes such as the Aztecs, Mayas, and Incas were decimated by the disease. They struggled to defend themselves, losing key leaders to illness as battle lines were forming.

The disease shaped the outcome of events in the history of the United States as well. As described in the textbox below, there were reports of smallpox being used in the American Revolutionary War as a biological weapon to intentionally infect the opposing forces.¹¹ Even when smallpox was no longer widespread, the timing of a single case could be crucial. President Abraham Lincoln delivered the Gettysburg Address in 1863 just before falling ill with a case of smallpox that would leave him bedridden for 10 days.¹²

After vaccinations became more widely available, smallpox continued to ravage areas where there was a large enough population to sustain its spread and where people met and traded in ways that allowed human-to-human chains of transmission to continue. In West and Central Sub-Saharan Africa, for example, it was calculated that the story of smallpox had lasted at least 1,300 years with 34,000 unbroken chains of person-to-person transmission.¹³

Smallpox: The First Biological Weapon

Smallpox played a major role in the Battle of Quebec, fought early in the American Revolutionary War on December 31, 1775. The American Continental Army was defeated in the battle, largely due to the British strategy of exposing American forces to infected civilians released from Quebec. Had smallpox not ravaged the American forces, parts of what is today Canadian territory might have become American land after the Revolutionary War.¹⁴

In densely populated India, more than 3.7 million deaths were recorded in the period from 1868 to 1907 in what Dr. Foege termed a “relentless decimation of humanity.”¹⁵ Smallpox was, in fact, the only disease that is known to have played such an important role in peoples’ lives that they created temples and deities devoted purely to the disease’s affliction and cure, including the Hindu goddess Shitala Mata, the Chinese goddess T’ou-Shen Niang-Niang, and the Yoruba god in Nigeria, Shapona.¹⁶

11 Jonathan Roy, *Smallpox Zero*, 26.

12 D. A. Henderson, *Smallpox*, 50, and Foege, *House on Fire*, 7.

13 Breman, “A Miracle Happened There,” 2.

14 Shurkin, *The Invisible Fire*, 177.

15 Foege, *House on Fire*, 95, © 2011, the Regents of the University of California.

16 D. A. Henderson, “The Eradication of Smallpox,” D7; Ogden, *CDC and the Smallpox Crusade*, 4; and Jonathan Roy, *Smallpox Zero*, 22.

While smallpox continued to kill an estimated 250,000 people each year in Europe during World War I, the prevalence of smallpox cases there transitioned to the less virulent variola minor after the war,¹⁷ as it had in the United States in earlier decades. This shift, accompanied by the widespread use of vaccine, reduced the threat from smallpox in most developed countries. However, all countries remained at risk as long as the disease continued to circulate globally.

1.3 Technological Advances in Preventing the Spread of Smallpox

One early approach to preventing the spread of smallpox was known as “variolation,” named after the variola virus. Using scabs and other infectious material from a person with smallpox, the virus was intentionally transmitted to a healthy person through superficial scratches on the skin. Variolation was used in India and China for centuries before being introduced to Europe and the American colonies in the 18th century. While this approach was reasonably effective in creating a localized, mild infection with a greatly reduced risk of death, the person who had been inoculated was, unfortunately, just as contagious as someone who had acquired the disease naturally.¹⁸

While variola only affected human beings, it was related to the *vaccinia* virus that causes skin lesions on cows (and was, thus, named from the Latin word for cow, *vacca*). In 1796, Dr. Edward Jenner, an English physician, demonstrated that introducing material from a cow infected with vaccinia into scratches on the arm of a healthy human would successfully protect that person from smallpox. Crucially, and in contrast to variola, people infected with the vaccinia virus were not contagious. Jenner’s discovery launched the modern age of medicine, and the word “vaccine” was coined for this new approach to preventing illnesses.

Although the development of vaccination was a major step forward, early vaccination programs relied upon having a series of susceptible individuals who would become infected in slow succession—one after another—until they became immune and could no longer serve as links in a continuous human chain of transmission. Later advances showed that glycerol could be used to stabilize the virus so that

¹⁷ Shurkin, *The Invisible Fire*, 216.

¹⁸ D. A. Henderson, *Smallpox*, 44–45.



Child in West Africa receiving an injection with a Ped-O-Jet, 1969.

Photo: Global Health Chronicles/Photographer unknown.

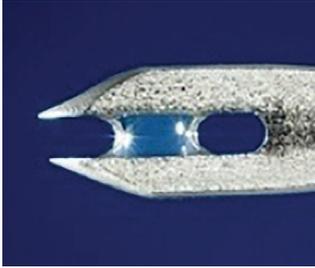
it could be stored in capillary tubes. However, the most significant progress began once the technology for storing a heat-stable, freeze-dried vaccine was developed at England's Lister Institute in the 1950s.

Along with the development of the heat-stable vaccine came improved health services and technology to deliver the vaccine. After Dr. D. A. Henderson became the chief of the surveillance section at CDC in 1961, he created a special unit devoted to smallpox control that worked with a new technology—the jet injector. The jet injector provided a safer, faster, more effective, and less painful alternative to injections, which had used a rotary lancet to press a drop of vaccine under the skin with multiple small punctures. The jet injector's technology was further developed into the Ped-O-Jet, a device that used a foot pedal rather than electricity to generate enough hydraulic pressure to shoot a small amount of vaccine through skin without a needle.

As many as 1,000 people per hour could be vaccinated with this rapid-fire approach,¹⁹ although the devices frequently required repairs. CDC continued testing the Ped-O-Jet in international settings as diverse as Tonga and Brazil until it was proven to be safe and effective. The devices were later used in West Africa to administer an estimated 60 million injections, thereby freeing 15 of the 20 countries in the West and Central Africa Program of smallpox by September 1968—a year and a half after the program had begun.²⁰

¹⁹ D. A. Henderson, *Smallpox*, 24; Jonathan Roy, *Smallpox Zero*, 38; and Ogden, *CDC and the Smallpox Crusade*, 11.

²⁰ D. A. Henderson, *Smallpox*, 138.



Bifurcated needle with a drop of smallpox vaccine.

Photo: Global Health Chronicles/Photographer unknown.

By 1970, Ped-O-Jets were being replaced by the next technological advance: the bifurcated needle. The bifurcated needle was very simple to use, only requiring the vaccinator to make multiple, firm jabs on the arm of the patient with a small amount of vaccine.

The bifurcated needle had several major advantages over the jet injector: There were no moving parts that could break down; it was easily portable for vaccinators traveling by foot and on bikes; and it was less likely to cause alarm than the jet injector, which resembled a gun. It was also economical, both in terms of the cost of the device and the amount of vaccine it required. It was estimated that a 25-dose vial of vaccine could provide 100 people with protection when administered with this needle. This effectively quadrupled the available vaccine supplies.

1.4 WHO's Global Smallpox Eradication Programme

When WHO launched the global Smallpox Eradication Programme, it was estimated that there were 10 million cases of smallpox in the world and 2 million deaths.²¹ Endemic smallpox was still present in 59 countries that were home to 60 percent of the world's population,²² and the rest of the world remained at risk of "importing" the disease from a neighboring country. In countries like the United States, which no longer had any endemic cases, smallpox prevention focused on vaccination programs, mandatory vaccination certificates for travelers, and rapid investigation of any suspected cases.²³ Vaccination of children was compulsory, because they lacked immunity to the virus and had a considerably higher mortality rate than adults. Even though there were no longer any endemic cases, as air travel became more common, the risk of importing smallpox cases grew.²⁴ No country was safe from a disease that could so easily be transmitted by the mere cough or sneeze of a visiting traveler. The global dialogue began to focus on eradicating the disease entirely.

In 1959, the World Health Assembly (WHA) adopted a resolution proposed by the Soviet Union calling for the global eradication of smallpox under a program to be managed by the World Health

²¹ *World Health*, May 1980, 18.

²² D. A. Henderson, *Smallpox*, 56.

²³ *Ibid.*, 20.

²⁴ *Ibid.*

Organization. The primary strategy for this program continued to be vaccinating millions of susceptible people, one person at a time. Despite the pledged support of member nations, however, the program floundered, primarily because it was based on voluntary contributions that did not materialize: There were no vehicles, there was no equipment, no manpower, and no money.²⁵ The Soviet Union and other countries requested additional resources for the global eradication of smallpox. However, most other industrialized member nations, which provided the majority of the organization's budget, were opposed to budget increases.²⁶ Without the funding to mount an effective global campaign or to support countries whose local resources were insufficient to tackle this problem, countries were slow to join the eradication efforts.

A confluence of events set the stage for a definitive vote on the future of smallpox eradication. In the United States, CDC and USAID were beginning to discuss plans for an interagency partnership to focus on smallpox eradication and measles control in 18 contiguous countries in West Africa. The White House—which was searching for a program that could be announced as the United States' contribution to the 20th anniversary of the United Nations at the time—learned of these plans from the U.S. Department of State, and President Lyndon Johnson liked the proposal.²⁷ A press release announcing the President's pledge of American support for smallpox eradication was issued in May 1965.²⁸

This new commitment from the United States, combined with continued lobbying from the Soviet Union, provided the stimulus for a vote at the WHA in 1966. Finally, after an extended debate about the projected costs and the likelihood of actually achieving global eradication, the World Health Assembly voted in 1966 to approve a special smallpox eradication effort.²⁹ The budget for the program was established at a modest \$2.4 million per year due, in part, to the resources already reserved for a larger program focused on the eradication of malaria.

²⁵ Shurkin, *The Invisible Fire*, 261.

²⁶ D. A. Henderson, *Smallpox*, 64.

²⁷ *Ibid.*, 72.

²⁸ Jonathan Roy, *Smallpox Zero*, 35, and D. A. Henderson, "Oral History," *Global Health Chronicles*.

²⁹ Shurkin, *The Invisible Fire*, 263.

Surprisingly, the U.S. Department of State, which had responsibility for funding all international organizations, did not vote to support the establishment of the global Smallpox Eradication Programme.³⁰ Despite support for the global program from CDC and plans for substantial investment from USAID in the West Africa program that would certainly benefit from and contribute to a global program, and despite the estimated \$150 million the United States spent annually to protect its borders from smallpox importation,³¹ the U.S. delegation cast a vote *against* the global eradication program. As Dr. D. A. Henderson wrote, “The delegation had been instructed by the State Department to vote against the budget if it provided for the additional funds for smallpox eradication. And so they voted against the budget they had lobbied to support.”³²

Once the intensified global program began, a number of factors helped to shape it. In addition to the new CDC/USAID investment in the West Africa program³³—where Peace Corps Volunteers and RPCVs contributed to efforts in 13 of 20 countries (see Chapter 3)—there were also technological advances in the delivery of vaccine, advances in understanding the disease, and new strategies that no longer relied solely on mass vaccination efforts.

WHO’s Director-General Marcolino Candau was concerned about risking the reputation of WHO on a program whose success was in doubt.³⁴

As Dr. D. A. Henderson recalled, “He insisted to the U.S. Surgeon General William Stewart that an American had to direct the program so that, when it failed, the United States would be seen to bear major responsibility for its approval. Specifically, Candau requested that I be given this job.”³⁵

Thus, in October 1966, Dr. D. A. Henderson was called to head the WHO’s global eradication effort. Despite a number of financial, logistical, and political obstacles—including lukewarm enthusiasm

30 D. A. Henderson, *Smallpox*, 25, 131.

31 Shurkin, *The Invisible Fire*, 264.

32 D. A. Henderson, *Smallpox*, 77, © 2009, Prometheus Books.

33 It is a measure of the importance of the global eradication program that it was proposed by the Soviet Union in 1958 and funded by the United States in West Africa. It was unusual for the two superpowers to agree on a common objective that transcended politics during the Cold War.

34 Shurkin, *The Invisible Fire*, 263, and D. A. Henderson, “Oral History,” *Global Health Chronicles*.

35 D. A. Henderson, *Smallpox*, 77, © 2009, Prometheus Books, and D. A. Henderson, “Oral History,” *Global Health Chronicles*.

from WHO headquarters and regional directors, some of whom believed global smallpox eradication was an impossible task and an unnecessary diversion from WHO's malaria program—Dr. Henderson persevered.

His prior work with CDC enabled close collaboration between the two organizations, shared learning, and an increasing emphasis on surveillance and epidemiology. His intimate knowledge of the plans for the U.S. program in West and Central Africa and the capabilities of the program staff proved to be an asset that he could leverage to make progress in the global agenda led by WHO. Furthermore, knowing that the budget for the global eradication program was inadequate, finding partnerships that could serve as sources of low-cost manpower to supplement national government contributions was absolutely essential for success. As an American, Dr. Henderson was familiar with the Peace Corps, which had only been in existence for five years at that point.

When the global program began, surveys revealed that only an estimated 1 percent of smallpox cases were being reported.³⁶ The true scale of the disease was projected at 10–15 million cases and 2 million deaths in 43 countries.³⁷ The majority of these countries still had endemic smallpox, with the greatest challenges in Zaire, Ethiopia, Indonesia, Afghanistan, India, Bangladesh, and Pakistan.³⁸

In some areas of Africa, such as the former British and Belgian colonies in East Africa (including Kenya, Malawi, Tanzania, Uganda, Zambia, Burundi, and Rwanda), national governments were able to make a great deal of progress using their local resources. WHO supplemented local efforts with vehicles, fuel, advisors, and assistance in improving the efficacy of freeze-dried vaccine stocks. As mass vaccination campaigns progressed, new cases of smallpox decreased.

³⁶ D. A. Henderson, *Smallpox*, 88.

³⁷ *Ibid.*; Ogden, *CDC and the Smallpox Crusade*, 80.

³⁸ Jonathan Roy, *Smallpox Zero*, 37.

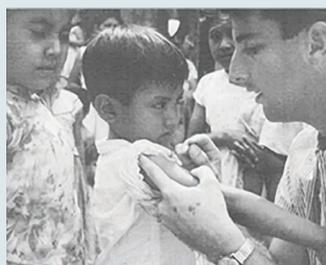
The Peace Corps' Role Begins to Take Shape

Before the global Smallpox Eradication Programme began, the Peace Corps sent Volunteers to numerous countries to work with the local ministries of health in general immunization programs that included smallpox. As described in the Peace Corps' 1964 annual report just three years after the agency was founded, "In Malaysia, Chile, Honduras, Bolivia, Peru, Colombia, Ecuador, and El Salvador, nurses work in rural health programs, some with traveling clinics using the back of a jeep as a consulting-operating room, others in immunization programs fighting smallpox, diphtheria, and polio. Still others staff up-country health centers."³⁹

Some of the early efforts of Peace Corps Volunteers also occurred through temporary assignments. In August 1967, as part of an immunization project, small groups of Volunteers in Tanzania supported teams led by WHO to vaccinate the Maasai against smallpox. Team members included Peace Corps doctor Fletcher Robinson; Peace Corps Volunteers Eliot Noyes, Susan Morrow (Parkins),⁴⁰ Anne Wiggins (Thompson), Donald Wolfensberger, and Mark Raymaker; Robin Dulake, a Voluntary Service Overseas (VSO) volunteer from England; and an interpreter. The groups lived in the bush for one month, eating canned food supplemented by fresh meat from the local game that they hunted.⁴¹

In July 1968, another team of Peace Corps Volunteers supervised by two Peace Corps doctors and supplied by the local Ministry of Health and Housing joined Tanzanian student health inspectors. Traveling by canoe along the shores of Lake Malawi, the team participated in a campaign to vaccinate more than 50,000 people against smallpox.⁴²

Larger groups of Peace Corps Volunteers and RPCVs began to engage in the global fight for extended periods in programs in Afghanistan in 1966, Zaire in 1970, and Ethiopia in 1971. Their stories are described in Chapter 2.



William Carey, a public health Volunteer in Bolivia, takes part in a smallpox vaccination campaign in the mid-1960s.

Photo: Peace Corps/Photographer unknown.

³⁹ Peace Corps, *Third Annual Report*, 83.

⁴⁰ Women who were married in subsequent years are listed here by their maiden names with their married names in parentheses.

⁴¹ Sadly, Volunteer Mark Raymaker disappeared during one of these hunting trips. Despite the efforts of the other Volunteers and a subsequent aerial search, he was never seen again. See "Hunt Tanzania Jungles for Green Bay Man," *Chicago Tribune*, August 15, 1967; Peace Corps Victim Report, March 3, 1968; and Dulake, email to author, Sept. 13, 2016.

⁴² "Peace Corps Fights Smallpox," *Spokesman Review* (Spokane, Washington), July 6, 1968. Two additional Volunteers whose description-of-service records include mention of support to a smallpox program are Cecilia Carreon and Ronald Hert. Their records do not indicate whether they participated in 1967 or 1968.

Figure 3: Map of the Status of Eradication in 1967



Map created using data presented in D. A. Henderson, *Smallpox*, 88.

One of the greatest advances in the global program came about through the growing realization that it was not necessary to vaccinate every human being to stop the spread of smallpox. As a result, the global program was organized around two components, the first of which was an initial mass vaccination surge covering at least 80 percent of the population. The goal of the surge was to reduce the number of people at risk of contracting the disease.⁴³ For mass vaccination to be successful, it was necessary for the vaccination teams to work outside of a country's health facilities in mobile teams.⁴⁴ "In Africa, a six-vaccinator team using bifurcated needles was expected to vaccinate an average of 3,000 people per day, and as many as 600,000 over the course of a year."⁴⁵

43 Vaccination protected people who had already been exposed to smallpox by preventing the illness or reducing its severity even if the vaccine was received several days after exposure.

44 Shurkin, *The Invisible Fire*, 246. Prior experience under the French colonial system had included the model of mobile teams, so this was not unfamiliar to the local people.

45 D. A. Henderson, *Smallpox*, 90, © 2009, Prometheus Books.

The second component of the global program was “surveillance and containment” to find and investigate new cases of smallpox in order to break the human chain of infection. Dr. William Foege was the first to pioneer this approach as a core element of the eradication strategy in Nigeria. During the period leading up to the country’s Biafran War, Dr. Foege mobilized the missionary health workers to collect information and communicate with each other using a network of shortwave radio connections. This allowed the smallpox teams to make informed guesses regarding locations where the virus might be incubating so that they could reach the local people with vaccinations in time to stop an outbreak.

In his book, aptly titled *House on Fire: The Fight to Eradicate Smallpox*, Dr. Foege described how he drew on personal experience working for the U.S. Forest Service fighting fires to develop this strategy: “The principles were simple and drilled into us repeatedly: separate the fuel from the flames, and the fire stops.”⁴⁶ Similarly, with smallpox, once cases were identified through surveillance, the susceptible people (the “fuel”) were separated from the active cases (the “fire”). Teams then vaccinated around the outbreak to establish a “fire line,” thus preventing further spread of the disease and reducing the need for (and focus on) mass vaccination. In May 1968, the surveillance and containment strategy that Foege had successfully introduced in Nigeria began to be implemented throughout Africa. Within a year, smallpox was eliminated in most of the eight trial countries, including heavily infected Sierra Leone.⁴⁷ Dr. Foster credited this new strategy with turning the tide in Nigeria, and, on a broader level, it “made eradication possible.”⁴⁸

As surveillance grew, the teams uncovered substantially more cases of smallpox than had been officially reported. In the most extreme countries such as Ethiopia, which still had endemic variola minor, the ratio was as high as 1,000 actual cases per one reported case.⁴⁹

These high numbers provided countries with the necessary impetus to embrace the eradication program, as they feared that an outbreak was escalating out of control.

Eventually, it was the surveillance and containment approach, with its focus on actively searching for and reporting cases, that allowed officials to have confidence that smallpox had actually been eradicated.

⁴⁶ Foege, *House on Fire*, 15, © 2011, the Regents of the University of California.

⁴⁷ D. A. Henderson, *Smallpox*, 137.

⁴⁸ Foster, Peace Corps interview, February 18, 2014.

⁴⁹ D. A. Henderson, *Smallpox*, 92.

RPCVs Support Botswana and Sudan

In the late 1960s, most countries in Africa were believed to be free of smallpox. Botswana and Sudan, however, faced setbacks after infected people crossed their borders and reimported the disease.

Smallpox had been eliminated from Sudan by 1963, even before the global eradication program began. However, about 1,000 cases of smallpox were found each year in 1970 and 1971. These cases were thought to be only 5 percent of the true number.⁵⁰ As was the case with many countries in the Horn of Africa, a civil war—which lasted until March 1972—complicated the surveillance work. Many roads were mined, and both transportation and communications were difficult.⁵¹ WHO officials in Geneva recognized the urgency of addressing these cases when they saw that the disease had been re-established throughout most of the country. WHO officials based in Sudan, however, were preoccupied with initiatives to control tuberculosis and cholera; consequently, progress was slow. The last known case was reported in December 1972, and surveillance was needed to ensure that no pockets of cases remained. David Bassett (RPCV/Nigeria) and James Lepkowski (RPCV/Ethiopia), both veterans of smallpox battles from their Peace Corps service, were sent by CDC and WHO, respectively, to help the government of Sudan plan a series of three-to four-week surveillance campaigns.

The case of Botswana provides a good illustration of the challenges inherent in a global eradication campaign. Smallpox transmission in Botswana had ended in 1964,⁵² but across the border in South Africa, the virus continued to spread without the knowledge of the local health authorities. In 1972, while visiting South Africa, Dr. D. A. Henderson uncovered an outbreak with more than 20 cases in a hospital in Transvaal State. Miscommunication between the laboratory and the hospital resulted in these cases being mistakenly identified as disseminated vaccinia—in other words, a reaction to the vaccination—rather than smallpox itself.⁵³ By the time the mistake was uncovered, transmission had already spread to the populated southern edge of neighboring Botswana. The situation in Botswana then escalated from a single case in June 1971 to a point where the virus had again spread throughout the country, creating more than a thousand new cases.⁵⁴ At that point, the government of Botswana sent in an official request for an operations officer from WHO. Garry Presthus, an RPCV from Togo (1966–1968) and a veteran of the Zaire program, responded to the call for aid. He partnered with an experienced health inspector in Botswana to mount surveillance and a mass vaccination program that reached 500,000 people.⁵⁵

50 D. A. Henderson, *Smallpox*, 92, and Foege, Millar, and D. A. Henderson, “Smallpox Eradication in West and Central Africa,” 221.

51 Ogden, *CDC and the Smallpox Crusade*, 107.

52 D. A. Henderson, *Smallpox*, 155.

53 *Ibid.*, 153.

54 *Ibid.*

55 *Ibid.*, 156.



Health workers use recognition cards to ask school children whether they have seen smallpox cases in Sudan, 1978.

Photo: © WHO/Joel Breman.

As the surveillance and containment approach took hold, a variety of methods for tracking down new smallpox cases emerged. Once health workers in several countries discovered that children were more willing to provide information on cases than adults, they began visiting schools with “recognition cards,” showing the students photos of smallpox patients and asking if they knew of any cases.⁵⁶ Another approach developed in Indonesia introduced the practice of offering a reward for reporting cases.

By 1973, India, Pakistan, Bangladesh, Nepal, and Ethiopia were the final five countries with endemic transmission in the world. Smallpox eradication workers faced floods and civil wars that triggered famines and massive refugee movements.⁵⁷ In South Asia, the major challenges were the size and mobility of the populations, particularly with public transportation that led to infected people mingling with susceptible people. In Ethiopia, on the other hand, the population was not as large, but it was dispersed in unmapped mountains and deserts that were difficult to reach.⁵⁸

At the same time that this final push was underway in 1973, a new director-general took office in WHO, and his support for the smallpox program brought new political will to the ongoing battle.⁵⁹

⁵⁶ Jonathan Roy, *Smallpox Zero*, 48.

⁵⁷ *Ibid.*, 50.

⁵⁸ *Ibid.*

⁵⁹ *Ibid.*, 51.

Peace Corps Volunteers Help End Transmission in Afghanistan

Volunteers confronted the challenge of reaching remote areas in Afghanistan, one of the last countries with endemic smallpox: “Under new and dedicated leadership and a courageous and industrious national staff, assisted by women Peace Corps Volunteers, a well-organized countrywide vaccination campaign succeeded in reaching more than 80 percent of the population. Special education efforts were needed to reach women and their children in many rural areas where women could not leave their homes and male vaccinators were forbidden to enter.”⁶⁰ Eventually, the national health teams were able to bring the transmission to an end in 1972 (see Chapter 2).

During the final four years of the global program, despite having had successes in Afghanistan and Indonesia, WHO encountered—in the words of Dr. D. A. Henderson—“desperately difficult problems in India, Bangladesh, Ethiopia, and Somalia that required additional effective field staff.”⁶¹ In some cases, talented national program staff in one country were hired to assist in the eradication efforts of another. In other cases, short-term consultants were hired for three-month assignments. In Bangladesh, for instance, at the peak of the eradication program in 1974–1975, WHO had a maximum of 150 international staff, including both paid positions and volunteers from the United Kingdom, Japan, Austria, and the U.S. Peace Corps. These staff were, however, only the proverbial “tip of the iceberg,” with as many as 150,000 national personnel filling critical roles as program directors, field supervisors, vaccinators, and laboratory and administrative staff.⁶²

Certification of Eradication in Indonesia

In April 1974—two years after the last case was detected—Indonesia became the second country after Brazil to go through an official process with WHO to certify the eradication of smallpox.⁶³ The process was so well-managed that it set “a pattern of excellence for others to follow” in certifying eradication as well as demonstrating to other densely populated countries in South Asia that eradication was, indeed, an achievable goal.⁶⁴ The commission charged with the certification effort included national staff, international observers from neighboring countries, and two WHO staff.⁶⁵ One of the WHO staff—William (Bill) Emmet—had spent four years in Indonesia,⁶⁶ but even before this work, he had supported smallpox eradication efforts as a Peace Corps Volunteer in Togo in the West and Central Africa Program (see Chapter 3).

60 Jonathan Roy, *Smallpox Zero*, 40, © 2010. D. A. Henderson and Jean Roy provided narration to Jonathan Roy, who synthesized the texts into this quotation.

61 D. A. Henderson, *Smallpox*, 104, © 2009, Prometheus Books.

62 Ibid.

63 Ibid., 125–126.

64 Ibid., 127.

65 Ibid., 126.

66 Fenner et al., *Smallpox and its Eradication*, 638.



Hindu smallpox goddess,
Shitala Mata.

Photo: © WHO/S. Khamsi.

In India, where more than 3.7 million deaths attributed to smallpox were recorded in the forty years between 1868 and 1907, the dense human population continued to facilitate the circulation of the virus on a scale rarely seen in other countries.⁶⁷ Although the British had attempted to make vaccination compulsory, the net effect had been an increase in the falsification of records and families hiding loved ones to avoid being separated.⁶⁸ India had established a goal of eradicating smallpox in 1962, but, in spite of administering 400 million vaccinations, cases continued to occur. Cultural beliefs that stemmed from a fear of offending the smallpox Hindu goddess, Shitala (or Sitala) Mata, created resistance to vaccination, but the largest challenges were quite simply the overwhelming density and mobility of the population over networks of roads and railways.⁶⁹

The Indian public health service gradually improved case reporting and added new technologies, such as freeze-dried vaccine. They replaced the painful rotary lancet with the newer, more efficient, less expensive bifurcated needle. Monetary rewards were used to reassure the local health workers that the government did, in fact, want to have cases reported⁷⁰ and to encourage them to track down rumors of cases.

When India detonated a nuclear device in 1974, the international press covering that story also reported that India, a seemingly advanced country, was struggling to control smallpox. Embarrassed, the government began making more resources available for house-to-house searches. When cases were found, victims were isolated within their homes. Guards were hired to sit in front of the doors to the homes to keep people who had not yet been vaccinated out and to prevent the sick from leaving.⁷¹ Whatever medicine was needed was provided along with subsistence pay.

Yet, in spite of these efforts, the number of cases began to spiral out of control. “Some [people] advocated that India formally withdraw from participation in the global eradication program. Such a move would have spelled death to the program.”⁷² “Two things were abundantly clear: Global eradication could not succeed without India, and India wanted and needed help.”⁷³

67 Foegen, *House on Fire*, 96.

68 *Ibid.*, 96.

69 *Ibid.*, 261; Ogden, *CDC and the Smallpox Crusade*, 100; and D. A. Henderson, *Smallpox*, 170.

70 Shurkin, *The Invisible Fire*, 319. Initially, primary health-care workers suppressed case reporting to their districts, as the cases were often viewed as a failure of the reporting individuals to adequately vaccinate the people in their area. It was simply easier not to report cases.

71 *Ibid.*, 322.

72 D. A. Henderson, *Smallpox*, 160, © 2009, Prometheus Books.

73 Ogden, *CDC and the Smallpox Crusade*, 100.

Ten years after his first experience in India with the Peace Corps and with the successful experience championing surveillance and containment in West Africa under his belt, Dr. Foege returned to India, seconded from CDC to serve as a consultant to WHO. He formed an effective working partnership with the Indian national team led by Dr. Rabinder Nath Basu and Dr. Mahendra Singh of the National Smallpox Eradication Programme, Dr. Sachida Nanda Ray, central director for vaccine production, Dr. M. I. D. Sharma, director of the National Institute of Communicable Diseases, and Dr. Mahendra Dutta and Dr. Mahendra Singh of the Central Appraisal Team.⁷⁴ The partnership also included WHO—notably, Dr. Nicole Grasset, Dr. Zdeno Ježek, and Dr. Lawrence Brilliant in WHO’s Southeast Asia Regional Office (SEARO). Together they reoriented the national program toward surveillance and containment.

The workforce that was brought to bear in India was so massive that it “probably constituted the largest single public health operation in history.”⁷⁵

At its peak, the program engaged an army of more than 100,000 health workers each year, who carried out nearly 10 million village visits during the three-year period [from] 1973 to 1975. ... The backbone of this enormous work force was made up of Indian nationals. ... Working closely with them in a number of professional, technical, and administrative capacities were 232 international health workers from 30 different countries on six continents.

– *Horace G. Ogden* (*CDC and the Smallpox Crusade*, 98–99)

Among these international health workers were RPCVs sent in on short-term assignments by WHO, Marc Strassburg (RPCV/Ethiopia), Alan Schnur (RPCV/Ethiopia), Jay Anderson (RPCV/Ethiopia), and Bill Emmet (RPCV/Togo). Jay Friedman (RPCV/Sierra Leone) was asked to transfer to India from his post in the smallpox program in Nepal for three months in 1974 (see Chapter 4).⁷⁶

⁷⁴ Fenner et al., *Smallpox and its Eradication*, 738, 755–756.

⁷⁵ Ogden, *CDC and the Smallpox Crusade*, 101.

⁷⁶ Friedman, “Oral History—Nepal,” *Global Health Chronicles*; interview with Strassburg, March 31, 2015; and emails to author, Schnur (August 22, 2016) and Emmet (August 20, 2016).

From Volunteer in India to Director of the Peace Corps

Although the Peace Corps did not play a direct role in India's smallpox eradication program, there was at least one Volunteer who participated in this massive effort: Ronald Tschetter, who served from 1966 to 1968, recalled this work after being appointed as the 17th Director of the Peace Corps (2006–2009). Although his primary project involved working with a team of social workers on family issues, "Tschetter found himself traveling across the country to deliver medicine to a village suffering from a smallpox epidemic. And there, in the small, nomadic village, he found meaning and purpose in his work."⁷⁷

In May 1975, a homeless woman who had traveled from Bangladesh and was living in a railway station was confirmed as the last case in India. Discovery of her case had led to an intensive effort to conduct house-to-house searches in 68 towns and cities, but no more cases were found. In June 1975, on India's Independence Day, Prime Minister Indira Gandhi was able to declare that the country was finally free of smallpox.

Neighboring Bangladesh (which was known as East Pakistan until 1971) had initially succeeded in freeing itself of endemic smallpox by August 1970 using the surveillance and containment approach modeled in West Africa.⁷⁸ In 1971, however, a civil war broke out that resulted in an estimated 10 million refugees from Bangladesh streaming into India.⁷⁹ Smallpox broke out in November 1971 at the Salt Lake camp near Calcutta, which housed approximately 250,000 refugees. By mid-January 1972, more than 2.6 million refugees returned to Bangladesh, spreading smallpox across the newly independent nation.⁸⁰ In response, a virtual army of thousands of health workers—aided by international consultants (including a number of RPCVs) and generous rewards for people reporting cases—went door-to-door looking for cases in an astounding 89 percent of the 12 million households in the country.⁸¹

Accomplishing this required an effective partnership between national staff and international workers, including the WHO epidemiologists assigned to 18 of the 19 districts in the country.⁸² The eradication program in Bangladesh showed how the smallpox warriors overcame many of the same factors that had allowed the disease to spread in India. By 1975, health workers had successfully eliminated the disease from Bangladesh and, with it, all of Asia (see Chapter 4).

77 Parnes, "Peace Corps Seeing Resurgence," *Naples Daily News* (Naples FL), October 2, 2006.

78 D. A. Henderson, *Smallpox*, 200–201.

79 *Ibid.*, 105, 198, and 201.

80 Jonathan Roy, *Smallpox Zero*, 55.

81 Foster, Peace Corps interview, February 18, 2014.

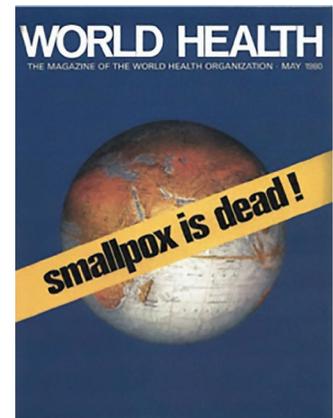
82 Foster et al., "Smallpox Eradication in Bangladesh, D23.

In 1975, Ethiopia was the only remaining country with known smallpox transmission. Faced with numerous other public health challenges, local health authorities did not consider the disease to be a high priority. However, given that the prevalent type of smallpox in the country—variola minor—was milder, sick people could still travel between the widely dispersed villages in the mountains. The poorly developed system of roads and mountainous terrain made it difficult for local teams of health workers and Peace Corps Volunteers to search for cases. Beginning in 1974, WHO brought in helicopters in a final, intense effort to eliminate the remaining pockets of the disease.⁸³ However, in the midst of this battle, a second, larger political battle was being waged that would result in the overthrow of Emperor Haile Selassie. In the ensuing chaos, WHO advisors and their smallpox teams were captured and held for ransom, necessitating military escorts.⁸⁴ Finally, in 1976, Ethiopia's last outbreak was uncovered among nomads in the Ogaden desert (see Chapter 2).

In September 1976 across the border from Ethiopia in Somalia—which had been thought to be free of smallpox—specimens from two cases discovered in Mogadishu were confirmed to be smallpox. An investigation uncovered additional people with the disease, some of whom had even been hospitalized without having been reported to WHO.⁸⁵ As health workers became aware of more cases, more and more staff were brought in to combat the disease.

In May 1977, World Health Assembly delegates expressed concern about the epidemic and the potential for some Somali patients with mild cases of the disease to join the hajj—the annual pilgrimage made by Muslims to Mecca, Saudi Arabia. “If the disease spread among the hundreds of thousands of pilgrims in Mecca, smallpox could be disseminated around the world.”⁸⁶

The national government declared the smallpox epidemic to be a disaster, and special donations poured in from other U.N. organizations, nongovernmental organizations, and several countries. Dr. Isao Arita, who had been second-in-command in WHO's Smallpox Eradication Programme until he took over for Dr. Henderson as chief of the Smallpox Eradication Unit in February 1977, personally led the effort to step up the eradication work. On October 26, 1977, the last naturally occurring case in the world was identified when a



Cover of World Health announcing the global eradication of smallpox, May 1980.

Cover: © WHO/Design by Peter Davies.

⁸³ Jonathan Roy, *Smallpox Zero*, 56.

⁸⁴ *Ibid.*, 56–57.

⁸⁵ D. A. Henderson, *Smallpox*, 233.

⁸⁶ *Ibid.*, 237–238, © 2009, Prometheus Books.

In May 1980, the World Health Assembly officially declared the world free of smallpox, calling this an “unprecedented achievement in the history of public health.” More than 3,000 years of human suffering, disfigurement, blindness, and death had finally been brought to an end.

hospital worker in Somalia, Ali Maow Maalin,⁸⁷ developed a fever and the characteristic rash after a brief exposure to two very sick young children, one of whom died within days of reaching the isolation camp.⁸⁸ “Heroic measures were taken”⁸⁹ to ensure that all of the people who had been in contact with him were tracked down, and transmission was stopped before the hajj began (see Chapter 4).

In the final years of the global eradication program (1973–1979), WHO conducted an intensive search for smallpox cases and frequently assigned short-term consultants to assist in this process. The final search included 21 independent, international commissions that certified eradication in 36 countries. Special reviews were conducted in 79 countries, and laboratories studied nearly 9,000 samples drawn from patients with other similar illnesses,⁹⁰ but no more cases were uncovered (see Chapter 4).

In May 1980, the World Health Assembly officially declared the world free of smallpox, calling this “unprecedented achievement in the history of public health to the attention of all nations, which by their collective action have freed mankind of this ancient scourge and, in so doing, have demonstrated how nations working together in a common cause may further human progress.”⁹¹ More than 3,000 years of human suffering, disfigurement, blindness, and death had finally been brought to an end.⁹²

⁸⁷ Jonathan Roy, *Smallpox Zero*, 58.

⁸⁸ D. A. Henderson, *Smallpox*, 239.

⁸⁹ *Ibid.*, © 2009, Prometheus Books.

⁹⁰ *Ibid.*, 246; Jonathan Roy, *Smallpox Zero*, 60.

⁹¹ D. A. Henderson, *Smallpox*, 249, © 2009, Prometheus Books.

⁹² Even after this announcement, Dr. Isao Arita remained at the head of the smallpox unit at WHO until 1984 to ensure that no other cases were uncovered.

Peace Corps Volunteer Case Studies

2

2.1 Afghanistan

The primary sources for this section are Peace Corps interviews and correspondence with Kristina Engstrom (RPCV/Philippines, 1962-1964), who served as the training director for the second group of Peace Corps Volunteer vaccinators in Afghanistan; Maggie Eccles (RPCV/Afghanistan) who worked in smallpox eradication as a Volunteer; and a video (Once in Afghanistan) produced by Jill Vickers (RPCV/Afghanistan) and Jody Bergedick. Material from other sources is footnoted as needed.

Eradication efforts by the Afghan Ministry of Health began in 1963 with freeze-dried vaccine donated by the Soviet Union.¹ Afghanistan's geography and climate posed almost insurmountable challenges. Aside from a few cities and towns, people lived in small settlements scattered across rugged, mountainous terrain and in the desert that, for the most part, could only be traversed on foot, on the backs of horses or donkeys, or by using the most rudimentary of roads. In the winter, snow made many of these places almost unreachable.

There were sparse communications, no maps, and little organization or reporting on the part of the local vaccinators. Government services were available only in the towns and cities. Health-care facilities generally consisted of a clinic with a single shelf of medicine. For most Afghans living in rural areas, there were no telephones or telegraphs, no schools, and no health services or facilities. Smallpox vaccinators were the first government representatives ever seen in some of these villages as well as the first trained health-care providers of any kind. If the vaccinators could not solve problems themselves or get around them, they would have to return to Kabul—usually a trip that could last several days.

In addition to the mountains, the weather, and the health-care system, Afghan vaccinators faced another challenge: nomadic encampments of ethnic *kuchis*. For thousands of years, these nomads had traveled throughout Afghanistan, camping when weather forced them to stop or when they found good pastures for their sheep or opportunities to trade. Along with their trade goods, they carried smallpox.

¹ D. A. Henderson, *Smallpox*, 189.

The eradication program was also challenged by a custom that was commonly practiced and deeply entrenched—variola.² The new smallpox management team discovered that fully one-third of smallpox cases in Afghanistan resulted from outbreaks triggered by variola. As Dr. D. A. Henderson recalled, “Any national attempt to outlaw the practice was meaningless because there was no government structure that could enforce it.”³ Rather than confronting the traveling mullahs (religious leaders) and local healers who practiced variola directly, government vaccination teams began giving vaccine to the mullahs and healers to replace the scabs they had collected from smallpox patients.

In 1967, a national program was formed with mass vaccination as its primary strategy.⁴ The program did not reach its full potential in efficiency and effectiveness, however, until 1969 when Dr. D. A. Henderson visited Afghanistan.⁵

Soon thereafter, improvements began to be seen. An experienced, retired Indian colonel, Dr. Arcot Rangaraj, and a committed Afghan program director, Dr. Abdul Mohammed Darmanger, became the leaders of the national program in Afghanistan.⁶ These changes energized the WHO staff and the Afghan Ministry of Health.

The Peace Corps Connection

Another major constraint of the smallpox program in Afghanistan was the custom of *purdah*, which dictated that women should be completely separated from men. Men were not allowed to look at or touch any women or girls who were unrelated to them. This cultural constraint posed a significant problem for vaccinators, who were usually men, and it prevented the most vulnerable members of society—children who were at home with their mothers—from receiving a life-saving vaccination in an area where variola major, with its high mortality, was widespread.

WHO began discussions with the Peace Corps as a way to deal with the problem of vaccinating Afghan women and children. The proposal

² Variola, as described in Section 1.3, is the ancient practice of deliberately infecting a person's skin with the smallpox virus in order to cause a mild case. These cases were known to be much less deadly than a natural (inhaled) infection, but variolated individuals—unlike those who were vaccinated—were just as contagious as naturally occurring cases.

³ D. A. Henderson, *Smallpox*, 189, © 2009, Prometheus Books.

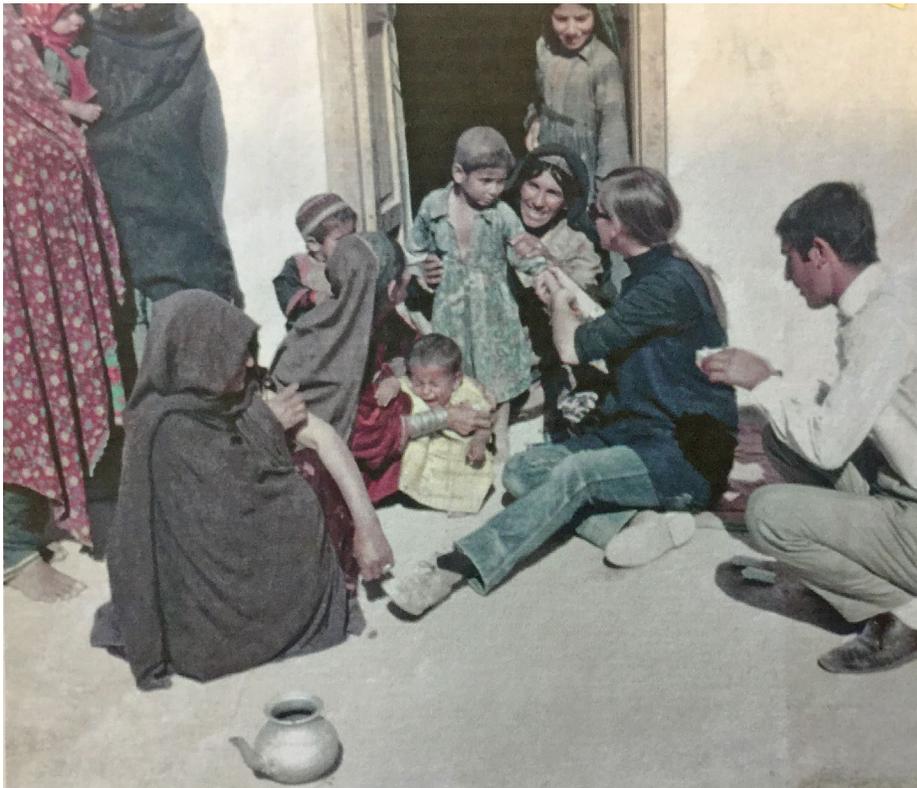
⁴ Ogden, *CDC and the Smallpox Crusade*, 97.

⁵ *Ibid.*

⁶ D. A. Henderson, *Smallpox*, 190.

was to send a group of female Volunteers to vaccinate Afghan women, particularly in rural areas. An intense debate ensued between the Peace Corps and WHO about the propriety, safety, wisdom, and effectiveness of sending American women to the most remote areas of a country known for its rugged mountains and vast deserts where they would travel, work, sleep, and provide health care with only Afghan men as counterparts and traveling companions. Although this type of mobile, public health work was unusual for Peace Corps Volunteers, since they would not be living in a community, Dr. Henderson persisted.

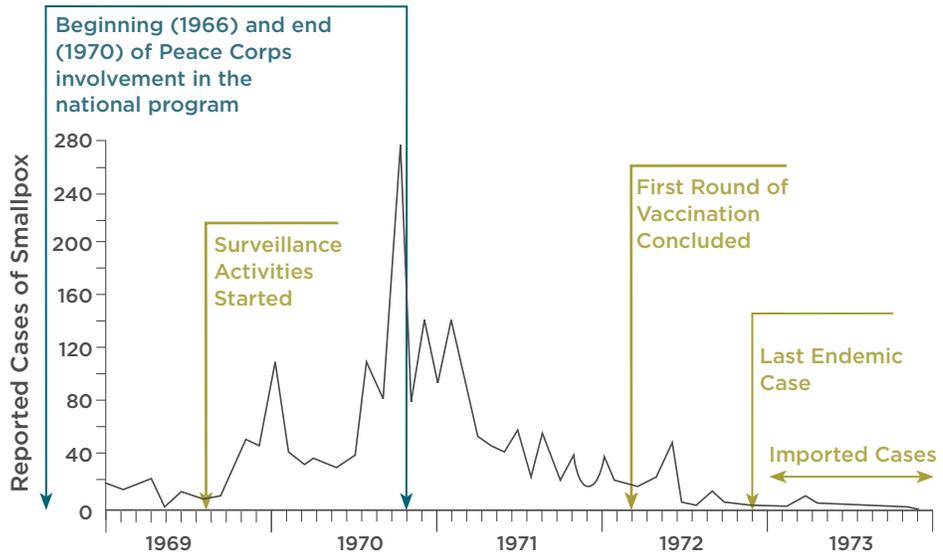
Eventually, Peace Corps staff agreed to pilot test the feasibility of this concept. In the summer of 1966, six Volunteers who were registered nurses already serving in Afghanistan—five of whom were women—began going to rural areas with Afghan teams to vaccinate the local inhabitants. They returned to Kabul after two weeks in the field with a positive assessment of the pilot test, and a full program was approved.



Peace Corps Volunteer Margery Bickler vaccinating a child in Afghanistan, 1969.

Photo: Peace Corps 50th Anniversary archives/Photographer unknown.

Figure 4: Timeline to the Elimination of Smallpox, Reported Cases in Afghanistan (1969-1973)



Reprinted with permission from D. A. Henderson, *Smallpox*, Figure 54, p. 194, © 2009, Prometheus Books. Adapted to illustrate the beginning and end of the Peace Corps Volunteers' contributions.

Volunteer Recruitment and Training

In March 1967, the first all-female group of Volunteers destined to serve as vaccinators in Afghanistan began training at the Experiment in International Living facilities in Brattleboro, Vermont. The group's makeup was of historic note: Women were in the minority in the early years of the Peace Corps, and this was one of the few all-women Peace Corps groups at that time.

Although the Peace Corps would have preferred to have recruits with experience or training in health, this was not a requirement. Instead, recruiters focused on finding self-reliant, flexible, independent women who were used to an outdoor life and in good physical condition. Training was intended to build on these strengths, developing trainees' confidence in themselves and their ability to achieve tangible results. Their training included Afghan culture, language (Farsi), the epidemiology of smallpox, and public health principles and practices. The training also covered vaccinations, including how to give injections in case the Volunteers were asked to help with outbreaks of other diseases. This strategy later proved useful when emergency campaigns had to be fielded during cholera epidemics.

In June 1967, the women who had been selected as Volunteers flew to Kabul for one final month of in-country training where they were introduced to vaccination work and the rugged nature of traveling and living in these isolated areas. This final month of training exposed trainees to the demands that this kind of public health work would place on them. At the end of this period, 20 women signed on to work as vaccinators, and two became teachers.

In October 1968, a second all-female group of vaccinators began their training for the smallpox program, largely guided by the experience of the first group. Their training was managed by the Center for Research and Education based in Estes Park, Colorado. The women were trained at several locations, including the White Mountain Apache Reservation in Arizona, where they spent a week helping the Public Health Service conduct a diabetes test among the Apache. Like their predecessors in the first group of vaccinators, the new trainees studied Afghan culture, Farsi, and vaccination techniques.

This group of 23 women left the United States and arrived in Kabul on January 1, 1969, to begin their final month of training in-country. Twenty-one were sworn in as Volunteers a month later: 18 became vaccinators, two became teachers, and one was assigned to the Peace Corps office's health clinic in Kabul.

When this group's service ended in October 1970, the all-female cohort was not replaced. By that time, the smallpox teams had discovered a way to work within the cultural custom of *purdah*. Male health workers could vaccinate women and girls who refused to come out into public view by having them extend a single hand or arm out of their homes while the rest of their bodies remained hidden behind the door.⁷

Table 1 provides a cumulative list of Peace Corps Volunteers in the smallpox program in Afghanistan from the start of the pilot testing to the last training group. This list was compiled from Peace Corps administrative data, *Once in Afghanistan* movie director Jill Vickers, and information obtained from Kristina Engstrom. It is expected to be largely complete given that this group of women has maintained close contact since their service ended. Dates of service listed in this table represent the entire period of service in Afghanistan. A few of these women shifted to other jobs, such as teaching English, working in the local Peace Corps office, or working as a laboratory technician, during their second year in-country.



Five Peace Corps Volunteers leaving Kandahar, Afghanistan, on their way to provide vaccinations in remote villages, 1969. From left to right: Maggie Eccles, Rita Hackett, Lynn La Froth, Carol Crawford (Omar), and Barbara Runyan.

Photo: Global Health Chronicles/Photographer unknown.

7 D. A. Henderson, *Smallpox*, 193.

Table 1: Peace Corps Volunteers in the Smallpox Program in Afghanistan⁸

Pilot Test Participants	First Group (1967)	Second Group (1968)
Richard Johnson (1965-1967)	Barbara Bazil (1967-1969)	Linda Berryhill (1968-1971)
Janet Kutny (1965-1967)	Carol Beecher (1967-1969)	Margery Bickler (Gadd) (1968-1970)
Alison Ostergren (1965-1967)	Beverly Blevins (Niemann) (1967-1969)	Carol Crawford (Omar) (1968-1970)
Janice Rudnitski (1965-1967)	Beryl Brinkman (1967-1969)	Jacquelyn Davidson (1968-1969)
Cheryl Stetler (1965-1967)	Margaret Bubon (Smith) (1967-1969)	Margaret Eccles (1968-1970)
Brenda Reiter (1966-1968)	Betty Ann Chapman (Cochran) (1967-1969)	Lizette Echols (1968-1969)
	Althea Daley (Rammessirsingh) (1967-1969)	Christine Frazier (Wilhelm) (1968-1971)
	Sharon Fee (1967-1969)	Rita Hackett (1968-1970)
	Pauline Golamis (Thomas) (1967-1968)	Martha Haynes (1968-1970)
	Jewell Griggs (Miller) (1967-1969)	Emily Charlene Keeling (McGrath) (1968-1971)
	Margot Hallenbeck (1967-1969)	Lynn La Froth (1968-1970)
	Elaine Hamblin (Monteilh) (1967)	Carolyn Moll (1968-1971)
	Judith Johnson (Sandberg) (1967-1969)	Janice (Jan) Reimer (1968-1970)
	Ann Kirkpatrick (1967-1969)	Barbara Runyan (1968-1971)
	Theresa Murphy (Woll) (1967-1969)	Jane Stebbins (Flower) (1968-1971)
	Bronwen Parry-Pritchard (1967)	Mary Beth Sylvester (Smetzer) (1968-1969)
	Norma Russell (Emery) (1967-1969)	Jill Vickers (1968-1970)
	Lenore Sheridan (1967-1969)	Katherine White (Dawa) (1968-1971)
	Mary Louise (Artis) Spriggs (1967-1969)	

Work of the Volunteers

Initially, the Volunteers focused entirely on vaccinating the Afghan women and children who were not being reached by the Ministry of Health. For the four years that the Peace Corps continued this work, the Volunteer vaccinators made sure that this part of the population was immunized against smallpox. At the same time, however, they understood their mission to be broader. In some villages, the curiosity value of being vaccinated by foreigners meant that everyone, including the men, wanted the Volunteers to give them vaccinations.

⁸ Women who were married in subsequent years are listed here by their maiden names with their married names in parentheses.

In these cases, like their Afghan counterparts, they saw it as their mission to vaccinate every man, woman, and child. As one Volunteer recalled, “We would knock on doors, walk in on weddings, on funerals. Everything would stop, and we would vaccinate everyone.”⁹

The women divided themselves into two groups—one worked in the program’s northern zone (based in Kunduz and Pul-i-Khumri) and one in the southern zone (based in Kandahar). Within these two regions, the Volunteers were based in provincial centers where they worked in teams of four or five. The Volunteers in both groups formed regional sub-groups, each of which found their own housing where they lived together.

This regional specialization provided the Volunteers with additional opportunities to learn local languages (e.g., Pashto in the South), and study local cultures (e.g., Hazara, Turkmen, or Uzbek in the North). They could also meet local leaders and establish ties with their neighbors. When traveling, the Volunteers would sleep on thin mattresses with quilts or Peace Corps-issued sleeping bags in the village “guest house”—usually a small mud room. After vaccination trips, they would return to bathe, wash clothes, write letters, socialize, and wait for the next assignment.

Several resource-related issues between WHO and the Afghan Ministry of Health (MOH) created frustrating delays in carrying out vaccination activities for the Volunteers and their teams. At times, getting an assignment required days of waiting as the MOH cobbled together a team of Afghan vaccinators, funds to pay the vaccinators, vehicles, and agreements with local leaders. As WHO and the Ministry of Health improved their ability to get resources to the mobile teams, morale improved.

Some assignments were near enough to their “home” towns that the Volunteers could return to their homes at night. On these infrequent occasions, the Volunteers encouraged the MOH to use the few female health workers that they had on staff since the women would be able to return home at night to their families. Most of the work required longer trips, lasting for several days to several weeks, requiring Volunteers and Afghan vaccinators to travel over rugged terrain and sleep outside in the summer and as guests in someone’s compound during the winter.



Volunteer Sharon Fee reconstituting the freeze-dried vaccine that had been donated by the Russians for fieldwork in Balkh Province, Afghanistan, 1968.

Photo: Engstrom, personal collection.

“We would knock on doors, walk in on weddings, on funerals. Everything would stop, and we would vaccinate everyone.”

From Once in Afghanistan

⁹ Vickers and Bergedick, *Once in Afghanistan* (DVD).

Within a designated area, each team could cover one or more villages per day depending on the population size and the distance between villages. Many areas were unreachable by vehicle, so the teams would be dropped off at the end of the road and then continue on foot. During the summer months in the South when temperatures could exceed 100 degrees, the teams would start their day around 5 a.m. after a breakfast of tea and bread. They would rest through the middle of the day and take breaks to drink tea and rehydrate themselves before resuming work in the late afternoon.

Originally, two Peace Corps vaccinators were assigned to each team, but as time went on, Peace Corps staff decided that it would be acceptable to send one Volunteer with each group. In addition to the Volunteers, each vaccination team included three or four Afghan vaccinators; a team leader, usually a sanitarian; and perhaps a driver and/or a soldier, depending on circumstances. Team and leadership assignments were made centrally in Kabul, although Volunteers generally managed their own assignments.

The team leader developed the schedule, located the areas to be covered, and organized the work of team members despite the lack of maps, census data, or reliable communication links with Kabul. During the fieldwork, each health worker was expected to administer 100 vaccinations per day. Two-person assessment teams would follow behind the vaccination teams, randomly checking a 10 percent sample of people for the telltale vaccination scars. One or two Volunteers were assigned to accompany these doctors and nurses on their assessment visits.

When a team arrived at a village, the team leader would request the headman's permission to administer vaccinations. Obtaining this agreement required reassuring, cajoling, teasing, humoring, and even occasionally threatening government action, so team leaders needed to be masters of diplomacy. As the Volunteers became more fluent in the local languages, some of them were able to assess the mood of the headmen and adjust their approaches to different situations almost as well as their Afghan mentors. Once an agreement had been reached, the health workers needed to develop a strategy, such as gathering the women and children in a single compound for their vaccinations, directing the village men to line up for a vaccination, or having a village leader escort the team from house to house to ensure that people who were not able to leave their homes or were too afraid to come out would be covered.

It is worth noting that, in spite of the prevalence of smallpox in Afghanistan, fear of the disease was not always enough to overcome resistance to vaccination. Some people thought that smallpox was caused by evil spirits, and they feared that the injections would introduce those spirits into their bodies. They had no experience that would enable them to associate the injection of some unknown fluid with the prevention of a disease.

Many local women who were more afraid of needles than of the disease itself would run away. Other women claimed that they would be unable to do any of their daily tasks, such as washing clothes, if something happened to the arm where they would be vaccinated. Some of the men were also resistant, because they were suspicious of strangers or skeptical of a program sponsored by the national government.

One of the Volunteers, Maggie Eccles, recalled that many villagers were suspicious and confused about the Volunteers' appearance, not knowing whether they were men or women despite their best efforts to dress appropriately in long, baggy pants and tunics. The local women were also unsure what to make of the Volunteers' seemingly strange behavior, as they traveled with men and moved freely about the villages with uncovered faces.

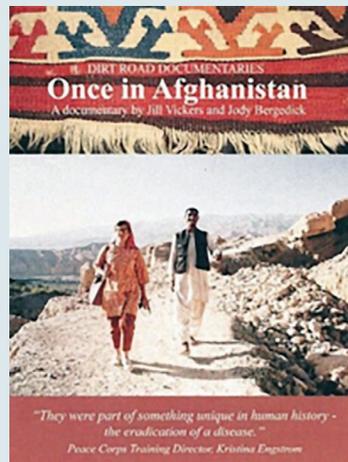
Eventually, most women agreed to be vaccinated or were directed to cooperate by male relatives. Once the Volunteers overcame local women's resistance to vaccination, many of these Afghan women invited them to sit for tea. Curious about their visitors, they would touch the Volunteers' hair, skin, and clothes while asking about their families and if they were married. "The visit of the foreign vaccinators was an exciting event in the lives of the people, and they didn't want to let go."¹⁰

The lengthy days of traveling from village to village within an area lasted until the team ran out of vaccine or clean needles, or until they were just too tired to continue. Whenever each day ended, the team had to find something to eat and a place to sleep. The tradition of Afghan hospitality meant that the villagers served them dinner on a cloth spread on a large rug on the floor. The female Peace Corps Volunteers followed the example of their Afghan team members, sleeping where they did and eating what the local people could share with them.

¹⁰ Eccles and Engstrom, Peace Corps interview, February 19, 2014.

Once in Afghanistan

In 2004, a retired teacher and Afghanistan RPCV, Jill Vickers, felt an increasing need to counter the perceptions of fear and mistrust toward Afghans that had arisen after 9/11. Vickers joined forces with coproducer Jody Bergedick to tell the story of vaccinating women and children against smallpox in rural Afghanistan in the late 1960s. Vickers and Bergedick hired a videographer and spent the next year and a half interviewing other RPCVs and their training director, Kristina Engstrom. Forty years after their service, they were ready to tell their compelling story of smallpox eradication in “an Afghanistan few know, because it is pre-Soviet invasion, pre-civil war, pre-Taliban, pre-NATO forces.”¹¹ Between its debut in 2008 and 2012, the video was shown 75 times in the United States, Australia, and Afghanistan. Dr. D. A. Henderson called the film “a most remarkable presentation ... expressing understanding, empathy, surprise, awe, [and] frustration.”¹² At WHO’s 30th anniversary celebration of the certification of smallpox eradication in May 2010, the training director for Peace Corps/Afghanistan’s women vaccinators, Kristina Engstrom, discussed the film with attendees and provided copies of the DVD to people who had participated in the eradication program in other countries.



Volunteer Maggie Eccles with her counterpart on the cover of a film produced by RPCVs from Afghanistan.

Program Accomplishments

The female Peace Corps Volunteers in Afghanistan were among the first Volunteers to be specifically trained to participate in WHO’s global Smallpox Eradication Programme. Among many other achievements, these women proved that Volunteers had something to contribute to the global eradication program and that American women could work effectively under demanding physical and psychological conditions on a sustained basis.

¹¹ *Once in Afghanistan* promotional material, author unknown.

¹² Quoted in Engstrom, “Film Story: The Story of *Once in Afghanistan*,” 3.

On a personal level, these women won the respect of their Afghan counterparts who learned to see them as capable, resilient, and equal to the task at hand. In spite of everything their culture, religion, and upbringing might have taught them, some counterparts even became friends with these American women.¹³ As a result, both the Volunteers and the local people learned more about each other, and rural Afghans became less likely to view foreigners, people from Kabul, and government representatives with suspicion, at least for a time.

On a professional level, these Volunteers won the respect and admiration of WHO, the Afghan Ministry of Health, and their Peace Corps colleagues alike.¹⁴ Their skills and tenacity enabled them to contribute to the newly re-energized WHO program in Afghanistan. Under new leadership, the national staff—assisted in part by Peace Corps Volunteers—organized a national vaccination campaign that succeeded in reaching more than 80 percent of the population.¹⁵ In all, more than 10 million people were vaccinated in a span of three years.

As the program in Afghanistan evolved, innovative ways to vaccinate women were developed. When WHO changed the primary strategy from mass vaccination to surveillance and containment, the need for women vaccinators decreased. As fewer women were needed to administer the actual vaccinations, these Volunteers transitioned into more administrative roles in surveillance and containment campaigns. By the time the last Peace Corps smallpox vaccinators left in January 1971, it was known that Afghan vaccinators could now reach everyone, including the women of Afghanistan.

Through the continued dedication of the Afghan vaccination teams—trekking through feet of snow on horseback or on foot for days at a time¹⁶—the endemic transmission of smallpox finally ended in 1972.¹⁷ On three separate occasions, the virus was reimported by nomads arriving from Pakistan, but the surveillance teams near the border were able to find and suppress these outbreaks before they spread.¹⁸ Smallpox was permanently eradicated in Afghanistan in 1974.

13 Two of the Volunteers in the last group married Afghan sanitarians they had met while vaccinating.

14 Eccles and Engstrom, Peace Corps interview, February 19, 2014.

15 Jonathan Roy, *Smallpox Zero*, 49.

16 D. A. Henderson, *Smallpox*, 194.

17 *Ibid.*, 188; Jonathan Roy, *Smallpox Zero*, 49; and Foege, *House on Fire*, 152.

18 D. A. Henderson, *Smallpox*, 195.

2.2 Zaire (Democratic Republic of the Congo)

The primary sources for this section are a Peace Corps group interview and correspondence with five RPCVs from Zaire who worked in smallpox eradication as Volunteers: Ken Bloem, Alan Fiske, Mark Robbins, John Schiller, and Tim Miner. Material from other sources is footnoted as needed.

“As I look back on events, I doubt very much that, without the PC input into these countries, we would have succeeded in sustaining the momentum of a global effort that required a group of determined young people who ignored the fact that many had pronounced the goal as ‘unachievable.’”

– Dr. D. A. Henderson

When Zaire¹⁹ gained its independence in 1960, there were few people who had received formal schooling, “the government was in shambles, and the lack of security was a continuing threat.”²⁰ Smallpox was prevalent throughout Zaire, and its position in the center of Africa put its neighboring countries at risk. Despite “grossly incomplete” reporting, it accounted for one-third of all smallpox cases in Central, Eastern, and Southern Africa.²¹

A pilot vaccination program was begun in Zaire around 1967, but it faced numerous challenges, including an attempt to combine smallpox work with BCG vaccination²² and a policy carried over from its colonial past of giving a certificate to each person who was vaccinated. Since the Belgians had punished people who did not obtain their vaccination certificates, the police continued to ask civilians for this documentation. Anyone who did not have a certificate following the mass vaccination campaign had to pay a fine. The paperwork generated by this policy meant that, “For each jet injector, six clerks were needed just to fill out the certificates.”²³

In 1967, the CDC and WHO offices dispatched Jean Roy (RPCV/ Cameroon) to Zaire for a six-week assessment of WHO’s progress in containing a smallpox outbreak (see Chapter 3). New leadership was announced for the smallpox program, including Dr. Jacques Pierre Ziegler, a French medical officer with 16 years of experience in Chad. Dr. Ziegler dispensed with the certificates, but other challenges remained, such as an erratic flow of resources from the newly formed government and an unreliable infrastructure of roads and bridges that had been hastily repaired after the recent civil war. The new government had not yet organized the country’s health services, so even such basic information as a list of dispensaries was not available. There were too few trained staff to field more than three vaccination teams for a country one-quarter the size of the United States and covered in dense rainforest.²⁴

19 When this program began, the country was still called the Democratic Republic of the Congo (DRC). President Mobutu changed the name to Zaire during the years that the Peace Corps Volunteers were living there. It is now called the DRC.

20 D. A. Henderson, *Smallpox*, 140, © 2009, Prometheus Books.

21 *Ibid.*, 140, 143.

22 *Bacillus Calmette-Guerin (BCG)* is a vaccine used for protection against tuberculosis.

23 D. A. Henderson, *Smallpox*, 140, © 2009, Prometheus Books.

24 *Ibid.*, 142.

The Peace Corps Connection

The Peace Corps' contributions to the efforts of WHO staff in Zaire from 1970 to 1973 constituted one of the first Peace Corps programs in the country. When it started, there were only a few other Volunteers in the country, and Peace Corps programming was only just beginning to take shape. USAID was also working in Zaire at the time, mostly on road maintenance and the organization of the ferry boat system.

When the smallpox program began, WHO was unable to recruit sufficient manpower to supplement the national workers. Dr. D. A. Henderson, the head of the WHO program, recalled how he sought Peace Corps Volunteers to provide needed manpower for the program in Zaire:

On the WHO side, we had a very small budget to work with (\$2.4 million) and [need for assistance in] 45 countries that were endemic or bordered endemic areas. ... As I recall, Zaire was allotted two positions in the budget—Pierre Ziegler and Vladimir Zikmund. ... Both were dedicated people, but Zaire was a monstrous problem. With the chaos of Zaire, with WHO funds and staff limited, and with very few Congo staff educated beyond primary school (the Belgians had only begun the education process), we needed staff who could organize, lead, keep some sort of records, etc. The Peace Corps seemed like a logical place to go. However, as a WHO staff member, I was forbidden to undertake any efforts to bring the Peace Corps and Zaire officials together. ... All contacts had to be strictly between the government and the Peace Corps.

... An incredible quirk of fate intervened. I was requested to come to D.C. because of other issues and was invited by my old college roommate to stay with him and his wife—Pete and Sally Craig. ... [Sally] was on Peace Corps staff in Washington and one of her responsibilities was Zaire! ... The highly persuasive Sally Craig managed to get agreement for assignees. So, the program acquired PCs [Peace Corps Volunteers] for Zaire and, a few years later, for Ethiopia. ... For Ethiopia, we had, in addition, PCs [other volunteers] from Japan and Austria. As I look back on events, I doubt very much that, without the PC²⁵ input into these countries, we would have succeeded in sustaining the momentum of a global effort that required a group of determined young people who ignored the fact that many had pronounced the goal as “unachievable.”

– *Dr. D. A. Henderson* (email to author, January 7, 2014)

²⁵ The research conducted for this report shows that there were 72 American Peace Corps Volunteers, 12 Japanese volunteers, and four Austrian volunteers who supported the WHO Smallpox Eradication Programme in Ethiopia.

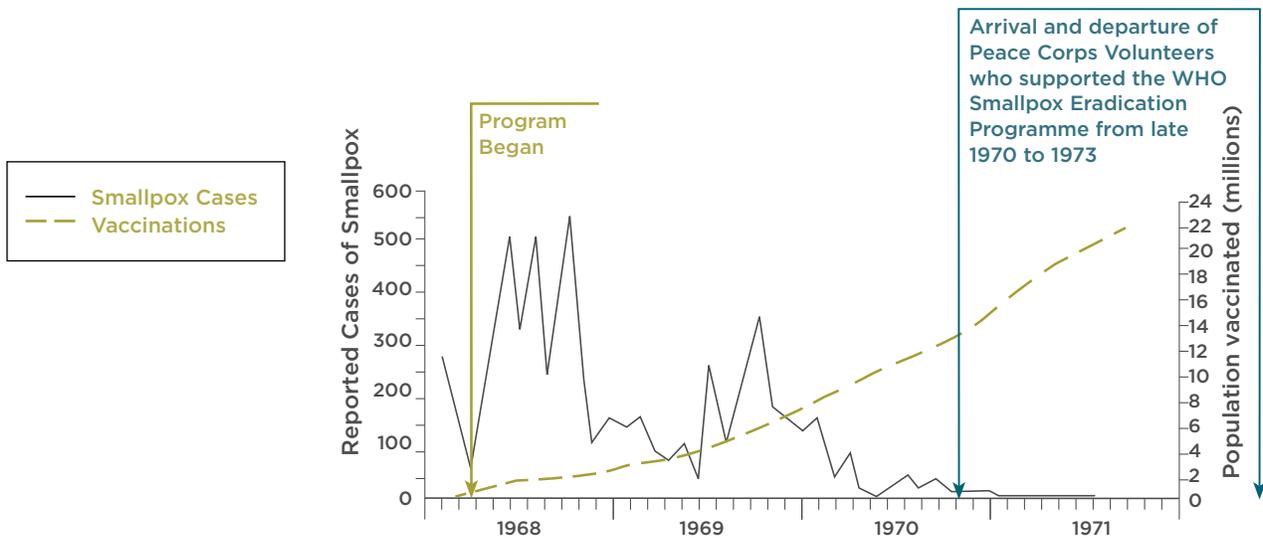
The Volunteers who were recruited for the Zaire program had already successfully completed their service in another country and were prepared for a new Peace Corps assignment where they needed to function independently. After arriving in Kinshasa and completing some paperwork and a brief orientation, they had very little contact with the post staff and no conferences or site visits. At the time, they were the only Volunteers outside of Kinshasa. “There was an active rebellion in three cities (Kisangani, Kindu, and Bukavu) in 1967, but there were parts of the country in 1970 and well beyond ... where a rebel presence was still evident, and governmental control was minimal or nonexistent.”²⁶

Despite these challenges, the Volunteers knew the significance of their work. As Alan Fiske recalled years later:

The epidemiology of smallpox meant that we each knew that if we individually failed, the whole campaign failed—not just in the Congo/Zaire, but potentially in Africa and the world. You knew what you did mattered—everyone was counting on you: team members and the people who would die if you didn’t stop the spread of smallpox. Our experience was a unique combination of autonomy, interdependence, and centralized control by a brilliant leader (whom we know was in turn reporting to another brilliant leader, D. A. Henderson).

– Alan Fiske (email to author, March 3, 2014)

Figure 5: Timeline to the Elimination of Smallpox, Reported Cases in Zaire (1968–1971)



Reprinted with permission from D. A. Henderson, *Smallpox*, Figure 36, p. 144, © 2009, Prometheus Books. Adapted to illustrate the beginning and end of the Peace Corps Volunteers’ contributions.

Volunteer Recruitment and Training

Mark Robbins, Alan Fiske, Ken Bloem, and John Schiller were Volunteers in Malawi from 1968 to 1970 on a project that included maternal and child health, nutrition education, environmental health, and infectious disease control. They heard about smallpox as part of their health training, but their program in Malawi was more focused on tuberculosis (TB) control and working with leprosy patients. Toward the end of their service, Peace Corps staff informed them of the opportunity for a third-year extension/transfer assignment to work with the WHO smallpox campaign in Zaire. As Mark Robbins recalled:

This project was considered highly visible because of its connection with WHO and possibly very challenging because of the conditions in the Congo. ... They were willing to accept one-year commitments in return for an expectation that the Volunteers who signed on knew how to survive happily in Africa and would fulfill those commitments. The other criterion, originally, was French language ability. After exhausting all the potential recruits from Francophone Africa, the Peace Corps, WHO, and government of Congo reluctantly agreed to accept non-Francophone recruits who would have to go through intensive French training for two months prior to arrival. That opened the gates to the Malawi Mafia [as Mark, Alan, Ken, and John were affectionately known in Zaire].

– *Mark Robbins* (email to author, March 5, 2014)

The first step for the Volunteers who needed more French language skills was to attend training in the Virgin Islands in late 1970 and early 1971. All four men arrived in Zaire between December 1970 and March 1971, joining Sherman (Rocky) Frederickson and John Uminski, who transferred in from Senegal. At their orientation to the smallpox eradication work, the Volunteers learned how to administer smallpox from Russian-made, freeze-dried vaccine. The first group of Volunteers used Ped-O-Jet vaccination guns until the bifurcated needle was introduced in this program.

Another Volunteer recruited to serve in the smallpox program was Tim Miner. Tim had originally been sent to Swaziland to teach high school English, but after learning that he was taking the place of unemployed Swazi teachers, he began to look for other opportunities. Tim was offered the chance to go to Zaire as a field epidemiology team lead in the smallpox program. After more than a year of service in Zaire, he stopped in Geneva on his home-leave trip to the United States. He met with Dr. D. A. Henderson at his WHO office, and their conversation led to his eventual posting to Bangladesh as a WHO technical officer from 1973 to 1974 (see Chapter 4).

Table 2 was compiled from numerous sources, including interviews and correspondence with the RPCVs as well as Peace Corps administrative data in an effort to be as comprehensive as possible in listing the Volunteers who supported this project.

Table 2: Peace Corps Volunteers in the Smallpox Program in Zaire²⁷

Name	Initial Peace Corps Service	Service in Zaire
Alan Fiske	Malawi (1968-1970)	1970-1972
Ken Bloem	Malawi (1968-1970)	1971-1972
John Schiller	Malawi (1968-1970)	1971-1973
Mark Robbins	Malawi (1968-1970)	1971-1972
John Uminski	Senegal (1968-1970)	1971-1972
Sherman (Rocky) Fredrickson	Senegal (1968-1970)	1970-1971
Mark Schwartz	Senegal (1969-1971)	1972-1973
Howard G. (Tim) Miner	Swaziland (1970-1971)	1972-1973
Arthur Milot		1971-1972
William (Bill) Robinson		1971-1973
Joseph (Joe) Degenhart		1971-1973

Work of the Volunteers

“It was a race against time.”

– Ken Bloem

As Mark Robbins recalled, smallpox eradication in Zaire was a “quasi-military operation” that required organization and discipline. When the first group of Volunteers arrived in Zaire, the mass vaccination phase was still underway with its armies of Land Rovers, injector guns, personnel, and thousands of people lining up for vaccinations. Ken Bloem remembered the urgency they felt to complete the vaccination phase: “It was a race against time because rebel control was spreading, so we had to complete mass vaccination while surrounded by corrupt locals and politicians who didn’t necessarily want us there—it was a hairy situation.”²⁸

²⁷ Even after smallpox was thought to have been eradicated in Zaire, surveillance continued. Part of the effort included assessing cases of monkeypox—a related, but much less severe, disease. At least two additional Volunteers were known to have participated during their Peace Corps service in this later work: Monica Wernette (1981-1983) and Brad Otto (a Volunteer from 1980-1985 who began his monkeypox surveillance in 1983). After their service, Monica continued to work for WHO while Brad worked for CDC. (Source: Jean Roy, Peace Corps interview, March 6, 2014; Miner, email to author, August 3, 2016; and Otto, email to author, September 9, 2016.)

²⁸ Robbins, email to author, January 2, 2014.

While the first Volunteers began to serve in the mass vaccination effort, the WHO strategy soon shifted from a focus on mass vaccination to surveillance and containment. In this second phase, each of the Volunteers was placed in charge of organizing and training a small provincial surveillance team. “This involved all of the traditional Peace Corps roles in learning about the host culture, transferring skills, and leaving something sustainable behind.”²⁹

In many other smallpox programs, the national Ministry of Health contributed staff, but with Zaire’s weak central government, this program evolved differently with no “counterparts” in the traditional Peace Corps sense. WHO contracted local men as technicians, vaccinators, drivers, night watchmen, and mechanics. They were paid from monthly funds forwarded by the WHO/Kinshasa smallpox program to the Volunteers for disbursement, but the local contractors were not employees of WHO or the Ministry of Health.

The Volunteers felt that they had an instrumental role in the surveillance and containment phase as team supervisors. As Mark Robbins explained, “The job was not that difficult technically—we knew what to do—but it was the most responsible job I had ever had in my still young life in terms of leadership, supervision, logistics, managing, and accounting for money.”³⁰

The Volunteers received shortwave radios to remain in contact with WHO. They communicated directly with Dr. Ziegler, who would drill them about what they had seen and done and how many hours they had worked. Typically, the Volunteers would spend 28 or 29 days per month on the road. The surveillance teams showed pictures of the disease to the local people, leaving immediately with food and provisions to investigate any reports of cases.

Despite the many challenges of Zaire—and unlike several other smallpox programs—none of the Volunteers recalled seeing any resistance to vaccination. As Alan Fiske said, “We never encountered resistance to vaccination. Many people, including the Pygmies, thought the vaccine imparted magical powers.”³¹ In fact, for this reason, Ken Bloem recalled seeing the same people go through the vaccination line four to five times.³² As time went on, the Volunteers saw fewer and fewer cases; Alan Fiske saw the last smallpox case in Zaire during his service.

“This involved all of the traditional Peace Corps roles in learning about the host culture, transferring skills, and leaving something sustainable behind.”

– Mark Robbins

²⁹ Robbins, email to author, January 2, 2014.

³⁰ Robbins, email to author, March 4, 2014.

³¹ Bloem, Fiske, Robbins, and Schiller, Peace Corps interview, March 4, 2014.

³² Ibid.

Program Accomplishments

By July 1971, an estimated 24 million vaccinations had been given in the smallpox program in Zaire. Volunteers continued to do surveillance work until 1973, but no further cases were found after June 1971.³³ In 1973, the Peace Corps highlighted the service of the Volunteers in Zaire in its annual report to Congress:

Public health is another area in which the Peace Corps was able to make significant contributions. For example, an extremely successful smallpox eradication project, undertaken jointly by the World Health Organization and the Zaire Ministry of Health, used Peace Corps Volunteers as mobile team leaders. The Volunteers contributed thousands of man-hours, trained nearly 2,000 medical personnel, and vaccinated more than 5.2 million people. For the first time, Zaire is described by WHO as free from smallpox.

(Peace Corps, FY 1973 Annual Operations Report, 23)

2.3 Ethiopia

The primary sources for this section are Peace Corps interviews and correspondence with four RPCVs from Ethiopia who worked in smallpox eradication as Volunteers: Robert Steinglass, Vince Radke, Marc Strassburg, and Dan Kraushaar. Other sources, including oral histories from the Global Health Chronicles, are footnoted as needed.

Ethiopia was one of the last countries in the world with endemic smallpox, and its central highlands, known as the “Tibet of Africa,” harbored the last pockets of the disease.³⁴

Dr. D. A. Henderson had visited Ethiopia in the late 1960s to talk to the government about smallpox eradication. Initially, the Ethiopian government was reluctant to devote significant resources to the effort since the country had the milder variola minor type of smallpox with a low case fatality rate of around 0.5 percent.³⁵ The government perceived the disease to be relatively minor compared to Ethiopia’s other health concerns. In particular, the government was already engaged in a large malaria eradication program funded by USAID.

As the government would soon discover, however, smallpox was much more widespread in Ethiopia than originally thought. This was the case precisely because variola minor was relatively mild—infected

³³ D. A. Henderson, *Smallpox*, 143.

³⁴ Steinglass, Peace Corps interview, November 22, 2013.

³⁵ Ibid.

people who were rarely bedridden often continued to travel, long distances, transmitting the disease wherever they went.³⁶ Another challenge for the eradication program was that variolation—the antiquated treatment for smallpox in which inoculated patients were capable of spreading the disease to others—was commonly practiced in the country.

The Ethiopia smallpox program utilized local health workers under the leadership of Ethiopian program manager Ato Yemane Tekeste and provincial level officials. It was supported by WHO advisors, including Dr. Kurt L. Weithaler, the senior WHO medical officer responsible for the smallpox program in Ethiopia, and director of field operations, Dr. Ciro de Quadros, a Brazilian epidemiologist who had fought the disease in his own country.³⁷ WHO supplied 21 vehicles and \$120,000 to fund the program.³⁸

The Peace Corps Connection

In January 1971, teams began looking for cases. They uncovered 26,000 in the first year: a vastly different result than the Ethiopian government's official statistic of 722 cases.³⁹ Faced with an epidemic and limited resources, Dr. Henderson called for reinforcements. Dr. Petrus Koswara, former director of the program in Indonesia, joined Ethiopia's WHO team. The neighboring countries of Sudan, Kenya, and Djibouti augmented the effort, focusing on preventing Ethiopian travelers from starting outbreaks in their countries.⁴⁰

Aware of the need for assistance in Ethiopia, CDC Director Dr. David Sencer approached the Peace Corps for help. The agency agreed to send a group of Volunteers to work with Ethiopian health officers in smallpox vaccination, surveillance, and containment under the general supervision of Drs. Koswara and de Quadros. In 1970, the Peace Corps sent approximately 15 Volunteers to Ethiopia in the first group and posted additional groups from 1972 to 1974.

³⁶ D. A. Henderson, *Smallpox*, 221.

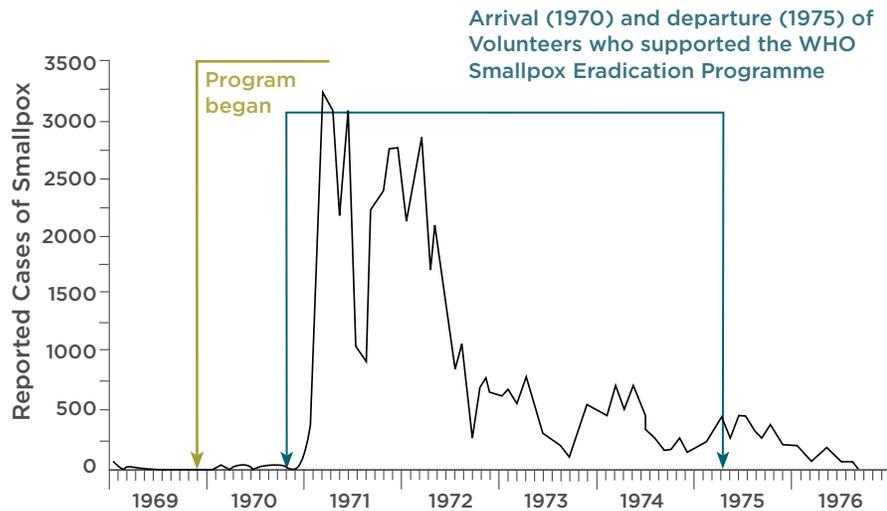
³⁷ *Ibid.*, 219.

³⁸ Shurkin, *The Invisible Fire*, 372.

³⁹ De Quadros, "Experiences with Smallpox Eradication," D30, and D. A. Henderson, *Smallpox*, 219.

⁴⁰ D. A. Henderson, *Smallpox*, 221–222.

Figure 6: Timeline to the Elimination of Smallpox, Reported Cases in Ethiopia (1971-1975)



Reprinted with permission from D. A. Henderson, *Smallpox*, Figure 62, p. 220, © 2009, Prometheus Books. Adapted to illustrate the beginning and end of the Peace Corps Volunteers' contributions.

Volunteer Recruitment and Training

The Volunteers who were assigned to the smallpox program in 1970 as their full-time project traveled to CDC headquarters in Atlanta for a two-week training course in smallpox epidemiology. Vince Radke, a Peace Corps trainee at the time, described this as the best training he had ever received.⁴¹ The trainees developed skills in differential diagnosis so that they could identify cases, and they learned about the strategy of surveillance and containment. They also learned to administer the vaccine with a jet injector.

After their training at CDC headquarters, the first group of Volunteers traveled to Ethiopia, arriving just as the country was in the midst of a cholera outbreak. For the first month, Vince Radke, Marc Strassburg, Dan Kraushaar, James Lepkowski, and other Volunteers provided vaccinations for cholera using jet injectors.⁴² These devices allowed them and their counterparts to vaccinate as many as 10,000 people against cholera in a single day.⁴³ Dan would later estimate that they were able

⁴¹ Radke, "Oral History," Global Health Chronicles.

⁴² David Bourne, who arrived two years later, also recalled that he and another unnamed Peace Corps Volunteer were able to vaccinate "several thousand people" when cholera broke out where they were working in the desert of Ethiopia. See Bourne, "Oral History," Global Health Chronicles.

⁴³ Radke, Peace Corps interview, November 13, 2013.

to vaccinate hundreds of thousands of people using this approach.⁴⁴ Only after the cholera outbreak was contained did they continue with their Peace Corps cross-cultural training.⁴⁵

Table 3 was compiled from numerous sources, including interviews and correspondence with the RPCVs as well as Peace Corps administrative data, in an effort to be as comprehensive as possible in listing the Volunteers who supported this project. Overall, a total of 72 Volunteers were found who worked in smallpox eradication during their service for periods ranging from a few months to four years. When the groups overlapped, there were as many as 40 Peace Corps Volunteers working in the country’s smallpox program in any given year.

Table 3: Peace Corps Volunteers in the Smallpox Program in Ethiopia

Name	Dates of Peace Corps Service in Ethiopia ⁴⁶
<i>Volunteers arriving before 1970</i>	
Timothy (Tim) Williams	1968-1972
<i>Volunteers arriving in 1970</i>	
Joseph (Jay) Anderson	1970-1972
Clyde Emerson	1970-1972
Russell Handzus	1970-1972
Graham Holmboe	1970-1971
Charles Kilmer	1970-1972
Phillip Kneller	1970-1972
Daniel (Dan) Kraushaar	1970-1972
James Lepkowski	1970-1972
Vincent Radke	1970-1974
Stanley (Stan) Ratoff	1970-1973
Michael Santarelli	1970-1973
James (Jim) Siemon	1970-1972
James (Jim) Skelton	1970-1972
Marc Strassburg	1970-1972
Gary Urquhart ⁴⁷	1970-1972

44 Kraushaar, Peace Corps interview, August 10, 2016.

45 In addition to applying their surveillance and containment skills to cholera, Dan Kraushaar reported in his Peace Corps interview that Volunteers were also asked to be on the lookout for cases of leprosy.

46 Dates of service listed in Table 3 cover the entire period of service in Ethiopia. The length of time dedicated to smallpox eradication is less than the total time in service for some Volunteers. Of the 72 Volunteers listed here, two were teachers who are believed to have worked in smallpox only as a secondary project during the summer. Among the others, three Volunteers were initially assigned to a rural development and agricultural extension project, and one Volunteer was initially assigned to an education project before they began working in smallpox.

47 Gary Urquhart also worked in Ethiopia after his Peace Corps service as well as in Pakistan and Bangladesh.

Table 3 (cont.): Peace Corps Volunteers in the Smallpox Program in Ethiopia



Peace Corps Volunteer William Anderson vaccinates a young child against smallpox near Ambo, Ethiopia, 1971. Anderson estimated that he had personally vaccinated 40,000 people during his service in the Peace Corps.

Photo: Peace Corps Media Library/ Photographer unknown.

Name	Dates of Peace Corps Service in Ethiopia
<i>Volunteers arriving in 1971</i>	
William P. Anderson	1971-1973
William (Bill) Bailey	1971-1973
Larry Clark	1971-1973
Thomas (Tom) Duffy	1971-1972
Gregory (Greg) Hoffman	1971-1973
Scott Holmberg	1971-1973
Jack Howard	1971-1973
Paul Mongeau	1971-1974
John Scott (Scott) Porterfield	1971-1973
Alan Schnur	1971-1974
Joseph (Joe) Sina	1971-1972
Peter Squyer	1971-1974
<i>Volunteers arriving in 1972</i>	
David Bourne	1972-1974
Peter Carrasco	1972-1974
John DeVleming	1972-1974
Dexter Fairbank, III	1972-1973
Michael Felton	1972-1974
Keith Heldenbrand	1972-1975
Charles (Chuck) Johnson ⁴⁸	1972-1975
Pamela Noble ⁴⁹	1972-1975
Clayton Pape	1972-1974
Donald Piburn ⁵⁰	1972-1974
Richard Poole	1972-1974
Steve Reiber	1972-1973
E. J. Rowland	1972-1974
Gerald Sulat	1972-1974
Thomas (Tom) Syrewicz	1972-1974
(Robert) Mark Weeks	1972-1974
Dennis Weibel	1972

⁴⁸ Chuck Johnson, a physician, served as the director of pediatrics at the Birla Pediatric Clinic in Addis Ababa during his Peace Corps service.

⁴⁹ Pamela Noble appears to have been the only woman assigned to the smallpox program in Ethiopia, in contrast to Afghanistan where all of the Volunteers who worked on this effort after pilot testing were women.

⁵⁰ Donald Piburn also served from 1989 to 1990 as a Peace Corps Volunteer in Paraguay.

Table 3 (cont.): Peace Corps Volunteers in the Smallpox Program in Ethiopia

Name	Dates of Peace Corps Service in Ethiopia
<i>Volunteers arriving in 1973</i>	
Richard Douglass (Doug) Arbuckle	1973-1974
Warren Barrash	1973-1974
Gene Bartley	1973-1976
Robert Bolan	1973
Raymond Bridge	1973-1974
James (Jim) Brown	1973-1974
Robert Cole	1973-1974
Stuart Gold	1973-1974
Tabo Mack	1973
Willam Martin	1973-1974
Elmer Moore	1973-1974
Thomas Ridgik	1973-1975
Robert Steinglass	1973-1975
Theodore (Ted) Tyson ⁵¹	1973-1974
<i>Volunteers arriving in 1974⁵²</i>	
Terry Brahmsteadt	1974-1975
Vincent Campbell	1974-1976
Kevin Carey	1974-1975
Benjamin Crabtree	1974-1975
Richard Godderz	1974-1975
Gene Johnson	1974-1975
Steven Lunde	1974-1975
Donald Martin	1974-1975
Ronald Mills	1974-1975
Robert Ogden	1974-1975
Clifford Pulaski	1974-1975
Edward Ruppert	1974-1975
Paul Weissleder	1974-1976

⁵¹ Ted Tyson transferred to Peace Corps/Ecuador in 1974.

⁵² The Volunteers who arrived in 1974 were sworn into service on September 8, a mere four days before Emperor Haile Selassie was overthrown. Once Haile Selassie had been deposed, the military assumed control of the country. The deteriorating security situation meant that Volunteers were given the option to terminate their service early. Many of them accepted that offer, but two others transferred from smallpox to an education project, and one shifted to service as a mechanic in the WHO motor pool.

Stamping Out Smallpox in the Capital

During his service, Dan Kraushaar sought out the assistance of local high school and college students. He trained the students to use jet injectors, and WHO provided a stipend for their work. Together, Dan and the students were able to provide vaccinations and conduct surveillance and containment. Initially, they found so many cases of smallpox that they used the mass vaccination approach, attempting to reach everyone in the city and its suburbs. As Dan recalled, “This was very successful, and we eventually vaccinated about 800,000 people. For this, I had a number of teams of students. ... They were stationed in different parts of the city and moved across the city over time. I shuttled them to and fro in a project Land Rover and supervised their work.”

Dan and his teams of students also taught people about smallpox and set up a hotline for people to report cases. “When we received news of a new case we immediately went to the household and vaccinated every contact, thus stopping the spread of smallpox from these cases. ... We also quarantined the infected person at the Infectious Disease Hospital so that we could limit their contacts with unvaccinated people in the city. This was a seven-day-a-week, day-and-night job.”⁵³

Within eight months, the neighborhood reporting system was successful in halting the spread of smallpox in Addis Ababa. At that point, the only cases were ones that had originated in other parts of the country. This work was celebrated in the local English newspaper, the *Ethiopian Herald*, on October 13, 1971, which mentioned an estimated 30 Peace Corps Volunteers engaged in this effort.⁵⁴



Urban vaccination campaign in Addis Ababa, early 1970s.

Photo: Kraushaar, personal collection.



Dan Kraushaar with student vaccinators, early 1970s.

Photo: Kraushaar, personal collection.

⁵³ Kraushaar, Peace Corps interview, August 10, 2016; and email to author, August 23, 2016.

⁵⁴ “Smallpox Put Under Control in Addis,” *Ethiopian Herald*, October 13, 1971.

Work of the Volunteers

After their CDC and Peace Corps training, Volunteers were assigned to the Ministry of Health as surveillance officers in January 1971. Most of them reported to provincial health departments in different parts of the country. For example, Vince Radke started working in the southern part of Kaffa Province while Marc Strassburg took the northern side. Jim Skelton served as an operations officer in the headquarters office in Addis Ababa while Dan Kraushaar focused on surveillance and vaccinations there. Each of the Volunteers worked with Ethiopian counterparts, and their work was supervised by WHO staff.

For the Volunteers outside of the cities, there were no maps and very few roads. They would often develop their own maps based on well-traveled footpaths. Prior to this time, smallpox cases had only rarely been reported by people who had taken the initiative to notify health centers. However, once the Volunteers began to actively search for cases with their Ethiopian counterparts, they were inundated by reports of people with smallpox.⁵⁵

In his book *Smallpox—The Death of a Disease*, Dr. Henderson recalled hearing from Volunteer Vince Radke about his visits to health centers, village leaders, and schools, saying: “Village after village was so heavily infected throughout large areas that we began to try to define the outer limits of the spreading epidemic, and to vaccinate people around the circumference of the area much as one would fight a forest fire.”⁵⁶ Vince would later recall that he had found as many as 1,000 cases in a two-week period early in his service.⁵⁷

The Volunteers recorded the details of every case they saw in a “line listing,” which contained information on all cases and their contacts. Each case and contact had to be followed up with a vaccination to ensure that the disease did not continue to spread. Initially, the Volunteers used jet injectors, but they eventually shifted to bifurcated needles, reconstituting the freeze-dried vaccine with saline and administering a drop of this mixture into the patient’s arm.

The Volunteers and their counterparts were often gone for extended periods searching for cases. Some went to schools to show pictures of smallpox patients and ask the students if they had seen anyone with the symptomatic pustules. In one area, Vince recalled that the

“Village after village was so heavily infected throughout large areas that we began to try to define the outer limits of the spreading epidemic, and to vaccinate people around the circumference of the area much as one would fight a forest fire.”

– Vince Radke

⁵⁵ Radke, “Oral History,” Global Health Chronicles.

⁵⁶ Personal communications, quoted in D. A. Henderson, *Smallpox*, 220, © 2009, Prometheus Books.

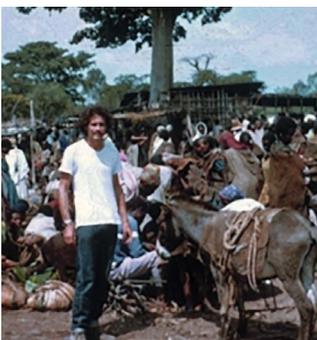
⁵⁷ Radke, “Oral History,” Global Health Chronicles.



A print of a baby with smallpox—photographed by Peace Corps/Ethiopia Volunteer Dan Kraushaar—posted on a local home known as a *tukul*, early 1970s. Dr. Kurt Weithaler sent this picture to WHO where hundreds of prints were made to educate Ethiopians about the importance of getting vaccinated. (See Page 9 of this report for an enlarged view of the baby's photo.)

Photo: Kraushaar, personal collection.

disease was so prevalent that every child recognized it immediately. In other areas, Volunteers used their knowledge of local customs to target high-traffic locations where people regularly gathered, such as weekly markets.



Robert Steinglass at a market in Awassa, Ethiopia, 1973.

Photo: Steinglass, personal collection.

Volunteer Robert Steinglass spent some time near Lalibela—a historic site and pilgrimage center for Ethiopian Orthodox Christians. Aware that thousands of pilgrims across Ethiopia would attend services there at key times, Robert planned his surveillance work around the Orthodox Christian calendar. Although many of the pilgrims directed him to remote locations where he would ultimately find someone suffering from an illness other than smallpox, Robert investigated each case.

When the first group of Peace Corps Volunteers joined Ethiopia's smallpox eradication program, Emperor Haile Selassie—revered almost as a god—ruled the country. When the Volunteers arrived in a province for the first time, they met with the local officials and were able to use a letter of introduction from the Ministry of Health, which stated that they had been sent by Selassie's government. The weight of this message usually meant that the Volunteers received full cooperation and support for their work.

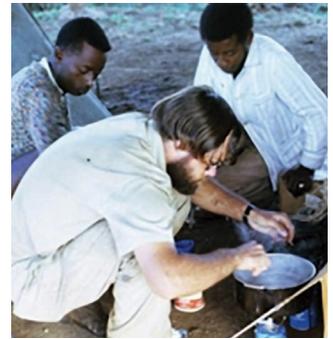
In the mountainous areas of northern Ethiopia, however, where people believed that smallpox infection was a punishment from God, Volunteers did encounter some resistance. A number of the Coptic priests in these villages instructed the local people to chase Volunteers and health workers away, sometimes using force.

At times, the government resorted to violence as well. Volunteer Scott Porterfield recalled that some of the health workers used the Ethiopian military to vaccinate people by force. In one instance, he witnessed a soldier breaking a man's foot with his rifle.⁵⁸ Appalled by the violence, Scott sought to instead vaccinate the population by learning "every nuance of their customs. ... This gave me a measure of respect, and once you've got their trust, you've got their vaccination."⁵⁹

When visiting a new village, Volunteers learned to go with their counterparts to the local leader first as a sign of respect and to explain the purpose of their trip. Occasionally, the chief would walk the Volunteers around the village, invite them to eat at his house, or buy the Volunteers food at the market. These public displays served as a visible "stamp of approval" from the chief.

Prior to this endorsement, though, the reaction of the villagers varied considerably. People in the most remote areas, which were more than a week's walk from the nearest road or telephone, had never seen a foreigner before the arrival of the Volunteers. In these villages, mothers often grabbed their children and fled to higher ground as Volunteers approached.⁶⁰ In other villages, the local people would wash their feet in a biblical gesture of respect and appreciation.

Volunteer Alan Schnur described the process of gaining the villagers' confidence: "We were sleeping in villages, walking through villages, and spending time there. Our evening dinners with local people, followed by the exchange of ideas over coffee, were useful to educate people to the purpose of our visit and that we were well-intentioned. This fostered trust-building."⁶¹



Vince Radke with Ethiopian colleagues boiling bifurcated needles before use, early 1970s.

Photo: Radke, personal collection.

58 Layer, "Land Rovers and Needles," 40.

59 Quoted in Layer, "Land Rovers and Needles," 41; confirmed with Porterfield, September 21, 2016.

60 Steinglass, Peace Corps interview, November 22, 2013.

61 Quoted in Layer, "Land Rovers and Needles," 41; confirmed with Schnur, September 18, 2016.

In areas of the country where food was plentiful, some villagers welcomed the arriving Volunteers by slaughtering a sheep or goat. While a great honor, Scott Porterfield explained that this cultural custom presented some challenges as well: “Feasting on a sheep in Ethiopia is not for the faint of heart.” After the sheep is slaughtered by cutting its throat, “the stomach is cut into strips, and passed around to the men to eat raw. The stomach is dipped in *kibe* (spiced butter oil) and *berbere* (spiced red pepper) and then crunched down with native beer.”⁶²

A number of local officials provided the Volunteers with a guide and translator. Although the Volunteers had undergone Peace Corps language training in Amharic, the government’s official language, the assistance of a translator was essential at times. With 70 different languages and 200 dialects spoken in Ethiopia, the Volunteers grew accustomed to encountering a different language with each new mountain range they crossed.⁶³

WHO provided Land Rovers for the Volunteers, but in some cases travel conditions were so difficult that teams had to build their own bridge or use machetes to clear a path for their vehicles.⁶⁴ In addition, the work in the North was very strenuous because much of the area was rural and mountainous. Volunteers did most of their work on foot, with mules or donkeys carrying their tents and vaccines from village to village.

Volunteers who worked in desert areas, such as the French Territory of Afars and Issas (now known as Djibouti), occasionally rented camels for transportation. Scott Porterfield described this region as “the hottest inhabited place on the earth.”⁶⁵ Scott once collapsed from heat exhaustion on his way to an army post on the border of Ethiopia and French Somaliland. The soldiers gave him mint tea to revive him. He then took a swim in a nearby lake while a soldier stood guard “with a machine gun on the lookout for crocs and hippos.”⁶⁶ On another occasion, Scott related how he and the Ethiopian health officer who worked with him waited for a caravan of travelers to make the difficult 90-kilometer walk to Dessie. On this 18-hour, overnight trek, they were attacked by hyenas; fortunately, they were able to fight them off.⁶⁷

62 Porterfield, interview with Andersson, October 2001; confirmed with Porterfield, September 21, 2016.

63 Radke, “Oral History,” Global Health Chronicles.

64 D. A. Henderson, *Smallpox*, 222.

65 Porterfield, interview with Andersson, October 2001; confirmed with Porterfield, September 21, 2016.

66 Ibid.

67 Ibid.

Saving a Life in Ethiopia

Scott Porterfield related how he saved a child's life while doing smallpox work in Ethiopia:

It took six hours to drive by Land Rover to Wadla Delanta in the highlands of Wello Province. Upon my arrival one late afternoon, a frantic and desperate father ran up with his son in his arms. His son had been bitten by a rabid dog. He went to the local priest who threw holy water on the child. The father told me that he just didn't believe the holy water was enough, and asked if I would take him to Dessie for "the shots." I loaded them in the Land Rover and drove the six hours back to Dessie. The son got his 21 shots in 14 days and survived. ... I got up at 5 the next morning and drove back to Wadla Delanta.

- *Scott Porterfield* (interview with Andersson, October 2001)



Vince Radke getting a vehicle out of the mud during fieldwork in Ethiopia, early 1970s.

Photo: Radke, personal collection.



Travel conditions in Ethiopia, 1974.

Photo: © WHO/Don Piburn.



Robert Steinglass on mule back, 1973.

Photo: Steinglass, personal collection.



Robert Steinglass on a Land Rover in a washed-out riverbed, 1973.

Photo: Steinglass, personal collection.



WHO teams take to the skies to combat smallpox. The helicopter belonged to a German Luftwaffe team doing surveillance during the famine in late 1973 or early 1974. Robert was able to “hitch a ride” to do smallpox surveillance. The systematic use of helicopters did not happen until late 1975 or early 1976.

Photo: Steinglass, personal collection.

In June 1972, Volunteer James Siemon and a local vaccinator undertook a special surveillance project in a district where no cases were being reported. The district covered 18,500 square miles. It had a health center, four clinics, eight schools, eight churches, and nine weekly markets. They visited these locations, showing everyone the smallpox recognition card and asking if anyone had seen cases. Based on reports from five different locations in the district, the team was able to uncover a single outbreak of nine cases, at least seven of which were the result of variolation.⁶⁸

At the World Health Assembly in May 1973, Dr. D. A. Henderson was able to secure a commitment from the U.S. surgeon general to fund three small helicopters that could bypass the very limited road system and take teams directly to the infected mountain villages.⁶⁹ While the helicopters did provide a new form of transportation, they also created new challenges. Two were attacked by villagers who perceived them to be Italian occupiers returning after 30 years. In another incident, a helicopter and pilot were captured by rebels and held for ransom. By the time they were released, “the Canadian pilot [had] persuaded the rebels that they should all be vaccinated, and this he did himself.”⁷⁰

By September 1973, the smallpox epidemic in Ethiopia appeared to be coming under control. Unfortunately, as had been the case in other countries, natural disasters intervened and threatened to undo the progress that had been made. In northern Ethiopia, severe droughts caused a famine that led to the deaths of an estimated 200,000 people. The famine also unleashed a stream of refugees into the central highlands where smallpox had not yet been controlled and where the local people continued to resist vaccination.⁷¹ In one extreme case, Dr. Ciro de Quadros recalled a dispute that grew so heated that one of the priests threw a live hand grenade at a WHO helicopter, saying that he was defending the village “against the “heretics” who wanted to change their religion.”⁷² Fortunately, no one was injured when the grenade exploded.

In 1974, as high school and college students began protesting the concentration of land and wealth in the hands of the royal family and the Ethiopian Orthodox Church, Volunteers including Robert Steinglass folded famine relief into their smallpox work. Robert adopted a tactic of using the grain as an incentive to convince people

68 D. A. Henderson, *Smallpox*, 215.

69 D. A. Henderson, “Oral History,” *Global Health Chronicles*.

70 D. A. Henderson, *Smallpox*, 224, © 2009, Prometheus Books.

71 *Ibid.*, 223.

72 De Quadros, “Experiences with Smallpox Eradication,” D33.

to be vaccinated in Wollo Province.⁷³ In this way, Robert and his Ethiopian colleagues were able to immunize 1,000 people per day, in stark contrast to the 20 people per day he estimates that they would have been able to immunize without an incentive. Using a similar strategy, other smallpox teams made vaccination a prerequisite for receiving antimalarials and cholera vaccine.⁷⁴

On September 12, 1974, Emperor Haile Selassie was deposed, and a revolutionary government took power. Despite the ensuing chaos—with the execution of prominent Ethiopians in Addis Ababa, Eritrea in open revolt, the spread of armed bandits, or *shiftas*, who kidnapped several smallpox workers,⁷⁵ and ethnic conflict between the Ethiopians and nomadic Somalis in the Ogaden Desert⁷⁶—Dr. de Quadros and his Ethiopian counterpart, Ato Tamiru Debeya, managed to keep the smallpox eradication program going.

When the security situation deteriorated to the point that Peace Corps Volunteers had to be withdrawn in 1975,⁷⁷ WHO was able to tap other resources, including epidemiologists who were no longer needed in India and a \$3 million gift from the U.S. government, to continue the fight.⁷⁸

Walking into a Revolution

After Haile Selassie was overthrown, David Bourne described the situation where he was working as a Peace Corps Volunteer as “anarchy.” David arrived at a village just after a gun battle between local residents and a judge who they believed had illegally expropriated property. The judge’s wife, most of his family, and about half of the “highway men” the judge had hired to protect his family were killed in the battle. The public health officer with whom David was staying treated those wounded in the battle at great personal risk—even as the local residents threatened to burn down his home. The following day, David recalled that the rest of the judge’s family “arrived by plane from Addis Ababa, the capital, armed with machine guns ... to exact revenge on the people, and I left on that very plane.”⁷⁹



Peace Corps Volunteer David Bourne administers a smallpox vaccination in the area around Dessie, Ethiopia, 1973.

Photo: Peace Corps Media Library/Taken by John DeVleming.

73 Robert Steinglass continued to fight smallpox until 1974 when he moved into famine relief.

74 D. A. Henderson, “Oral History,” *Global Health Chronicles*; Layer, “Land Rovers and Needles,” 42.

75 Shurkin, *The Invisible Fire*, 383; de Quadros, “Experiences with Smallpox Eradication,” D35.

76 Shurkin, *The Invisible Fire*, 379–380.

77 D. A. Henderson, *Smallpox*, 225, and Peace Corps administrative records.

78 Shurkin, *The Invisible Fire*, 380, 382.

79 Bourne, “Oral History,” *Global Health Chronicles*.



Peace Corps Volunteer John DeVleming vaccinates an Ethiopian, 1973.

Photo: Peace Corps Media Library/Taken by David Bourne.

The United Nations Development Programme brought in helicopters in 1975 and 1976 to reach the few remaining pockets of smallpox in the Ethiopian highlands.⁸⁰ The Ethiopian government also increased the number of health workers devoted to smallpox eradication to 1,200.⁸¹ They took over the program in its final years. The areas with outbreaks were gradually reduced until only the Ogaden Desert bordering Somalia remained. Given the perceived thoroughness and success of the surveillance program in Somalia,⁸² it was believed that the case of a 3-year-old girl in the Ogaden was the last naturally occurring case in the world. However, in 1977, only one month after Dr. D. A. Henderson and a television crew had traveled to this remote area to announce the end of smallpox, two new cases were discovered in Somalia. Dr. de Quadros mounted an intensive search in Ethiopia covering more than 25,000 square miles: “Thirteen epidemiologists and 150 search workers with vehicles, helicopters, and fixed-wing aircraft participated,”⁸³ but no further cases were ever found in Ethiopia.

Program Accomplishments

While Volunteers were not able to participate in the very final stages of Ethiopia’s smallpox eradication program due to the tenuous security situation, they did contribute significantly to the victory. These contributions were documented in the Peace Corps’ *FY 1973 Annual Operations Report*:

By far the most significant development was the extremely successful operation of the Smallpox Eradication Program. In January 1971, when Ethiopia first joined WHO’s world program for the eradication of smallpox, less than 2,000 cases had been reported in the preceding four years. At the end of 1972, the yearly total rose to more than 25,000 cases, the highest incidence of any country in the world.

(Peace Corps, *FY 1973 Annual Operations Report*, 45)

Working alongside their host country counterparts and other volunteers from Japan and Austria, the Annual Operations Report also stated that 64 Peace Corps Volunteers helped to inoculate more than 6 million people against smallpox by the end of FY 1973.⁸⁴

80 Steinglass, Peace Corps interview, November 22, 2013.

81 Shurkin, *The Invisible Fire*, 382.

82 D. A. Henderson, *Smallpox*, 227.

83 Ibid., 233, © 2009, Prometheus Books.

84 Peace Corps, *FY 1973 Annual Operations Report*, 45. It should be noted here that the original report in 1973 incorrectly identified the other volunteers working in Ethiopia as Australian. In fact, they were Austrian. See D. A. Henderson, *Smallpox*, 104.

In 1975, the Peace Corps reported that:

Peace Corps/Ethiopia is proud to have had a hand in a particularly significant accomplishment in FY 1975: major steps toward the arrest of the dreaded smallpox disease. Smallpox Volunteers, working along with various other international organizations, have come very close to bringing to a halt the disease which has claimed thousands of lives in Ethiopia.

Political unrest in Ethiopia toward the end of the fiscal year resulted in a program cut-back. Volunteers now work in the most secure possible areas in this troubled country. (One Volunteer continues his work near the Kenya border.)

(Peace Corps, FY 1975 Annual Operations Report, 32)

Volunteers were able to see the value of this work firsthand. Vince Radke recalled vaccinating children in a village with multiple cases: “I was coming down the road one day, and here was this chief that I had met a couple of months before. And he got off his mule and he came up to me and he said, ‘Thank you very much, and thank Haile Selassie for bringing you, because you had saved much suffering for the children by giving them the vaccination.’”⁸⁵ Thirteen of the Peace Corps/Ethiopia Volunteers continued fighting smallpox in other countries including India, Bangladesh, Pakistan, Sudan, Somalia, Yemen, and Kenya after completing their Peace Corps service. Their additional contributions are described in those sections and the WHO Global Summary in Section 1.4.

⁸⁵ Radke, “Oral History,” Global Health Chronicles.

3

RPCV Case Studies, Part 1: CDC and USAID Join Forces in West and Central Africa

The primary sources for this section are a Peace Corps interview with Jean Roy (RPCV/Cameroon), correspondence with Jean Roy, Mark LaPointe (RPCV/Guinea), and Jay Friedman (RPCV/Sierra Leone), and their oral histories from the Global Health Chronicles. Material from other sources is footnoted as needed.

In November 1965, as the 20th anniversary of the founding of WHO was approaching, President Johnson announced that the United States would support a new program focused on the control of measles and the eradication of smallpox in 18 countries in West Africa.¹ This program grew out of a successful trial of a new measles vaccine that was conducted by the National Institutes of Health in the United States in collaboration with the Ministry of Health in Burkina Faso (then known as Upper Volta) in 1961.

At the time, measles was widely feared because it struck children almost universally before their second birthday, causing the deaths of at least 10 percent of children in West Africa.² As RPCV Mark LaPointe recalled, the measles mortality was so high that “You’d hear stories about a woman who had several children under 5, and measles would come along, and all of a sudden she had none.”³ It was with good reason, then, that African governments insisted on measles vaccination. Epidemiologists from CDC began to be involved in this program once the focus for the measles component shifted to disease control and prevention,⁴ and they negotiated with USAID to broaden the scope of the program to include smallpox eradication.⁵ Unlike measles, which targeted children from six months to six years of age, smallpox affected both children and adults, peaking during months when festivals and other social events would bring together enough people to sustain the transmission of the virus. As a result, the two diseases needed to be targeted differently to accomplish their goals—just one of many complexities in this program.

1 Jonathan Roy, *Smallpox Zero*, 35, and D. A. Henderson, “Oral History,” *Global Health Chronicles*.

2 Ogden, *CDC and the Smallpox Crusade*, 21.

3 Mark LaPointe, “Oral History,” *Global Health Chronicles*.

4 Foege, Millar, and D. A. Henderson, “Smallpox Eradication in West and Central Africa,” 220.

5 Ogden, *CDC and the Smallpox Crusade*, 24.

The program covered an area larger than that of the contiguous United States inhabited by 120 million Christians, Muslims, and animists (people who believe that spirits exist in animals, plants, and rocks).⁶ The population was organized into hundreds of tribal groups who spoke a variety of local languages in an interconnected web of trade and migratory labor.⁷

Some of these groups had traditional beliefs about the best ways to combat smallpox. Many responded to the disease by constructing isolation huts for patients while others consulted traditional healers.⁸ In western Nigeria, Togo, and Benin, the Yoruba people prayed to the local god Shapona for protection from smallpox.⁹ In Benin, local healers known as *fetisheurs* actually contributed to the spread of smallpox, either by telling the local people not to get vaccinated or by variolating their patients: “By custom the fetisheurs inherited all the possessions of dead smallpox victims and, as such, they had little incentive to participate in the eradication of smallpox.”¹⁰

In contrast to these examples, local beliefs in West Africa sometimes helped promote eradication in areas where vaccinations were viewed as “powerful medicine” among populations who had witnessed the benefits of measles vaccine and penicillin injections.¹¹ In some cases, the local community or religious leaders organized vaccination events, resulting in the vaccination of as many as 14,000 people in a single day.¹²

When the West Africa Smallpox Eradication/Measles Control Program began, most of the countries had only recently gained their independence from the European colonial powers. There were some clinics in English-speaking areas and quasi-military mobile teams in Francophone countries, but the smallpox program staff also needed to negotiate with tribal leaders, local governmental entities, missionary groups, newly founded intergovernmental African organizations,¹³ and—in the case of the two socialist countries of Guinea and Mali—party workers.¹⁴

6 Foege, Millar, and D. A. Henderson, “Smallpox Eradication in West and Central Africa,” 220.

7 Ibid. and Ogden, *CDC and the Smallpox Crusade*, 19.

8 Breman, “A Miracle Happened There,” 3.

9 Jonathan Roy, *Smallpox Zero*, 22; and Foege, Millar, and D. A. Henderson, “Smallpox Eradication in West and Central Africa,” 221.

10 Jonathan Roy, *Smallpox Zero*, 44, © 2010. D. A. Henderson and Jean Roy provided narration to Jonathan Roy, who synthesized the texts into this quotation.

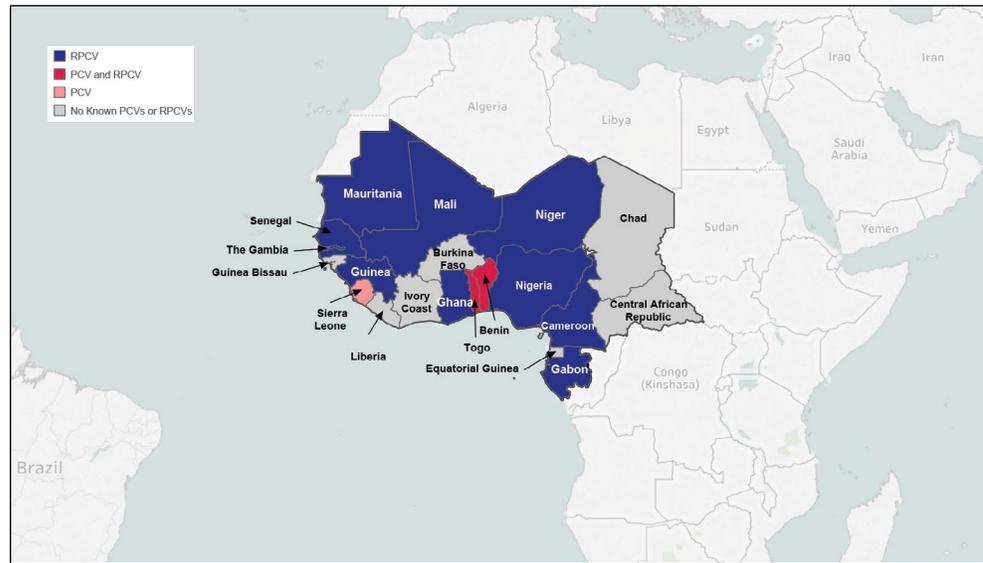
11 Shurkin, *The Invisible Fire*, 251.

12 Ibid., 255, and Foster, Peace Corps interview, February 18, 2014.

13 There were two regional coordinating bodies: the Organisation de Coopération et de Coopération pour la Lutte contre Grandes Endémies (OCCGE, the “Organization for Coordination and Cooperation in the Fight Against Major Endemic Diseases”) in West Africa and the Organisation de Coopération pour la Lutte contre Endémies d’Afrique Centrale (OCEAC, the “Organization for Coordination in the Fight Against Major Diseases in Central Africa”).

14 Ogden, *CDC and the Smallpox Crusade*, 20.

Figure 7: Countries Where Peace Corps Volunteers and/or RPCVs Contributed to the West and Central Africa Program



Map is based on a list of countries published in Foege, Millar, and D. A. Henderson, "Smallpox Eradication in West and Central Africa," Figure 1, p. 220.

One major hurdle to overcome was the lack of diplomatic relations between the United States and the People's Republic of the Congo. Developing this connection was critical, not only to ensure meaningful results for the eradication program in this region but also because a key stakeholder, WHO's regional Africa bureau, was headquartered in Brazzaville.

The West and Central Africa program was eventually expanded to cover 20 nations—including very large countries like Nigeria at the crossroads of the region—because to do less would virtually ensure the "continuous reintroduction" of smallpox.¹⁵

Dr. Henderson described the situation in Africa at the time the project was launched:

It was difficult to know how to tackle Africa. Almost every country either had endemic smallpox or was the immediate neighbor of one that did. ... There were difficult problems of every sort: civil strife, famine, hordes of displaced refugees, devastating infectious diseases, a severe shortage of health resources and staff, poor roads and communications, authoritarian and often unstable governments—and, in some countries—little support for a smallpox eradication program.

- *Dr. D. A. Henderson* (*Smallpox*, p. 129, © 2009, Prometheus Books)

¹⁵ Ogden, *CDC and the Smallpox Crusade*, 24.

Within this difficult context, the joint USAID/CDC program began work to address the needs of West Africa. It was estimated that 200,000–400,000 cases of smallpox occurred in West Africa annually, although “given the estimated ratio of reported cases to actual cases, WHO later estimated that the number was actually in the millions.”¹⁶ An average of 14 percent of these cases resulted in the death of the patient, with children under 1 year of age suffering one of the highest mortality rates (29 percent).¹⁷

Staff from the CDC smallpox unit crisscrossed Africa, developing individual plans for each country in collaboration with national governments, USAID missions, and U.S. embassies. Primary funding for program costs, including vaccine, vehicles, and jet injectors, was provided by USAID. WHO provided funds for local costs including fuel. CDC contributed medical staff and nonmedical “operations officers” who managed logistics, transport, training, equipment, and budgets.¹⁸ The acceptance of these operations officers by the national ministries of health represented a major shift.¹⁹ Until that time, African countries had only wanted medical officers and doctors, but having additional manpower to manage the programs was to prove invaluable. In many ways, the eradication of smallpox depended more on having the people with the right skills and equipment in place at the right time than on having people with a deep clinical understanding of the illness.

In many ways, the eradication of smallpox depended more on having the people with the right skills and equipment in place at the right time than on having people with a deep clinical understanding of the illness.

Program Start-Up and Strategy

Despite difficult circumstances, most programs began functioning in early 1967. Internally, CDC had debated two options: (1) take time to study the situation further; or (2) strike hard and fast. The second argument, championed most forcefully by Dr. D. A. Henderson, won out. According to this view, a number of factors had suddenly come together that needed to be taken advantage of before the situation changed. There was finally sufficient global will to do the job, as expressed by the World Health Assembly and institutionalized by the WHO Secretariat; the United States had expressed a political and economic commitment to the program, supported by resource allocations; and the program had access to the skilled manpower and appropriate technology necessary to get the job done.²⁰

16 Foege, *House on Fire*, 72, © 2011, the Regents of the University of California.

17 Foege, Millar, and D. A. Henderson, “Smallpox Eradication in West and Central Africa,” 222.

18 Breman, “A Miracle Happened There,” 5.

19 Foster, Peace Corps interview, February 18, 2014.

20 Ogden, *CDC and the Smallpox Crusade*, 39.

In hindsight, it was very fortunate that the “strike hard and fast” view won the day. Less than a year later, the Biafran War erupted in Nigeria, and the program staff could no longer travel safely in that region.

CDC planned to post medical epidemiologists and operations officers in Africa, backed up by a small regional office in Nigeria (the most populous country in the region), and a small support team at CDC headquarters in Atlanta.²¹ As Dr. Foege wrote:

From the very first days of the eradication program in Africa, it was obvious that fighting smallpox was not just a medical or scientific endeavor but was very much a matter of management. ... We needed to make scientific observations to understand the epidemiology of smallpox, the role of population density, the impact of cultural practices, the influence of climate, the vulnerabilities of the virus, and the impact of public health tools and experiences. ... We needed managers, administrators, and logistics experts—people who knew how to solve problems and how to get things done. The program would not fail for lack of scientists, but it could fail—even with the best strategy—if we didn’t attract the very best managers.

– *Dr. Foege* (*House on Fire*, 131-132, © 2011, the Regents of the University of California)

CDC tried to recruit internally, but at that time, it was not common for CDC staff to have travel and living experience in Africa or to accept positions overseas.²² As Dr. D. A. Henderson later recalled:

For qualifications, we focused primarily on motivation, intelligence, a willingness to live and work under difficult circumstances, and youth. Previous experience was not a factor, as only a few American candidates—mostly those from our own CDC smallpox unit—knew much about smallpox as a disease or had worked in a large-scale vaccination program in a developing country.

– *Dr. D. A. Henderson* (*Smallpox*, 133, © 2009, Prometheus Books)

Having exhausted the internal roster of potential candidates, CDC reached outside the agency to recruit operations officers who were focused on program management rather than the intricacies of the clinical presentation of smallpox. RPCVs with field experience and skills in learning and adapting to new cultures and languages were excellent candidates for these positions.²³ Dr. Foster said of the RPCVs, “These guys had the skills and experience to make the programs work on the ground.”²⁴

²¹ D. A. Henderson, *Smallpox*, 133, 139.

²² *Ibid.*, 132; Ogden, *CDC and the Smallpox Crusade*, 9.

²³ Foster, Peace Corps interview, February 18, 2014.

²⁴ *Ibid.*

A Return to Action

Shortly after returning to the U.S. in 1965 from his Peace Corps service in Cameroon, Jean Roy was faced with a decision: accept an offer to work as the director of an English school in Kinshasa, Zaire (now the Democratic Republic of the Congo), or pursue an opportunity with CDC. At the time, Jean knew that he was also likely to be called up in the draft for the Vietnam War. He had already received deferments to attend seminary, serve in the Peace Corps, and obtain a graduate degree. “Those were my three options at the time: the CDC, the Congo, the army.”²⁵

After choosing to join CDC—and just two weeks into his training—Jean received his final draft notice for Vietnam and was forced to resign to prepare for military service. En route to his home in Maine, he stopped in Washington, D.C., to make a long-shot case for continuing his new work at CDC to one of his congressmen, Senator Edmund Muskie. The senator’s secretary was able to arrange a call during a meeting the senator just happened to be having with Surgeon General William Stewart. Muskie and Stewart agreed that smallpox eradication was an important U.S. government priority and that Jean should apply to be part of CDC’s Commissioned Corps in lieu of military service. A few days later, Dr. D. A. Henderson—who was then the chief of CDC’s smallpox eradication efforts—asked Jean to return to Atlanta to continue the Epidemic Intelligence Service (EIS) course and the smallpox eradication training.

So I took the bus all the way back [to Atlanta] ... and continued the program. I did all the training, the Dodge trucks, the jet injector, the French training, the statistics, and listened to all of the fantastic speakers from London, people who had been to Africa, the public health workers who had been working on sleeping sickness, and leprosy, and other diseases. They were just “the greats” of public health.

– *Jean Roy* (“Oral History,” Global Health Chronicles)

Once the new CDC staff had been recruited, they needed to be trained, equipped, and installed in their host countries. Intensive training for the entire Africa team began on July 5, 1966, in Atlanta, Georgia. Due to the lack of paved roads and the frequency with which vehicles broke down in West Africa, both medical and operations officers were required to have some training on the Dodge trucks that were being procured for the project. Both groups received training in basic statistics, epidemiology, surveillance, and management. They also received lectures on tropical diseases; West African health

²⁵ Jean Roy, “Oral History,” Global Health Chronicles.

systems, history, and cultures; French; diagnosis and management of smallpox cases and measles control; the use, repair, and maintenance of Ped-O-Jets; and the roles of the different stakeholders, including the State Department, USAID, and the U.S. Information Agency.²⁶

Having completed training, and with a new esprit de corps uniting them,²⁷ the new staff prepared to leave at the end of the summer of 1966. However, a number of other hurdles remained: passage of the Foreign Assistance Act to fund the program; procurement of vehicles; identification of housing for the incoming staff in 19 countries; and final signatures from national officials on each country plan. The country plans, in particular, included delicate negotiations in Nigeria (where the government had just been overthrown) and in Mali, Guinea, and Mauritania, where local socialist governments were suspicious of U.S. intentions.²⁸

The West and Central Africa program was launched in January 1967 with 15 medical officers (epidemiologists) and 22 public health advisors (operations officers) managing the country programs. Together they joined forces with the ministry of health staff in each country participating in this program. The basic strategy of the program consisted of an “attack phase” with two components: mass vaccination of the entire population within three years and an assessment of vaccination coverage that had been achieved. This was to be followed by a second “maintenance phase,” which would focus on “incoming susceptible persons” (e.g., newborns) and strengthening surveillance.²⁹ The results were dramatic: By October 1969, 19 of the 20 countries were free of smallpox.³⁰ By May 1970, the final country, Nigeria, saw the last case in this region of the world.

The Peace Corps Connection

While the list of Peace Corps Volunteers, RPCVs, and former Peace Corps staff who worked on USAID/CDC’s West and Central Africa Program may not be comprehensive, research has shown that there was a Peace Corps connection at one point or another in 13 of the 20 countries covered by the joint USAID/CDC program. The majority

26 Ogden, *CDC and the Smallpox Crusade*, 30–31; Jean Roy, “Oral History,” *Global Health Chronicles*; Jean Roy, Peace Corps interview; Breman, “A Miracle Happened There,” 4; and Friedman, “Oral History—Nepal.”

27 Ogden, *CDC and the Smallpox Crusade*, 32.

28 *Ibid.*, 38.

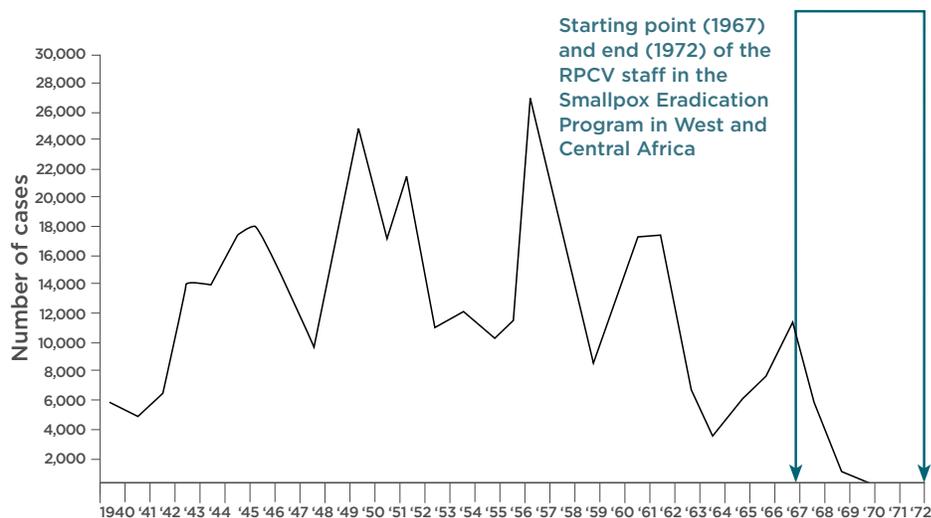
29 Foege, Millar, and D. A. Henderson, “Smallpox Eradication in West and Central Africa,” 223.

30 *Ibid.*, 228.

of these connections come from the role that five RPCVs played as operations officers.

Although few Volunteers were found to have been directly *assigned* to the West and Central Africa smallpox program, there were several cases of Volunteers who supported it. Jean Roy attributed Volunteer involvement in the country programs to the informal, friendly relationships between Peace Corps and CDC smallpox staff in the capital cities and to the personal connections that the Volunteers were able to develop. These relationships allowed some assignments to develop as informal arrangements. One such example was Peggy Holt (Burch), a Volunteer who worked with Jean Roy as an assistant in the CDC's smallpox project office in Cotonou, Benin, and later at the Ministry of Health.

Figure 8: Timeline to the Elimination of Smallpox, Reported Cases in West and Central Africa (1940-1967)



Reprinted with permission from © Foege, Millar, and D. A. Henderson, "Smallpox Eradication in West and Central Africa," Figure 2, p. 221. Adapted to illustrate the beginning and end of the RPCVs' contributions.

Table 4 is compiled from numerous sources, including Peace Corps interviews, oral histories from the Global Health Chronicles, correspondence with the RPCVs, and Peace Corps administrative records, in an effort to be as comprehensive as possible in listing the Volunteers who supported this project.

Table 4: Peace Corps Connections in West and Central Africa

Name	Peace Corps Connection	Role in the West and Central African Program (and years where known)
Jeannel (Jean) Roy	RPCV from Cameroon (1963-1965)	Operations officer in Benin (1966-1969) Assistant desk officer and desk officer in Atlanta (1969-1970) covering Benin, Cameroon, Ghana, and Togo Regional smallpox/measles surveillance officer (1971-1973) based in Senegal with travel to The Gambia, Guinea, Mali, Mauritania, and Niger <i>(Also served in Bangladesh after this program)</i>
Bernard Challenor	Former Peace Corps/ Zambia doctor	Medical officer in Benin
Jay Friedman	RPCV from Sierra Leone (1962-1964)	Operations officer in Mali (1966-1968), Gabon (1968-1970), and Nigeria (1970-1972) <i>(Also served in Nepal and India after this program)</i>
Mark LaPointe	RPCV from Guinea (1963-1965)	Operations officer in Gabon (1966-1968), Mali (1968-1970)
Tony Masso	RPCV from Panama (1963-1965)	Operations officer in Niger (1966-1969)
Peter Crippen	RPCV from Thailand (1964-1966)	Public health advisor in Nigeria (1970-1972) <i>(Also served in Bangladesh after this program)</i>
David Bassett	RPCV from Nigeria (1964-1967)	Operations officer in Nigeria <i>(Also served in Sudan, Nepal, Ethiopia, and Zaire after this program)</i>
Margaret (Peggy) Holt (Burch)	Volunteer in Benin (1967-1970)	Supported program alongside the CDC operations officer in Benin (1968-1969)
William (Bill) Emmet III	Volunteer in Togo (1967 ³¹ -1969)	Supported program alongside the CDC operations officer in Togo (1968-1969) <i>(Also served in Indonesia, India, and Bangladesh after his Peace Corps service.)</i>
Garry Presthus	Volunteer in Nigeria (1966-1967) and Togo (1967-1968)	Supported program alongside the CDC operations officer in Togo (1967-1968) <i>(Also served in Botswana and Zaire after his Peace Corps service)</i>
John Eichrodt	Volunteer in Togo (1966-1968)	Supported smallpox (1966-1968)
Andrew Berman	Volunteer in Togo (1967-1969)	Supported smallpox (1968)
Volunteers (no other names were known to the research team)	Sierra Leone	Supported Don Hopkins, CDC's medical officer, in Sierra Leone by alerting the health offices of cases in their villages (1967) ³²

31 Bill Emmet taught English for his first year in the Peace Corps. During his summer break from teaching in 1968, he volunteered to work with Andy Agle and the smallpox eradication program as part of a field team. This experience led to the Peace Corps/Togo country director allowing him to transfer full time to smallpox work for his final year of Peace Corps service (1968-1969). (Emmet, email to author, August 20, 2016).

32 Ogden, *CDC and the Smallpox Crusade*, 65, and Ernestine Hopkins, "Oral History," *Global Health Chronicles*.

3.1 Benin

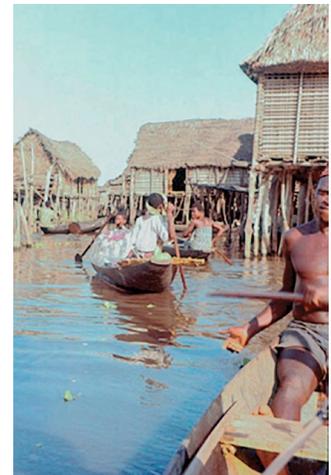
The primary sources for this section are a Peace Corps interview and correspondence with Jean Roy (RPCV/Cameroon) and his oral history from the Global Health Chronicles.

Following his CDC training, Jean Roy was posted to Benin (known at that time as Dahomey) from December 15, 1966, until November 1969. At the time, Benin had the second highest incidence of smallpox in the world. Jean expected that he would need to organize the vaccination of the entire population of Benin. “I was 25 years old, and I’m thinking ‘I’m going to have to vaccinate, with the Ministry of Health teams, all 1.5 million people.’ I was overwhelmed. Because that was the strategy: start at the coast, go up north, and vaccinate all the tribes, all the people, the cities, the towns, and villages.”³³

Jean worked in close coordination with the CDC epidemiologist and former Peace Corps doctor, Bernard Challenor. They had a fleet of approximately 15 Dodge trucks at their disposal, along with eight Ministry of Health mobile teams that had experience providing curative and preventive services and combatting epidemics of yellow fever, leprosy, and the other major diseases under the French colonial administration. With new vehicles, jet injectors, and in-service training, these teams were prepared to eradicate smallpox and control measles.

Jean recalls that these mobile teams of nurses, male health workers, and laboratory technicians would go off for three months at a time with tents, cooks, and “all the luxuries of home. ... They loved it; there was an esprit de corps, teamwork. ... Their mission was to use the jet guns and to vaccinate everybody from the coast, to the north, up to the desert.”³⁴ These mobile teams would send word to the village chiefs in advance of their arrival, and the villagers would be lined up by age and sex.

After testing the new approach of eradication-escalation in Nigeria, Dr. Rafe Henderson traveled to Benin from the regional office in Nigeria, where he served as deputy director and epidemiologist. He spent nearly three months trying the same experiment of active case detection and containment using just 12 vaccinators. Jean credited this new strategy with reducing smallpox in just three to four months, much faster than what could have been accomplished vaccinating the entire population of Benin. He recalled,



Survey work in Ganvie, Dahomey, Benin, 1965-1966.

Photo: Global Health Chronicles/Rafe Henderson (CDC).

“I was 25 years old, and I’m thinking ‘I’m going to have to vaccinate, with the Ministry of Health teams, all 1.5 million people.’”

– Jean Roy

³³ Jean Roy, “Oral History,” Global Health Chronicles.

³⁴ Ibid.

I said, “Rafe, I don’t understand this search and destroy stuff, eradication-escalation. Go for it.” So I gave him a free hand, and I kept on running the regular [mass vaccination] operation, the systematic, rational, ancient method, which I hope is a lesson learned. ... The key to eradication was the search and destroy, the containment, and the flexibility to adapt to new diseases, new approaches, and not use the old ways.

– *Jean Roy* (“Oral History,” Global Health Chronicles)

Jean regularly traveled to Lagos, Nigeria, to pick up smallpox and measles vaccines from the regional office vaccine depot. He reported progress to the Lagos office and frequently interacted with Dr. Stan Foster, who was working as a senior advisor at the Nigerian Ministry of Health’s Smallpox Office. Together they successfully controlled an outbreak on the Togo-Benin border in which 80 people had died out of 100 cases, and the survivors were severely handicapped.

3.2 Gabon

The primary sources for this section are Peace Corps correspondence with Mark LaPointe (RPCV/Guinea) and Jay Friedman (RPCV/Sierra Leone) and their oral histories from the Global Health Chronicles.

Mark LaPointe served in the Peace Corps from 1963 to 1965 in Guinea, where he taught English at a technical school and worked on agricultural projects. His experience working with village chiefs and other leaders under a Marxist government taught him to be “very diplomatic and circumspect” with local officials.³⁵ When he received a recruitment call from CDC about the openings for smallpox program operations officers, he accepted a position, and moved to Atlanta for training shortly after getting married.

Mark arrived in Gabon in late November 1966. He remained there as the country’s sole CDC staff person until he was transferred to Mali in late 1968. At that point, Jay Friedman replaced him in Gabon, from late 1968 until April 1970.

The counterparts who supported this program included the head of the Grandes Endémies group in Gabon, a local general who served as the “dean of the medical community,”³⁶ and the head of the technical bureau of French advisors. Some of the connections they forged in 1968 have continued 40 years later.

³⁵ Mark LaPointe, email to author, September 5, 2014.

³⁶ Mark LaPointe, “Oral History,” Global Health Chronicles.

Due to its low population density, Gabon had been able to eliminate smallpox locally despite using relatively ineffective vaccine, but the threat of importing the virus continued as long as neighboring countries were still infected. The government of Gabon agreed to welcome the CDC's smallpox program, but only because it included what was of greater interest to them: the measles component of the program.

Surveillance: “using data as a tool to control disease”

– Mark LaPointe

Mark set up a training program on the new technology being used in the smallpox program—the jet injector guns—and he helped with the planning for a new warehouse and cold chain to maintain the measles vaccine. He also promoted the CDC's approach of surveillance and “using data as a tool to control disease”³⁷ rather than simply a requirement for reporting. The work of Mark (and later Jay) then focused on smallpox surveillance.

As in many other countries, road conditions made travel difficult. At one point, Mark recalled that they had to rebuild a bridge because their truck fell through it. The advantage in Gabon, however, was that there were local garages that the smallpox teams could use to repair their vehicles.

3.3 Mali

The primary sources for this section are Peace Corps correspondence with Mark LaPointe (RPCV/Guinea) and Jay Friedman (RPCV/Sierra Leone) and their oral histories from the Global Health Chronicles, which cover their work in several countries.

Jay Friedman was drawn to the West Africa program after seeing an advertisement in the Peace Corps bulletin looking for people to work at CDC “who had lived in Africa, who could speak French, and who could fix a car.”³⁸ Having put himself through college working as a mechanic and with his experience as a Peace Corps Volunteer in Africa, he knew the job was for him. Unlike most other Volunteers and RPCVs, he knew what smallpox was because he remembered the outbreak in New York City in 1947. In July 1966, two weeks after seeing the bulletin, he reported to Atlanta for training.

Jay was assigned to Mali in December 1966, where he remained until being transferred to Gabon in September 1968. At the time, the strategy in Mali—as elsewhere in West Africa—focused on mass vaccination. The local counterparts of Jay and medical officer Dr.

³⁷ Mark LaPointe, “Oral History,” Global Health Chronicles.

³⁸ Friedman, “Oral History West Africa,” Global Health Chronicles.



Visit to Mali by U.S. dignitaries in 1968 following the 25 millionth vaccination ceremony in Ghana. Pictured from left to right are Jay Friedman (RPCV/Sierra Leone), Dr. David Sencer, Dr. William Stewart, Dr. Pat Imperato, Dr. J.D. Millar, Dr. George Lythcott, and Dr. Ben Blood.

Photo: CDC/Photographer unknown.

Pascal (Pat) Imperato³⁹ included the minister of health and other Ministry of Health staff at the national, regional, and local levels. Jay also worked closely with registered nurses, vaccinators, drivers, and mechanics from Mali as well as a technical advisor from France who was in charge of the fieldwork.

Initially, Mali was a difficult country in which to work, because the newly formed national government was aligned with the Soviet Union. It was comprised of socialists and Marxists who had fought for independence against the French. They perceived the French as having exploited Africa and Americans as fighting the Vietnam War against their “socialist brothers.”⁴⁰ As Jay Friedman explained, “The fact that this program was financed by the United States ... meant it wasn’t easy for us to work at first. But Dr. Imperato and I ... made friends with all the principal characters. ... Gradually, we gained their confidence and we didn’t have any further problems.”⁴¹

³⁹ Dr. Imperato later became the commissioner of health and acting health services administrator of New York City, chair of the board of directors of the New York City Health and Hospitals Corporation, founding dean of the School of Public Health at SUNY, and a distinguished author.

⁴⁰ Mark LaPointe, “Oral History,” Global Health Chronicles.

⁴¹ Friedman, “Oral History Nepal,” Global Health Chronicles.

The local measles control program, which was also directed by CDC, initially used electric jet injectors. They later switched to Ped-O-Jets, which were more practical for mobile teams. Jay recalled how he “spent a lot of time in Mali working on trucks, fixing them, and fixing jet guns, and doing a little bit of epidemiology on smallpox outbreak investigations.”⁴²

One of the major challenges they faced in Mali was finding a way to access the nomadic cattle herders in the Niger River delta—a swampy area in the middle of the desert where the river spreads out until it is “100 miles across and then re-forms as a river 100 miles later.”⁴³ Lake Débo, at a central bend in the river, is formed from seasonal flooding that is so widespread that the river changes from one that the teams could drive across in the dry season to one that steamboats would navigate for six months of the year.

Jay credited the medical officer on his team, Pat Imperato, with learning to understand the movements of the nomadic people and figuring out how to position the vaccination teams to get to the different nomadic groups when they were accessible. The vaccination teams in this area often needed to use boats to gain access to the nomadic population. During the final outbreak of smallpox in the country from October to November 1968, the lack of roads made travel conditions so difficult that the smallpox teams could only reach the area by traveling through the neighboring country of Burkina Faso with vaccinators “carrying Ped-O-Jets on their heads.”⁴⁴

While they were administering vaccinations in the field, the smallpox workers also instructed local Malian health workers to alert the Ministry of Health to any cases they were seeing. Any time word reached them of a possible outbreak, they would launch an investigation. The smallpox workers were also called upon to assist with other urgent health needs in the country, at times controlling a yellow fever outbreak and providing polio vaccinations.

Mali became an especially difficult place to work for Mark LaPointe, who replaced Jay Friedman, as the government of Modibo Keita was overthrown in a military coup in November 1968 shortly after Mark’s arrival with his wife and 1-year-old daughter. Mark recalled staying home for about three days, listening to occasional machine gun fire. He contrasted this with the more orderly transition of power that he had witnessed in Gabon in the summer of 1968, when President Leon M’ba died and was succeeded by Omar Bongo.

42 Friedman, “Oral History West Africa,” *Global Health Chronicles*.

43 Ibid.

44 Mark LaPointe, “Oral History,” *Global Health Chronicles*.

Mark LaPointe recalled working with these local teams, particularly the vaccinators, and building their capacity: “Most of our vaccinators were not trained, except by us.”⁴⁵ Their medical knowledge was, thus, rudimentary. At one time, Mark recalled that the vaccinators thought the polio vaccines were “candy” and would start eating them.⁴⁶

Despite their limited knowledge of health and despite having only a primary-school level of education, however, Mark credits the local workers with making a great contribution to smallpox eradication in the country. Mark also credits an exceptional group of local drivers with making sure the teams got where they needed to go, sometimes stopping “out in the middle of nowhere in 115° to 120° F heat” to repair a broken axle.⁴⁷

3.4 Niger

The primary sources for this section are the oral histories of Tony Masso (RPCV/Panama) and his CDC colleague Don Moore from the Global Health Chronicles. All quotations in this section come from those two interviews.

“It was because we were young and we had both been in the Peace Corps that we were able to endure the conditions.”

– Tony Masso

Tony Masso joined CDC in 1966 because he was interested in continuing his “international experience, learning another language, and doing something good.” Tony accepted a position as the operations officer for the program in Niger. In December 1966, he was posted to Niger along with his pregnant wife, who had also been a Peace Corps Volunteer. Tony later said in an interview in 2006, “It was because we were young and we had both been in the Peace Corps that we were able to endure the conditions.”

Niger is a large country of deserts and mountains with few natural resources, little agriculture, and even less rainfall. Tony described seeing the local people living “at the edge of existence. ... I remember one of my first impressions was seeing people living as they did 2,000 years ago, during the time of the Bible. You saw people literally with no more than one little clay pot and a little fire and a few seeds ... no conveniences at all—moving from place to place on the back of a donkey.”

Tony remained in Niger for more than three years, working closely with Donald (Don) Moore, the CDC medical officer, in the building that housed the public health services. When Tony and Don arrived to

⁴⁵ Mark LaPointe, “Oral History,” Global Health Chronicles.

⁴⁶ Ibid.

⁴⁷ Ibid.



Tony Masso examines a child with smallpox in Niger, 1967.

*Photo: Global Health Chronicles/
Photographer unknown.*



Tony Masso searching for nomadic tribes in Niger, 1968.

*Photo: Global Health Chronicles/
Photographer unknown.*

begin this work, they had already been trained in epidemiology, how to operate the equipment, how to maintain the vaccines, and how to map out the towns where they would be working. Together, with support from the Ministry of Health and cooperation from the French, they trained a team of about 16 male nurses and organized them to deliver vaccination services to the entire country.

Unlike some of the other countries, the local chieftains in Niger offered no resistance to the vaccination program. In fact, they supported it. They did expect to be informed in advance of the arrival of the vaccination teams, however, out of respect for their role as chief in welcoming important visitors. Showing respect also necessitated accepting any food or drink that was offered. In one case, this included partaking of a communal bowl being passed around a group of 10 men. “To drink it, you had to clear a space to put your mouth and clear out the flies to drink the camel’s milk, but you couldn’t refuse.”

Tony and Don remembered the local health workers on their teams as dedicated people who would rise by 5 in the morning, travel 12 to 14 hours, set up camp, and be ready to vaccinate the next day with “meager pay and meager food.” In an interview with CDC, Don Moore recalled one occasion in which they heard about a measles epidemic in Agadez and organized the team to travel there. Upon arrival, they asked to see the village chief.

We were told ... “He’s over there.” And we went over there, and “over there” happened to be a cemetery for the children who had died from measles. There were ... about 30 to 40 graves, maybe more, and the people were sitting around them mourning. And, of course, we came and said, “We’re from the measles-smallpox vaccination team,” and they said, “Well, doctor, I wish you could have been here about a month earlier.”

– *Don Moore* (“Oral History,” Global Health Chronicles)

*“When we took off,
the door fell off
of the aircraft. ...
And they said, ‘No
problem. We’ll land
and put it back on.’”*

– *Don Moore*

As hard as the teams worked to reach the villages with vaccination services, transportation in Niger continued to be a major challenge with frequent breakdowns, broken axles, and, on one occasion, an accident that flipped their vehicle completely upside down. Don remembered one particularly challenging trip to an area called N’guigmi that was known locally as the *fin du monde* (“the end of the earth”): “We had to fly out there in a small plane flown by the French. When we took off, the door fell off of the aircraft. ... And they said, ‘No problem. We’ll land and put it back on.’ So they landed the plane, put the door back on, and we got back in.”

Tony and Don met up with the local team who had arrived by land and set up camp, but their troubles were not over yet. Don described seeing a harmattan like “a huge wall of sand in the air” like a hurricane, which blew down their tent. He went on to say:

So we had that to deal with, this sandstorm. I remember we were making some rice ... and a plague of small grasshoppers or small locusts came, just clouds of them came. There was no way to keep them out of the tent. ... We lifted the lid on the rice to see if it was done, and several of these grasshoppers flew in. And that boiled rice was the only thing we had to eat. ... Before we could get the grasshoppers out, more flew in. So then we decided, well, we’ll just eat the grasshoppers. And so that’s what we did.

– *Don Moore* (“Oral History,” Global Health Chronicles)

In 2006, Tony Masso was interviewed by a CDC team documenting the smallpox eradication work. He recalled his time in Niger as a great adventure running parallel to the exploration of space around 1969. He used this analogy to inspire his counterparts:

I can remember being out under the desert skies with a team of African male health workers ... and I remember saying, “Look at those stars and look at the moon. The American space program was going up there. And here we are, and we’re going to do something just as important. We’re going to wipe a disease off the

face of the earth. ... Like that big sky, those stars are not alone; we're not alone. We are in each of 20 West African countries doing the same thing, and if we all do our job, we'll see it removed from Africa as a disease." That was tremendously rewarding to be able to say to those people, to believe it, and then to leave when it was all done.

- *Tony Masso* ("Oral History," Global Health Chronicles)

3.5 Togo

*The primary source for this section is the Peace Corps' 1963 Second Annual Report to Congress.*⁴⁸

In the Peace Corps' 1963 Second Annual Report to Congress, the agency reported that 50 Volunteers had been requested by the government of Togo. Of these, "seven Volunteers are requested ... to work with a UNICEF campaign to vaccinate the entire Togolese population for yaws and smallpox in the next two years. One Volunteer will be assigned to each of the seven teams under a Togolese director, moving gradually north until the entire country is covered."⁴⁹

The smallpox program in Togo continued into the late 1960s. Two of the more well-known RPCVs from this program were Garry Presthus, a Volunteer from 1966 to 1968, who later went on to work as a WHO operations officer in the smallpox programs in Zaire and Botswana, and William (Bill) Emmet, a Volunteer from 1967 to 1969, who later participated in the WHO commission to certify the eradication of smallpox in Indonesia.

3.6 Nigeria

The primary sources for this section are House on Fire: The Fight to Eradicate Smallpox by Dr. William Foege, oral histories of Jay Friedman (RPCV/Sierra Leone) and Peter Crippen (RPCV/Thailand) from the Global Health Chronicles, and a Peace Corps interview and correspondence with Dr. Stan Foster.



Volunteer William (Bill) Emmet vaccinates a Togolese girl with a jet injector, 1968. Emmet worked with one of three Togolese health teams that had vaccinated nearly 1 million people out of the total population of 1.5 million by the late 1960s.

Photo: Peace Corps Media Library/Photographer unknown.

⁴⁸ Peace Corps, 1963 Second Annual Report to Congress, 92.

⁴⁹ Ibid. It remains unclear after review of Peace Corps administrative records, including description-of-service records, if this request for seven Volunteers was fulfilled. Four Volunteers are known to have participated in smallpox eradication in Togo during their service. Their names are included in Table 4 on Page 71. An additional 11 people were identified as Health Volunteers during this time period, but their descriptions of service do not mention smallpox.

Evacuating Ahead of Civil War in Nigeria

In his book, *House on Fire*, Dr. Foege recalled the emotional moments when he was forced to face separation from his wife and two young sons in order to fight smallpox in a country that was about to erupt in civil war. Initially, he hunkered down with his family, stocking up on canned food and filling the bathtub with water as he and his wife listened to mortar shells and machine gun fire outside their apartment.

In April [1967], the U.S. Embassy issued the instruction that American women and children had to evacuate from Eastern Nigeria because of the heightened threat of military action. Evacuation flights out of Port Harcourt had been arranged for a Sunday. Missionary families streamed into Enugu on their way to Port Harcourt. ...

...The roads were crowded. People could take with them only what fit into a single suitcase. Families were emotional as they approached the moment of being split apart. It was especially heart-rending when people of the region stopped us for an explanation. Why were we leaving? ...

...Dave [Thompson], Paul [Lichfield], and I drove back to Enugu to continue our work, determined to eliminate smallpox from the region before we ourselves would have to leave.

– *Dr. Foege* (House on Fire, 130–133, © 2011, the Regents of the University of California)

The war became notorious for the starvation of some of the besieged regions. Over the course of two and half years, an estimated 1 million to 3 million people died from fighting, disease, and starvation.⁵⁰

The last smallpox case in the countries covered by the West and Central African program was found in May 1970 in southwestern Nigeria. Just as the team was preparing to celebrate victory, they received word of a case at the infectious disease hospital. The vaccinators tracked the woman's movements back to her village several hundred miles away. Initially, the headman refused to acknowledge that there were any cases in his village until his own granddaughter walked out of a hut, covered in smallpox. The investigators then found another 34 cases and vaccinated everyone in the area. With that effort, smallpox transmission in West Africa was ended.⁵¹ Surveillance, on the other hand, was needed for an additional two years to ensure that no remaining cases had escaped detection.

Jay Friedman was assigned to the state of Kano in northern Nigeria in 1970 after his work in Gabon came to a close. Jay spent two years there working on mass vaccination and surveillance-containment until April 1972. His Nigerian counterpart, Al-Haji Mohammed Kazaure, was in charge of the epidemiological unit responsible for vaccination activities in Kano.

⁵⁰ Metz, *Nigeria: A Country Study*, 60.

⁵¹ Shurkin, *The Invisible Fire*, 293.

Peter Crippen applied to CDC's West Africa program, was accepted in 1970, and was assigned to Nigeria. Peter was posted to Calabar and Enugu, where the Biafran War had recently ended. He would remain in Nigeria for two years continuing surveillance but did not see any cases during his time there.

Program Accomplishments

In 1968, a special celebration in Ghana commemorated a major milestone in the program: the 25 millionth vaccination. U.S. dignitaries at this occasion included the U.S. Surgeon General Dr. William Stewart; CDC Director Dr. David Sencer; CDC Smallpox Program Director Dr. Millar; Dr. Benjamin Blood of the Surgeon General's international health staff; Director of the West and Central Africa Smallpox Eradication and Measles Control Regional Office Dr. George Lythcott; and U.S. Ambassador Franklin Williams. Most of the health ministers from the countries in the program also attended.⁵²

As the program continued, it was estimated that, between January 1967 and December 1969, 100 million people were vaccinated for smallpox⁵³ and 28 million children were vaccinated against measles in the 20 countries covered by this program. This was estimated to include more than 80 percent of the population in at least 13 of these countries.⁵⁴

The results of this massive vaccination program and the successful surveillance and containment strategy were dramatic: 19 of the 20 countries were free of smallpox by October 1969.⁵⁵ By May 1970, the final country—Nigeria—was free of smallpox, and with it, the entire region of West and Central Africa.

In a 1975 article, "Smallpox Eradication in West and Central Africa," Dr. Foege and others pointed out that the total cost of this program for the U.S. government (\$15 million) was approximately equal to what the United States would normally spend every 39 days to remain smallpox-free.⁵⁶ This program was not only a sound investment in public health for the United States, but also a great gift to the

The success in West and Central Africa served as a catalyst in other areas of the world by showing that eradication was an achievable goal and by demonstrating the effectiveness of the strategy of surveillance and containment.

⁵² Ogden, *CDC and the Smallpox Crusade*, 45.

⁵³ By the end of this program, more than 150 million smallpox vaccinations were delivered. See Ogden, *CDC and the Smallpox Crusade*, 44.

⁵⁴ Shurkin, *The Invisible Fire*, 275–276; and Foege, Millar, and D. A. Henderson, "Smallpox Eradication in West and Central Africa," 223.

⁵⁵ Foege, Millar, and D. A. Henderson, "Smallpox Eradication in West and Central Africa," 228.

⁵⁶ *Ibid.*



Dr. Stan Foster, senior advisor to the Nigerian program, administers the ceremonial 10 millionth vaccination in Nigeria with Dr. Emmanuel Smith of the Nigerian Ministry of Health, 1967. Photograph caption clarified by Dr. Foster.

Photo: Global Health Chronicles/Photographer unknown.



Tribal chiefs from Ghana at a ceremony celebrating the 25 millionth vaccination after the program had been in place for one year, January 1968.

Photo: Global Health Chronicles/Gordon Robbins (CDC).

people of 20 countries. Moreover, the success in West and Central Africa served as a catalyst in other areas of the world by showing that eradication was an achievable goal and by demonstrating the effectiveness of the strategy of surveillance and containment.⁵⁷

There is no doubt that the smallpox program contributed to strengthening the local health systems of the countries in this program—particularly their internal capacity in surveillance—which enabled them to manage programs targeting other vaccine-preventable illnesses.⁵⁸ Looking back on the accomplishments of the West Africa program 30 years later, Dr. Stan Foster reflected, “Had West Africa not succeeded, it’s doubtful that the global program would have succeeded. ... A lot of the lessons learned out of West Africa laid the foundation for what went on in Asia, and Ethiopia, and Somalia.”⁵⁹

⁵⁷ Foege, Millar, and D. A. Henderson, “Smallpox Eradication in West and Central Africa,” 230, and Breman, “A Miracle Happened There,” 21.

⁵⁸ Foege, Millar, and D. A. Henderson, “Smallpox Eradication in West and Central Africa,” 219, and Ogden, *CDC and the Smallpox Crusade*, 41.

⁵⁹ Foster, “Oral History,” *Global Health Chronicles*.

RPCV Case Studies, Part 2: Short-Term Assignments with WHO

4

4.1 Nepal

The primary sources for this section are Peace Corps correspondence with Jay Friedman (RPCV/Sierra Leone) and his oral history from the Global Health Chronicles. Material from other sources is footnoted as needed.

Nepal is a small country that presented the Smallpox Eradication Programme with a very large challenge: conducting fieldwork in the shadows of the highest mountains in the world. Cars were few and far between as were paved roads. Many areas were only accessible by airplanes or long hikes. Transportation was so difficult, in fact, that stories were told of a Nepali general who purchased a 1932 Ford in Canada, shipped it to Nepal via India, and then hired a team of 30 porters to carry it across the Himalayas on a bamboo platform.¹ Only later was WHO able to obtain funds for helicopter charters, which allowed the smallpox workers to reach remote locations that had previously only been accessible by traveling great distances on foot for days at a time.

Set against this challenging backdrop, the smallpox program in Nepal began in 1971, combining mass vaccination with surveillance and containment. In April 1972, Dr. D. A. Henderson asked Jay Friedman—an RPCV (Sierra Leone) and a CDC veteran of the West and Central Africa program (Mali, Gabon, Nigeria)—to accept a WHO post as a technical officer in Nepal.² This move necessitated his resignation from CDC, but he readily took on this challenge. By the end of the month, Jay had arrived in Kathmandu, a place he would call home for the next five years. For his first three years, Jay worked under WHO medical officer, Dr. M. Sathianathan. A British technical officer rounded out the WHO team for two of those years. During his last two years, Jay was joined by a second RPCV and veteran of the West and Central Africa Program, Dave Bassett, who worked as an operations officer in Nepal until he was reassigned to Ethiopia.³

1 Friedman, “Oral History Nepal,” Global Health Chronicles.

2 Ogden, *CDC and the Smallpox Crusade*, 98.

3 D. A. Henderson, *Smallpox*, 185.



A Nepalese smallpox patient collecting smallpox scabs from his foot in the 1970s. Jay Friedman holds a cup in which the specimens will be sent to the laboratory for diagnosis.

Photo: CDC/Photographer unknown.

The WHO team and their Nepali staff established a smallpox office and surveillance team in each of the country's 75 districts and linked them in a well-organized system, but inevitably, the success of Nepal's eradication effort was interwoven with India's.⁴ As Jay explained during a March 2008 interview with Dr. David Sencer (CDC director from 1966 to 1977), Nepal suffered from constant endemic smallpox, which "moved around the Indian subcontinent in a big circle," inundating them with cases, every one of which was the result of cross-border travel from India to Nepal.⁵ Much of Jay's work was, thus, traveling around the country with the Nepali staff to investigate outbreaks of the disease.

In February 1975, a new king was crowned in Nepal, resulting in travel restrictions at a time when smallpox cases were still being seen, but the team prevailed. By April 1975, within a month of India's last recorded case⁶ the smallpox team informed WHO that the disease had finally been eradicated. Surveillance continued for another two years until an international commission certified the eradication of smallpox from Nepal in 1977. Jay Friedman was one of the authors of the final report⁷ on smallpox eradication to the International Assessment Commission. As a result of their work, Jay and the head of WHO in Nepal were invited to an audience with King Birendra, a rare honor for a foreigner.

4.2 Bangladesh

The sources for this section are Peace Corps interviews and correspondence with multiple RPCVs and Dr. Stan Foster, as well as oral histories from the Global Health Chronicles. Material from other sources is footnoted as needed.

In the 1950s, 86,000 deaths from smallpox were recorded in a three-year period in Bangladesh⁸ (then known as East Pakistan) before an effective program established in 1961 succeeded in eliminating the disease using the surveillance and containment approach modeled in West Africa.⁹ Unfortunately, the success achieved by 1970 proved to be short-lived. When the civil war that resulted in Bangladesh's independence from Pakistan erupted in 1971, an estimated 10 million

4 Ogden, *CDC and the Smallpox Crusade*, 98.

5 Friedman, "Oral History—Nepal," *Global Health Chronicles*.

6 Ogden, *CDC and the Smallpox Crusade*, 98.

7 WHO, *Smallpox Eradication in Nepal*, 1977.

8 D. A. Henderson, *Smallpox*, 104.

9 *Ibid*, 200–201.

refugees from Bangladesh streamed into India.¹⁰ At that time, India was still battling smallpox, and some Bangladeshi refugees became infected with the disease at the Salt Lake camp near Calcutta.

When the civil war ended, India rapidly expelled millions of Bangladeshi refugees who had fled there to escape the fighting.¹¹ Smallpox workers at CDC watching a televised story about the Bangladeshi refugees who were being repatriated were able to “diagnose” a smallpox outbreak among the refugees, such was the distinctive appearance of the disease.¹² Unfortunately, in spite of their attempts to alert WHO, the refugees started being released back to Bangladesh before the disease was fully contained. Floods of these refugees—the vast majority of whom took public transportation—brought an unwelcome surprise for the health authorities in Bangladesh: the reimportation of smallpox.¹³ A country that had been preparing to declare eradication suddenly had some 90,000 cases, but only an estimated 10 percent of the cases were being reported to the public health system.¹⁴ According to Dr. Henderson, “If the authorities in charge of the [refugee] camp had ensured that everyone had been vaccinated—as officials at other camps had done—they could have spared at least 200,000 people from smallpox, 40,000 of whom died.”¹⁵

With monsoon rains compounding the situation, millions of internally displaced people crowded into shelters, providing the ideal circumstances for the continued spread of the disease. Some vaccinators, trained to use the bifurcated needle and freeze-dried vaccine, were sent to contain the outbreaks.

Their work was hampered by several factors: Bangladeshi health workers who were reluctant to report cases for fear of being penalized by their superiors for not having vaccinated the local people; patients who were fearful of being forcibly removed to isolation camps; and families who feared the British custom of burning the houses and bodies of smallpox victims.

10 D. A. Henderson, *Smallpox*, 105, 198, and 201, and Ogden, *CDC and the Smallpox Crusade*, 105.

11 D. A. Henderson, *Smallpox*, 198.

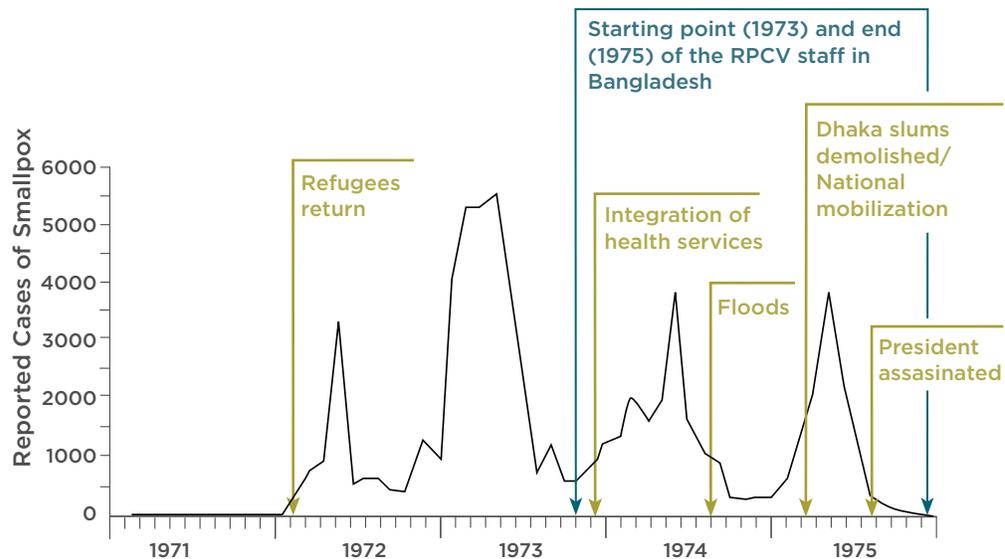
12 Foege, *House on Fire*, 78, and Ogden, *CDC and the Smallpox Crusade*, 105.

13 Jonathan Roy, *Smallpox Zero*, 55.

14 Foster, Peace Corps interview, February 18, 2014.

15 D. A. Henderson, *Smallpox*, 198, © 2009, Prometheus Books.

Figure 9: Timeline to the Elimination of Smallpox, Reported Cases in Bangladesh (1971–1975)



Adapted and reprinted with permission from © D. A. Henderson, *Smallpox*, Figure 57, p. 204, to illustrate the beginning and end of the RPCVs' contributions.

The international effort to eradicate smallpox in Bangladesh started in earnest in 1972 with 20 people organized into five mobile teams headed by local district staff. Dr. Stan Foster, who had earlier served as the senior smallpox advisor and CDC team leader in Nigeria, was seconded from CDC to assist in controlling the explosive growth of the smallpox epidemic.¹⁶ He served under Dr. Nicholas Ward, the WHO team leader. (Dr. Foster later became the WHO team leader.)

At that time, outbreaks smoldered in the slums and resettlement areas of large cities like Dhaka.¹⁷ By October 1973, the situation appeared to be coming under control, with cases confined to approximately 150 villages.¹⁸ Just then, however, “The government suddenly and inexplicably decided ... to suspend all health activities for three months. ... This devastating change in operations occurred at the start of the smallpox season, and it took the staff months to re-establish the eradication program.”¹⁹

¹⁶ D. A. Henderson, *Smallpox*, 202.

¹⁷ *Ibid.*, 204.

¹⁸ Foster, “Smallpox Eradication in Bangladesh—Lessons Learned” (lecture), July 12, 2008.

Villages were considered “infected” if they had one or more known cases and were labeled as such until six weeks after the last case was found.

¹⁹ D. A. Henderson, *Smallpox*, 205, © 2009, Prometheus Books.

Over the next two to three years, WHO sought to bring in more consultants to fill the need for additional manpower, increasing the number of epidemiologists to 12.²⁰ Over the five years of the program, it was calculated that 30,000 people contributed to the eradication of smallpox in Bangladesh, including 225 international workers from 28 countries²¹ and 10,500 local family welfare staff.²²

Among the international workers were a number of RPCVs who built off their previous experience in smallpox eradication in Ethiopia (Jay Anderson, Peter Carrasco, John DeVleming, Paul Mongeau, Donald Piburn, Alan Schnur, Vince Radke, Michael Santarelli, Marc Strassburg, Gary Urquhart, Mark Weeks); Zaire (Ken Bloem, Mark Robbins, Alan Fiske, Tim Miner); and West Africa (Jean Roy, Peter Crippen, and Bill Emmet). Several RPCVs (including Mark Robbins, Alan Fiske, and Vince Radke) took time off from their graduate programs to work on smallpox. Most of the RPCVs came on short-term assignments lasting a few months, but Tim Miner stayed for two years from 1973 to 1974. Tim, the only non-physician in his WHO group, was assigned to riverine areas in southern Bangladesh. He lived on a hospital ship for six months and taught himself enough basic Bengali to trace reports of smallpox and to secure lodging and food.²³

By the end of October 1974, “victory seemed virtually within reach.”²⁴ Unfortunately, the monsoon season with the worst flooding in two decades led to famine in the area, and the remaining infected villages sent “tidal waves” of refugees to Dhaka’s slums.²⁵ By December, a hospital in Dhaka had active cases. Astonishingly, even days later, word of these cases had still not been shared with WHO’s smallpox program, a mere three-minute walk away from the hospital.²⁶

In January 1975, this bad luck was exacerbated by the government’s decision to bulldoze acres of slums around Dhaka. “It was a disastrous decision: 100,000 people, now homeless, dispersed to other areas across the country. Smallpox began erupting everywhere.”²⁷ The rapidly escalating number of infected villages led to a presidential directive declaring smallpox to be a national emergency, and all available resources were mobilized.²⁸

20 D. A. Henderson, *Smallpox*, 205.

21 Foster et al., “Smallpox Eradication in Bangladesh,” D28.

22 D. A. Henderson, *Smallpox*, 205.

23 Miner, “Oral History,” Global Health Chronicles.

24 D. A. Henderson, *Smallpox*, 205, © 2009, Prometheus Books.

25 Ibid., 207.

26 Shurkin, *The Invisible Fire*, 359.

27 D. A. Henderson, *Smallpox*, 207, © 2009, Prometheus Books. Foster et al., “Smallpox Eradication in Bangladesh,” D23, and Foegen, *House on Fire*, 185, also tell the story of the slums being bulldozed.

28 D. A. Henderson, *Smallpox*, 207, and Foegen, *House on Fire*, 185.



The face of a young child in Bangladesh with confluent smallpox, 1975.

Photo: CDC/James Hicks.

With the global eradication program on the line, an urgent call for international support brought in additional resources from Sweden, Canada, Denmark, Norway, and the United Kingdom.²⁹ The number of epidemiologists grew to 60,³⁰ including many veterans from programs in Africa and Asia. Andrew Agle, a CDC veteran of the programs in West Africa and Afghanistan, focused on administrative and financial management. As Mark Robbins (RPCV/Malawi and Zaire) explained, all of the smallpox workers knew the high stakes at play. “In Bangladesh, if we didn’t stamp out the epidemic that was raging in 1975, it would spread into India and reverse their hard-won eradication.”³¹ He went on to say, “We all heard and responded to the call to fight the last big smallpox epidemic in Bangladesh in 1975.”³²

WHO brought in Dr. A. J. Rangaraj, a physician and former colonel in the Indian army who had served as the senior advisor for the smallpox program in Afghanistan, to direct field operations as the deputy WHO team leader.³³ Dr. Stan Foster would later recall how Dr. Rangaraj drew on his experience as a paratrooper with American General Joseph Stilwell in Burma during World War II to encourage the smallpox warriors to continue their fight with unflagging optimism. After the battle had been won, Dr. Rangaraj admitted to Dr. Foster that he did not actually think it would work. However, he felt that he had learned in Burma that if a soldier thought he would die, he actually would. In his view, only optimism was going to give the smallpox “troops” a *chance* to succeed.

An expanded shortwave radio network was developed along with new methods to isolate patients and prevent the virus from spreading. Methods included posting round-the-clock guards to keep patients quarantined in their homes, providing food and water to sustain patients and their families while they were contagious, vaccinating every person within a half mile of the home, searching every house within five miles of the home, and training community members to provide vaccinations and serve as guards.³⁴

29 D. A. Henderson, *Smallpox*, 207.

30 Ogden, *CDC and the Smallpox Crusade*, 106.

31 Robbins, email to author, March 4, 2014.

32 Robbins, email to author, March 5, 2014.

33 D. A. Henderson, *Smallpox*, 207.

34 *Ibid.*, 209; and Foster, “Smallpox Eradication in Bangladesh—Lessons Learned” (lecture), July 12, 2008.

A legion of health workers fanned out across Bangladesh, tracking down cases and offering rewards for reporting cases. The epidemiologists searched by water, land, and air with the single-minded goal of finding and investigating each and every case—combing through the delta’s rice paddies, rivers, and marshes; riding atop crowded trains; and flying above the region in Russian helicopters.³⁵ If health workers found a case, they would isolate the individual in his or her home and appoint 24-hour guards. The health workers would then create lists of the patient’s contacts, check the immunization status of those contacts, and administer vaccinations as needed.

“We all heard and responded to the call to fight the last big smallpox epidemic in Bangladesh in 1975.”

– Mark Robbins

The Human Cost of Smallpox

Returned Peace Corps Volunteer Tim Miner recalled a time during his investigations along the Brahmaputra River when a group of villagers led him to a patient who lived in a brand new hut.

There was this young woman covered with smallpox from head to toe. ... There wasn’t space on this person that there wasn’t a pox, and so I knew right away what it was. ... And this young man starts explaining to me that this is his new wife, his new bride. And I said ... ‘I know that vaccinators had been in this village before. ... How come she wasn’t vaccinated? Was she away or something?’ He said, ‘No, I hid her from the vaccinators because I didn’t want her to have a smallpox [vaccination] scar on her skin.’ ... Here was this young person ... with so much in front of her to look forward to ... and her life ended in such a tragic way.

– Tim Miner (“Oral History,” Global Health Chronicles)

In all, it is estimated that 40,000 other people also died out of the 225,000 people who were afflicted with smallpox in the period from 1972 to 1975, after the reintroduction of the disease to Bangladesh.³⁶

RPCV Vince Radke recalled following a man with smallpox who was traveling on a public river boat. In each village where the man was suspected of having stopped, Vince and his team vaccinated all of the man’s contacts. One of the last cases Vince found was a 2- to 3-year-old girl who was just starting to develop the characteristic fever at the onset of the illness. She went on to develop a mild case of smallpox, but the vaccination she received quite probably saved her life.

³⁵ Shurkin, *The Invisible Fire*, 363.

³⁶ Foster et al., “Smallpox Eradication in Bangladesh,” D22.



Rahima Banu, final smallpox victim in Bangladesh scarred by variola major, 1975.

Photo: CDC/WHO; Stan Foster.

Between the lengthy periods of fieldwork, the smallpox teams would meet and present their field reports. The discussions purposefully focused on failures, because they observed that addressing failures would lead to successes.³⁷ As one example, after a considerable effort had been made to publicize the reward for bringing a smallpox case to the attention of the authorities, the eradication team was disappointed to find out that only 30 percent of the local people knew about the reward. They studied this as a “failure” and found out that the health workers were not telling the public about the reward so they could claim it for themselves. Once the smallpox team understood this, they were able to set up a dual reward system for both the public and the health workers, increasing public awareness to 80 percent of the local people. Dr. Foster credits the RPCVs on his team with contributing to this analysis and solution.

Another realization that grew from this study of failures was that the disease was continuing to spread in areas where the teams were conducting intensive surveillance. They realized that, by asking families about “visitors,” they were not hearing about relatives who were considered family, not “visitors.”³⁸ Additionally, when the teams learned of a local belief that people entering a house with smallpox through the back door would not get infected, they made other changes as well, such as posting guards at the front and back doors of patients’ homes.³⁹

In August 1975, having just attended the ceremonies to celebrate India’s historic victory over smallpox, WHO Director-General Dr. Mahler and Dr. D. A. Henderson were stopped at the airport in New Delhi en route to Dhaka with the news that the first president of Bangladesh and his family had just been assassinated.

After the President was assassinated, RPCV Mark Robbins described how his team rushed to secure all of the WHO vehicles by hiding them in private residences so they would not be commandeered by the military. The team spent a week in colleague Andy Agle’s home waiting for order to be restored:⁴⁰ “Martial law had been declared, radio communications were suspended, and India had begun

37 Foster et al., “Smallpox Eradication in Bangladesh,” D27.

38 In one such case, smallpox staff eventually discovered that 17 separate outbreaks were caused by families from one village visiting victims in another. See Shurkin, *The Invisible Fire*, 358; Foster et al., “Smallpox Eradication in Bangladesh,” D27.

39 Foster, Peace Corps interview, February 18, 2014.

40 Robbins, email to author, January 3, 2014.

preparations to deal with still another unanticipated inundation of refugees.”⁴¹ Fortunately, however, luck was with the program this time, and no new cases crossed the border to overturn India’s hard-won victory. House-to-house searches continued until civil disorder erupted in early November. Even after the United Nations recalled its personnel to Dhaka, the WHO epidemiologists remained in the field searching for smallpox.⁴²

Navigating Political Turmoil in Bangladesh

Returned Peace Corps Volunteer Alan Fiske recalled the assassination of the Bangladeshi president and its aftermath:

I went to Bangladesh to join the smallpox campaign there ... as a WHO advisor. ... I remember taking briefcases of money out to the villages to pay the local smallpox workers, with some concern that the bandits, well-armed with weapons left over from the civil war, must have heard my well-circulated announcements that I was coming for payday. But I especially remember the tremendous dedication of my Bangladeshi colleagues who worked through Ramadan, with no food or water all day, despite the pitiless heat. While I was there, a visit was planned for [D. A.] Henderson, President Mujibur Rahman, and the WHO and Bangladeshi smallpox leaders to come visit a village in which we had just contained a smallpox outbreak. We were excited, as you can imagine. But on 15 August 1975 the President was assassinated. ... I stayed four to five months or so, until there was clearly no more smallpox in Noakhali (or, we thought then, anywhere in Asia); I handed things over to my Bangladeshi colleagues, and headed out. But while I was doing my paperwork in Dhaka, there was another coup (6 November); with colleagues, I holed up in the UN guest house, listening to the tank and machine gun fire, the occasional bullet whistling by. Then I returned to my Ph.D. studies.

– *Alan Fiske* (email to author, January 2, 2014)

On November 14, 1975, WHO convened a special press conference to announce that two months had passed since the last case of smallpox had been found and that Bangladesh was now free of the disease.⁴³ The staff celebrated their victory, but it was again short-lived. The very next day, a cable arrived from densely populated Bhola Island with bad news: A three-year-old girl, Rahima Banu, had been diagnosed with the disease. Dr. Foster personally made the day-long trip to investigate. “It was smallpox. A call brought ... surveillance teams by speedboat, steamboat, jeep, motorcycle, and finally by foot.”⁴⁴ The teams knew that it was November, the monsoon was over, and they were standing on the cusp of victory, but the season with the highest risk of transmission was about to begin.

41 D. A. Henderson, *Smallpox*, 211 © 2009, Prometheus Books.

42 Ibid.

43 Ibid.

44 Ibid., © 2009, Prometheus Books.

As Mark Robbins recalled, “We understood that if we didn’t get it done right and fast, all of the money and effort that went before us could be rendered useless.”⁴⁵ A virtual army of 24,000 health workers⁴⁶—supplemented by international consultants—was mobilized to address this challenge. Eighteen thousand people within a mile of Rahima’s home were vaccinated. Vaccination teams fanned out once again, working day and night at markets, schools, bus stations, ferry landings, and crossroads, advertising the reward and searching for other cases, but they found none. Their dedication to the battle was ultimately successful in proving that the disease had been eradicated from Bangladesh in 1975.

The battle to combat smallpox in Bangladesh was a critical turning point in the global fight to eradicate the disease. With the large, crowded population and constant movement of people fleeing monsoons or seeking employment, conditions for the continued spread of the disease were ideal. Consequently, there was real doubt as to whether the final goal was achievable. As Dr. Henderson recalls, “If the effort had not succeeded then, I wonder today whether a battered staff and WHO’s exhausted fiscal resources could have sustained the momentum in Bangladesh and, indeed, that of the global program.”⁴⁷ With this milestone, all of Asia was finally free of this ancient scourge.

4.3 Yemen

The primary sources for this section are a Peace Corps interview and correspondence with Robert Steinglass and Pages 13–20 of a WHO report he authored to the International Commission for the Certification of Smallpox Eradication based on the status of the work in Yemen.

In 1950, a pilgrim returning to Yemen from Mecca, Saudi Arabia, caused an epidemic that resulted in at least 30,000 cases of variola major and 18,000 fatalities. However, even prior to this time, variola major had been endemic in Yemen. The lack of vaccination services, the common practice of variolation and a cultural resistance to vaccination, a dense and mobile population, a location along well-traveled pilgrimage routes, and the nation’s cool and dry climate were

⁴⁵ Robbins, email to author, March 4, 2014.

⁴⁶ Jonathan Roy, *Smallpox Zero*, 55.

⁴⁷ D. A. Henderson, *Smallpox*, 198, © 2009, Prometheus Books.

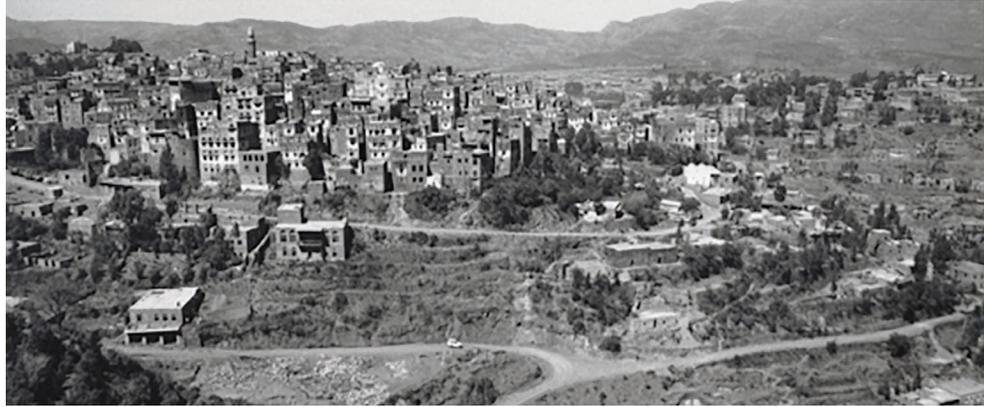
all factors conducive to the survival and spread of the virus. In 1960, a visiting epidemiologist from WHO observed that epidemics were seen every five to seven years when the number of susceptible people—children and others who had not been vaccinated—had grown to a sufficient level.

In June 1978, smallpox had not been reported anywhere in the world for the prior eight months. It was considered to have been eliminated from Yemen—the last reported outbreak in the country occurred in 1969—but proof was needed. There were concerns that if smallpox still existed in the country, it could spread undetected along the trade routes with Somalia. Accordingly, the Yemen Ministry of Health and WHO began intensified surveillance to establish, with careful documentation and beyond reasonable doubt, that smallpox had indeed been eradicated in the country. Careful diplomacy was needed in areas such as North Yemen that were not under strong governmental control.

Robert Steinglass, who had recently completed his Peace Corps service as a Volunteer in Ethiopia's smallpox program, traveled to North Yemen in 1978 on a one-year assignment as a WHO operations officer. In this role, Robert was in charge of documenting that North Yemen was free of smallpox and paving the way for the country to be officially certified by WHO as having eradicated the disease. Robert formed three field teams, which included two Peace Corps/Yemen Volunteers who served as surveillance workers: Michael Last (1978–1980) and David Haddow (1978–1979). In 10 months, Robert and these two Volunteers visited all 10 governorates, 146 (90 percent) of the 162 districts, and 766 villages and towns in search of smallpox cases.

The teams set about this extensive traveling in a country that, until just a few years earlier, did not have any roads. Yemen's very mountainous villages were built for defense from—not contact with—the outside world. The few, narrow, cliff-hanging roads that did exist at the time were hand-chiseled from the rock face. The inherent danger in this fieldwork was brought home when Michael Last had to be evacuated for hospital care after a car accident.

The teams collected data via a “pockmark survey” from nearly 150,000 people. In this survey, the teams visually inspected the villagers: Anyone who had a mark on his or her face was assessed to see if smallpox had caused the scar. If there was no recent evidence of the disease in the area, and particularly if there were no children under 10 with scars, then the investigators would know that the



Town in the mountains of Yemen, 1979.

Photo: Peace Corps Media Library/Photographer unknown.

smallpox chain of transmission had “burned out.” They found through these pockmark surveys that the most recent evidence of smallpox was from about 1968 to 1969.

A “vaccination scar prevalence survey” was conducted in Yemen at the same time. For this survey, the teams inspected the arms of 116,000 people to assess if they had previously received smallpox vaccination. Although the survey showed that the Yemeni population was poorly immunized, ironically, this finding gave the team confidence that smallpox did not exist. If the disease had been reintroduced into the area, it would have spread quickly, widely, and visibly.

During village visits, the teams announced a reward of \$1,000 for the first person to notify them of a laboratory-confirmed, active case of smallpox. They searched markets, mosques, tea shops, and schools for any cases of people with a fever and rash. Whenever there were cases that could not be readily diagnosed as another disease or illness, the teams sent a sample of the scabs to CDC headquarters in Atlanta, Georgia, for testing. They found approximately 100 cases that required this differential diagnosis, all of which were proven to be chickenpox.

The combination of results from the two surveys, the ability to detect cases of chickenpox in different parts of the country (increasing confidence that smallpox would have been detected, if present), and the complete absence of smallpox cases reported at health centers across the country were considered sufficient evidence that smallpox had been eliminated from the Yemen Arab Republic. North Yemen was among the last six countries in the world certified free of the

disease. South Yemen (which, at the time was a separate country) was also certified free of smallpox in 1979. Together with North and South Yemen, Ethiopia, Somalia, Kenya and the French Territory of Afars and Issas (now Djibouti) were the last six countries in the world to be declared free of the disease. This accomplishment set the stage for the worldwide Declaration of Smallpox Eradication.

4.4 Kenya

In late 1974, about five months after shifting from smallpox work to famine relief, Peace Corps/Ethiopia Volunteer Robert Steinglass had a chance encounter with several staff members from the African Medical and Research Foundation (“the AMREF Flying Doctors”) at a restaurant in Addis Ababa. He told them about his work in smallpox, and one of them mentioned having seen cases in Kenya along its border with Ethiopia. At the time, Kenya had eradicated smallpox as an endemic disease, so Robert knew these must be importations. In keeping with the protocol of following up on all reported cases, he immediately alerted the head of the WHO Smallpox Eradication Programme in Addis Ababa. Robert’s alert was the first that WHO had heard of these cases, and it ensured that smallpox was brought under control in Kenya before the disease could re-establish itself.⁴⁸

A few years later, Kenya again confronted the challenge of smallpox being carried into the country by people traveling between Somalia and Kenya. These cases (three in 1974 and five in 1977) were carefully documented in the final report certifying eradication of the disease.

In 1977, Marc Strassburg, another returned Peace Corps/Ethiopia Volunteer, conducted surveillance work as a short-term WHO consultant on the extreme northeastern border of Kenya and Somalia. Marc informed fellow Ethiopia RPCV Vince Radke that Dr. D. A. Henderson was looking for additional advisors in the country. Vince answered the call and joined the effort in Kenya, where he remained with WHO from 1977 until 1979 when eradication was certified.

Vince relied on local people able to cross into Somalia and on nearby Peace Corps Volunteers to be on the lookout for any cases of rash on the face and hands that was consistent with smallpox to supplement his surveillance efforts. Fortunately, no cases were found, and Kenya was declared free of smallpox in 1979 after a final, intensive push in a pockmark survey that examined more than 650,000 people.⁴⁹

⁴⁸ Steinglass, email to author, February 28, 2014.

⁴⁹ WHO, *Smallpox Eradication in Kenya*, 5.

During their time in Kenya, Vince Radke and Marc Strassburg participated in international smallpox coordination meetings with senior officials from WHO, donor countries, and other countries in the region that were combatting smallpox. Robert Steinglass, who at that time had just been appointed by WHO and was traveling with his family to North Yemen to take up his assignment there, joined them at this meeting.

4.5 Somalia

Across the border from Ethiopia and Kenya, specimens from two cases in Mogadishu, Somalia, were confirmed by CDC to have smallpox in September 1976.⁵⁰ In part, because the country had previously been thought to be free of the disease, “The Somali government had hoped to hide these outbreaks and to avoid the publicity and embarrassment of being the last country in the world harboring smallpox.”⁵¹ Shortly thereafter, however, additional cases and outbreaks were discovered. Launching a program to eradicate smallpox in Somalia required months of negotiations between WHO and the national government, which was reluctant to allow extensive searches across the country. Meanwhile, nomadic tribes of cattle herders continued to circulate and spread the disease.

There was no question that the stakes were high. Beyond the clear human costs, the annual financial expense of sustaining global smallpox control was estimated at more than \$1 billion dollars. Global certification of eradication now hinged entirely on the case of Somalia. Every day that certification was delayed meant that the global smallpox vaccination program had to continue.⁵²

In May 1977, World Health Assembly delegates expressed concern about the epidemic and the potential for some Somalis with mild cases of the disease to join the hajj—the annual pilgrimage to Mecca, Saudi Arabia: “If the disease spread among the hundreds of thousands of pilgrims in Mecca, smallpox could be disseminated around the world.”⁵³ However, Somalia’s declaration of the smallpox epidemic as a disaster allowed the United Nations Disaster Relief Office (UNDRO) and WHO’s Emergency Relief Operations (ERO) to supply funds, vehicles, personnel, and supplies. Special donations also poured in from NGOs and several countries. Rewards of \$200 to \$500 were offered to encourage the reporting of cases.

50 Jonathan Roy, *Smallpox Zero*, 57, and D. A. Henderson, *Smallpox*, 233.

51 D. A. Henderson, *Smallpox*, 233, © 2009, Prometheus Books.

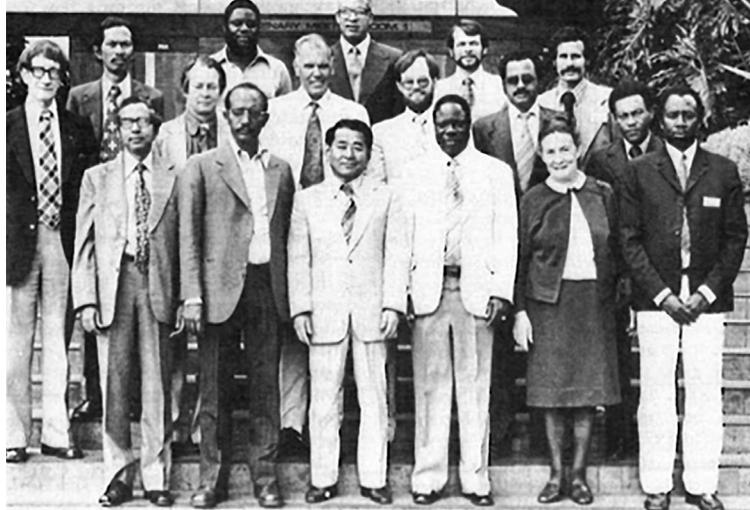
52 Wickett and Carrasco, “Logistics in Smallpox,” D132.

53 D. A. Henderson, *Smallpox*, 237–238, © 2009, Prometheus Books.



Participants in the second intercountry coordination meeting, Nairobi, 1977. Left to right, front row: Girma Teshome (Ethiopia), R.O. Hauge (WHO), Tesfaye Temelso (Ethiopia), unidentified participant, M. Strassburg (RPCV at WHO), D.W.O. Alima (Kenya), unidentified participant; middle row: E. Shafa (WHO), B. O'Keefe (Kenya), P. Chasles (WHO), W. Koinange (Kenya), I.D. Ladnyi (WHO), B. Teelock (WHO), I. Arita (WHO), C. Algan (WHO), Z. Islam (WHO), N.C. Grasset (WHO); back row: Z. Ježek (WHO), I. Mwatete (Kenya), Yemane Tekeste (Ethiopia), M. Dutta (WHO), M.K. Al Aghbari (WHO), A.H. El Sayed (Sudan), A. Deria (Somalia), M.N. El Naggar (WHO), M.A. Gure (Somalia), and V. Radke (RPCV at WHO).

Photo: © World Health Organization/Photographer unknown.



Participants at the third coordination meeting in Nairobi, 1978. Left to right, front row: Z. Islam (WHO), Yemane Tekeste (Ethiopia), I. Arita (WHO), C.L. Khamis (Kenya), B. O'Keefe (Kenya), D.W.O. Alima (Kenya); middle row: H.B. Lundbeck (Sweden), K.R. Dumbell (United Kingdom), S.O. Foster (CDC/WHO), V. Radke (RPCV at WHO), W.M. Jaffer (Democratic Yemen), Girma Teshome (Ethiopia); back row: P.R. Arbani (WHO), I. Mwatete (Kenya), M.N. El Naggar (WHO), J.F. Wickett (WHO), R. Steinglass (RPCV at WHO).

Photo: © World Health Organization/Photographer unknown.

There was no question that the stakes were high. Global certification of eradication now hinged entirely on the case of Somalia.

In order to ensure that nomadic groups did not transmit cases across Somalia's long, open desert borders, a coordinated effort supported by a number of epidemiologists fanned out across Somalia, southern Kenya, and neighboring areas of Sudan.⁵⁴ Dr. Isao Arita, who had taken over as chief of the WHO Smallpox Eradication Unit in 1977, personally led this work. CDC Director Dr. Foege, himself a former smallpox warrior who understood the importance of making this last stand against the disease, sent several epidemiologists from the United States, including Dr. Stan Foster.⁵⁵ Several RPCVs were later remembered by Dr. Foster as "key players."⁵⁶ The RPCVs who joined in this final battle included Alan Schnur (RPCV/Ethiopia), Peter Carrasco (RPCV/Ethiopia), Michael Santarelli (RPCV/Ethiopia), Mark Weeks (RPCV/Ethiopia), and Tim Miner (RPCV/Zaire).

Tim Miner led facial pockmark and vaccination scar surveys to assess the population's susceptibility, while Dr. Foster worked on strategy development. Fieldwork conditions in Somalia were as challenging as they had been anywhere. Dr. Foster later recalled how he lived with nomads in Tiayeeglow, surviving on camel's milk and sorghum and sleeping on animal skins in the desert. He described how the nomads burned out the milk containers to sterilize them and how hard it was to get used to the burnt flavor of the milk.⁵⁷

"At its peak in June and July, [the effort] included 44 WHO and national epidemiologists, 2,700 surveillance workers and supervisors, and nearly 600 watch guards to make sure that patients remained isolated.⁵⁸ As searchers became aware of more cases—including some 500 who had been hospitalized but not reported—more and more staff were brought on to combat the epidemic and scabs of suspected cases were sent to Moscow and CDC for analysis.

RPCV Tim Miner became one of the health workers who interviewed the last case of naturally occurring smallpox anywhere in the world—Ali Maow Maalin—and Peter Carrasco worked on surveillance and containment around this case.⁵⁹ Surveillance efforts continued in Somalia for another two years, but no more cases were ever found.

54 D. A. Henderson, *Smallpox*, 235.

55 *Ibid.*, 238.

56 Foster, Peace Corps interview, February 18, 2014.

57 *Ibid.*

58 D. A. Henderson, *Smallpox*, 237, © 2009, Prometheus Books.

59 Schnur, email to author, August 20, 2016.

Conclusions

5

Smallpox was the first human disease to be eradicated worldwide—a feat that required a truly global effort, and one which Peace Corps Volunteers and RPCVs joined in force. Their contributions illustrated what the Peace Corps does best—grassroots work at the “last mile” of development—while adding a new dimension to the agency’s work through close collaboration with other government agencies and international development partners, including CDC, USAID, WHO, and host country public-sector health workers.

This final chapter will consider some of the factors that contributed to success, both in terms of the characteristics of the smallpox program and the personal attributes and skills of the Peace Corps Volunteers and RPCVs who played a role in it. Lastly, the report concludes with a brief reflection on the legacy of the smallpox program.

5.1 Programmatic Factors

Some of the most important programmatic factors that surfaced in the research for this report are outlined below. Each factor, analyzed in turn, played a critical role in guiding the work of the Volunteers and RPCVs.

- ▶ Effective technical leadership, management, and supervision of the overall program
- ▶ Effective network of mutual support and a collective esprit de corps
- ▶ Clear expectations regarding the nature of the work, role, and required performance
- ▶ Availability of human and financial resources
- ▶ Reliance on concepts in public health and simple technology that did not require medical expertise

Effective technical leadership, management, and supervision of the overall program

The Volunteers and RPCVs were led by national staff and international leaders from WHO and CDC who were unparalleled in their dedication and determination to eradicate this disease. They were also very engaged in supervising the progress of their teams. These leaders had the organizational and management skills to shape the smallpox program and guide it to a successful conclusion. In Afghanistan, for example, the smallpox eradication program improved in efficiency and effectiveness after Dr. D. A. Henderson visited the program in 1969, and a new pair of experienced leaders energized the staff from the Ministry of Health. In other countries, Volunteers and RPCVs spoke of the regular communications they had with the WHO representatives in the field, particularly Dr. Ciro de Quadros in Ethiopia and Dr. Jacques Pierre Ziegler in Zaire, who maintained daily shortwave radio calls with the Volunteers. Many of the Volunteers in Ethiopia and Zaire described the regular, ongoing access that they had to these leaders as a source of inspiration that led them to build careers in international health. As Ken Bloem wrote:

Dr. [Jacques] Pierre Ziegler, the French infectious disease physician who headed the smallpox program in Zaire, was, in my opinion, the best, most charismatic, most effective leader I ever had the honor of working directly under. ... My most striking recollection of his leadership style was his fierce loyalty to each [member] of this motley crew of fundamentally untrained, green public health Volunteers. I had a sense through my 18 months or so working under him, that should any of us ever need personal medical help, a political rescue, or special evacuation—that he would move heaven and earth to provide it. As acute as my perception of the fierceness of his loyalty, his professional standards and attention to the details of our performance were equally intimidating. Stated differently, his loyalty engendered from us young recruits a reciprocal level of performance that would not accept anything short of total effort.

- *Ken Bloem* (email to author, March 3, 2014)

Effective network of mutual support and *esprit de corps*

Equally critical to the success of the program were the strong bonds that the Volunteers and RPCVs formed with each other and with their many local counterparts among the public-sector health workers. The RPCVs who were interviewed remembered their host country team members as hardworking, dedicated people. These local staff

were the bedrock on which the smallpox program foundations were built. Jay Friedman described their efforts to rid their countries of the scourge of smallpox as nothing less than “heroic.”¹

Although, initially, some of the local health workers were skeptical about achieving the eradication of smallpox, they became convinced once the program started to take hold in their countries. Once this belief took hold among the national smallpox teams; however, their commitment and team spirit were bolstered by a strongly held, almost-missionary zeal.

The shift from doubt to belief was not unlike a religious conversion; it involved not just facts, but emotions, too. A person suddenly transformed by the vision of what was possible could not be stopped. ... Like a communicable disease, the belief in smallpox eradication was infectious.

– *Dr. Foegen* (House on Fire, 53, © 2011, the Regents of the University of California)

This esprit de corps was found at the highest levels. Years later, reflecting back on his experience, Dr. Foegen attributed the strength of the alliance between the government of India and WHO to traveling together, “spending time with one another on trains and in jeeps, sharing lodgings, meals, and conversation.”² “Indeed, in my view, the single most important reason for the successful eradication of smallpox ... was the seamless coalition that developed between India’s smallpox program leaders and the array of international participants involved.”³

This same observation held true in many other countries as well. The shared sense of purpose and the knowledge that all were part of a global program contributed to their drive to succeed. Radio check-ins and meetings in countries like Zaire and Bangladesh provided relief from the grinding fieldwork and opportunities for camaraderie to develop. Team members openly shared successes, failures, and stories as they continually sought to overcome obstacles.⁴ Team spirit was developed in a way that allowed everyone to feel they were contributing, not only the medical staff. The bonds that were developed during this work have transcended the passage of time.

“We were assigned to a campaign—not a regular job or regular bureaucracy.”

– *Ken Bloem*

1 Friedman, email to author, Oct. 24, 2014.

2 Foegen, *House on Fire*, 53, © 2011, the Regents of the University of California.

3 *Ibid.*, 144, © 2011, the Regents of the University of California.

4 Foster et al., “Smallpox Eradication in Bangladesh,” D29.

Clear expectations and clearly stated goals regarding the nature of the work, role, and required performance

Coming into the smallpox program, the Volunteers knew that their work would be demanding. Having a clear sense of this appears to have helped them set their expectations. In Zaire, in particular, the use of third-year extensions meant that the Volunteers who were recruited knew how intense this program would be. They knew that a successful, previous Peace Corps experience of living in Africa—preferably in the bush—was required of them. As Ken Bloem remarked,

Although this seems obvious, the smallpox program was different from almost any other Peace Corps program in that we were assigned to a *campaign*—not a “regular” job or “regular” bureaucracy. And the focused, energized, sky-high expectations of a campaign suspend the regular rules of management, and replace them with intensified total-commitment expectations. Each of us Volunteers knew this going in. ...

There was an expectation of adventurousness, a certain idealism, a degree of self-confidence, and an ability to live and work independently. ... And, in the selection process, we were made aware of the campaign mentality and expectations of the assignment.

– *Ken Bloem* (email to author, March 3, 2014)

In addition to having clear expectations regarding the nature of the work, the Volunteers also had a clear role to play and very clear goals:

For all the complexity that went into making the Zaire smallpox program a success, the goals and the focus of our daily activity were very simple, in my opinion—both for the mass vaccination and in the surveillance phase of the campaign. I do not recall ever feeling that I didn’t know *what* to do. For mass vaccination: reach every village/vaccinate every person, period. For surveillance: visit every corner, every health outpost/clinic. If there was any personal doubt, it only concerned whether we had the time, the energy, the courage to achieve it.

– *Ken Bloem* (email to author, March 3, 2014)

One of the best examples of clear expectations for performance was also found among the Volunteers in Zaire. The shortwave radio calls between Dr. Ziegler and the Volunteers in this project served to create a spirit of healthy competition.

Our monthly report required each of us, among other very simple measures, to specify how many days we spent on the road, (i.e., visiting health clinics all over the province each of us had been assigned to). I recall a very strong sense of competing with the other Volunteers ... to spend fewer days back at the base (Kamina) and more days out in the bush.

– *Ken Bloem* (email to author, March 3, 2014)

Availability of human and financial resources

The astounding quantity of human resources needed to eradicate smallpox in a single country such as Bangladesh (where 30,000 people labored tirelessly toward this end) underscores the immense need for manpower. Each one of these people needed funds for transportation, food, and housing. Delivery of each vaccination required equipment and vaccine. Publicity and the system of rewards further added to the cost of the programs. While many of the resources were contributed by the local governments and WHO's smallpox program budget, additional resources were needed in a number of countries. These were provided at different times and places by other agencies of the United Nations and donations of funds and vaccines from the United States, the USSR, and Sweden and additional manpower in the form of Volunteers from Japan and Austria as well as the U.S. Peace Corps.

Reliance on key concepts in public health and effective training in ways to collect and use data for decision making

The science of epidemiology, which had only been in existence for about 50 years when the global eradication program began, emphasized the collection and analysis of data on cases and outbreaks. “Numbers consumed our days, became our compass, and guided our actions.”⁵ New outbreaks were studied to track cases back to the original “index” case and that person’s contacts in order to find out how the disease was spreading. Known outbreaks were tracked until four weeks had passed without a new case to ensure that the entire chain of transmission had been brought to an end.

5 Foegel, *House on Fire*, 146, © 2011, the Regents of the University of California.

Born out of necessity in Nigeria, the strategy of surveillance and containment was refined to a point where it overtook mass vaccination as a critical element of eradication programs. “The presence of the virus was easy to detect, since almost everyone developed lesions, mostly on the face and extremities, where they were easily seen. ... Surveys of a village quickly revealed the last time the virus was active in the community, based on the age of the youngest people showing scars.”⁶ In reflecting on his experience in Gabon, Mark LaPointe referred to CDC’s approach to surveillance as “using data as a tool to control disease.”⁷

Reliance on simple programs and technology that did not require medical expertise

The new strategy of surveillance and containment meant that operational and management skills became as important as medical knowledge. The Volunteers and RPCVs were instrumental in demonstrating the value of efforts by non-medical professionals, a lesson that was later replicated in many other public health programs in Africa and South Asia.

The new strategy of surveillance and containment led to the expansion of teams in new directions where operational and management skills became as important as medical knowledge. This fact, coupled with the willingness to go the extra mile to track down cases and contacts of cases, meant that Peace Corps Volunteers and RPCVs—none of whom were physicians—had a greater impact than they would have had if the program required the delivery of medical services. In fact, the Volunteers and RPCVs were instrumental in demonstrating the value of efforts by non-medical professionals, a lesson that was later replicated in many other public health programs in Africa and South Asia.

In the case of smallpox, the technology that had been developed to fight the disease was easy to learn for non-medical professionals. By the time that Volunteers began to be involved in the global program, the jet injector had been developed along with freeze-dried vaccine, which allowed countries to maintain a stock of vaccine without extensive cold chain equipment to maintain its potency. The development of the Ped-O-Jet allowed vaccinators to move out of facilities to mobile programs that could more easily reach rural areas where electrical connections were scarce. The subsequent shift to the use of bifurcated needles made the technology even easier to learn and teach. One RPCV estimated that local staff who were not epidemiologists or doctors could be taught to become “instant experts in smallpox eradication” in about 15 minutes.⁸

6 Foege, *House on Fire*, 77–78, © 2011, the Regents of the University of California.

7 Mark LaPointe, “Oral History,” *Global Health Chronicles*.

8 Friedman, email to author, Friday, October 24, 2014.

5.2 Personal Attributes and Skills of the Volunteers and RPCVs

In researching the Peace Corps' contributions to the global eradication program in the 27 countries documented in this report, several themes emerged beyond the programmatic factors discussed above. The Volunteers and RPCVs who participated in these efforts achieved success by using the knowledge and skills they had acquired through their Peace Corps service as well as their own internal drive to make a difference. Drawing on the stories and perspectives of the RPCVs interviewed for this report, the following list of attributes and skills was identified as central to their work.

- ▶ Sense of purpose and determination
- ▶ Sense of adventure
- ▶ Cultural sensitivity and language skills
- ▶ Creativity, innovation, and flexibility
- ▶ Optimism

Sense of purpose and determination

First and foremost, there was a strong, personal sense of mission among the Peace Corps Volunteers and RPCVs—a recognition of the profound significance of the effort and the importance of their work. As mentioned above, Alan Fiske recalled years later: “You knew what you did mattered—everyone was counting on you: team members and the people who would die if you didn’t stop the spread of smallpox.”⁹ Mark Robbins also reflected on this characteristic when he said, “There was a seriousness of purpose and expectation of working hard and tirelessly that we all shared—I’m sure every single one of us, and the regular paid WHO team leaders too.”¹⁰

RPCV Tim Miner said of Dr. Ziegler (WHO staff in Zaire), “He knew that Volunteers would go to the ends of the earth to find these cases.”¹¹ Tim went on to say in his interview that WHO staff had the “belief and confidence” in Volunteers to get the job done. The Volunteers possessed a phenomenal work ethic. They had to be diplomats, mechanics, linguists, and serve as exemplary Americans representing not only WHO and the United Nations, but the United States as well.¹²

9 Fiske, email to author, March 3, 2014.

10 Robbins, email to author, March 4, 2014.

11 Miner, Peace Corps interview, December 17, 2013.

12 Ibid.

The female Peace Corps Volunteers from Afghanistan demonstrated patience and determination in developing ways to address the villagers' concerns and reinforce to their counterparts that the task was indeed achievable. As one Afghan counterpart put it in conversation with Maggie Eccles (RPCV/Afghanistan), "We learned from you to stick to it. When a village would say no, you would stick to it."¹³ Maggie said, "You had a goal and you were determined to meet that goal; if you ran into obstacles, you just tried something else."¹⁴

The Volunteers were convinced that the program would succeed, and their conviction served to energize and mobilize their counterparts to engage in this battle with them. The Volunteers in Afghanistan felt that their contribution was to infuse in the local health staff the belief that the task was achievable. This was a critical factor in maintaining the morale of those local team members, without whom eradication would not have been achieved.

Sense of adventure

Peace Corps service in some of the most remote parts of the world can feel very isolating—even more so in the 1960s and 1970s before the advent of the internet, email, and mobile phones. There is no question that self-sufficiency and a sense of adventure were required in the eradication of smallpox. The work entailed endless weeks of difficult travel, whether over mountainous terrain or through hostile local conflicts, with little food and few of the creature comforts that many Americans are used to having.

When the vaccination program in Afghanistan was first being considered by the Peace Corps, the post staff were concerned that American women would not be able to deal with the rugged life in rural Afghanistan. The pioneering Volunteer nurses who pilot-tested the smallpox project disproved this assumption and showed how it could be done, paving the way for more Volunteers to work full time in smallpox eradication. Their experience demonstrated that women could do work that was physically and mentally challenging with little support in some of the most remote places in the world.

The Volunteers and RPCVs described in this report were an adventurous group who relished the opportunity to travel and who took the obstacles and rugged conditions in stride. As Jean Roy recalled, "Volunteers came readily prepared to 'rough it' in villages

¹³ Engstrom and Eccles, Peace Corps interview, February 19, 2014.

¹⁴ Ibid.

and to be on the road for long periods. This was especially true in difficult countries like Zaire, Ethiopia, Sudan, etc.”¹⁵

John Schiller (RPCV/Malawi and Zaire) wrote, “Working on smallpox eradication was a fantastic assignment that demanded professionalism. You felt you were part of something very important, and also part of a great adventure.”¹⁶

Cultural sensitivity and language skills

While all of the smallpox program workers were respectful of the local cultures, Jean Roy recalled that “Peace Corps training in [cross-cultural] sensitivity was extremely important. It tilted the scales to better understanding.” He went on to say that “Peace Corps Volunteers came readily prepared in terms of language knowledge, cultural training, and a good understanding of the country history and culture.”¹⁷

Given that Volunteers and RPCVs were open to learning from their host cultures, they were able to form the best strategies for encouraging people to get vaccinated and work around cultural barriers. One example was Bangladesh, where RPCVs adapted their approach after learning that family members were not being mentioned when investigators asked if “visitors” had been in the home of someone with smallpox.

The Volunteers in Afghanistan were able to use their understanding of the local culture to help overcome resistance among local women. By the time they left Afghanistan, the women Volunteers had developed several techniques that male health workers could use to vaccinate even the most conservative or shy women. Overcoming these obstacles allowed the Volunteers to reach a female population that had previously been thought to be inaccessible to male health workers.

From the female Volunteers in Afghanistan to the male Volunteers in West Africa who reasoned with local fetisheurs, Peace Corps service instilled an approach that underscored the importance of first understanding the reluctance of the local people to receive vaccinations before addressing that resistance.

“Peace Corps training in [cross-cultural] sensitivity was extremely important. It tilted the scales to better understanding.”

– Jean Roy

¹⁵ Jean Roy, Peace Corps interview, March 6, 2014.

¹⁶ Schiller, email to author, January 3, 2014.

¹⁷ Jean Roy, Peace Corps interview, March 6, 2014.

*The keys to success:
absolute integrity,
cultural sensitivity, and
optimism.*

– Dr. Bill Foege

Beyond typical language skills, Peace Corps service may have helped the Volunteers and RPCVs to use a variety of social and verbal cues to communicate effectively with the local people. Peace Corps service likely taught those individuals to not wait for—nor expect—perfect fluency in the target language before they set about their work.

Creativity, innovation, and flexibility

In hearing the stories from the Volunteers and RPCVs who participated in smallpox eradication, one cannot help being struck by the creativity, innovation, and flexibility that they showed in combatting this disease. Examples include using school children to help with case detection in several of the country programs because of the observation that they were more likely to be forthcoming with information than skeptical adults; using famine relief in Ethiopia to convince wary nationals to consent to being vaccinated; and the women in Afghanistan realizing that they could accomplish their goals by simply convincing local women to put one arm outside the door of their homes to be vaccinated.

As Jean Roy said, “Listening to the people, taking risks, being flexible, constantly changing, and learning, those were the keys.”¹⁸

Optimism

Before the Volunteers arrived, health workers and officials in countries like Ethiopia were not convinced that eradication was possible, and in countries like India and Bangladesh, they were even punished for reporting the existence of smallpox cases. In these situations, “The field-workers, so weary with the heat, long hours, and difficult field conditions, were vulnerable to suggestions that their efforts were futile.”¹⁹ This is where the Peace Corps Volunteers and RPCVs played a key role, bringing their “can-do” spirit to the global fight. Alan Fiske said, “We had some skills and spoke French, but what we really had was a mentality, work ethic, and attitude to get going and do it.”²⁰

After collaborating with the Volunteers, local health workers saw that the people who did not receive the smallpox vaccination got the disease; the results were visible. This proved to them that surveillance and containment was an effective strategy, and the experience they gained helped to build the capacity to do surveillance and administer vaccination programs for other diseases, such as BCG and measles.²¹

18 Jean Roy, “Oral History,” *Global Health Chronicles*.

19 Foege, *House on Fire*, 167, © 2011, the Regents of the University of California.

20 Fiske, Peace Corps interview, March 4, 2014.

21 Radke, Peace Corps interview, November 13, 2013.

Years later in writing about his experience, Dr. Foege described what he saw as the key personality characteristics that he learned to seek out in short-term specialists when he had to rapidly scale up operations. “Absolute integrity,” cultural sensitivity, and optimism were what he saw as the keys to success.²² Dr. Foster also underscored the importance of optimism as a critical ingredient in the success of the program in Bangladesh.²³ Not only did the Peace Corps smallpox warriors possess these personal traits, but they projected these attributes in ways that were highly inspirational. Some 40 years after their work in Ethiopia, Sileshi Taye, Vince Radke’s counterpart, characterized Vince’s enthusiasm and commitment as “contagious.”²⁴

Modeling the Peace Corps “can-do” spirit with counterparts:

“What we really had was a mentality, work ethic, and attitude to get going and do it.”

– Alan Fiske

5.3 Legacy of the Smallpox Program

What was the legacy of the smallpox program in terms of public health both globally and in the United States, the reputation of the Peace Corps, and on the Volunteers and RPCVs who participated in the global eradication efforts?

Domestic and International Public Health

There is no doubt that the smallpox program contributed to strengthening the health systems in many countries, particularly with regard to their internal capacity in surveillance. Once health workers had developed these skills, they were able to use them to manage programs targeting other vaccine-preventable illnesses.²⁵

The smallpox program was a testament to the power of surveillance and containment as a public health strategy. The strategy was then used extensively in a variety of international settings, including the United States. As Mark LaPointe noted in Gabon, CDC’s approach to surveillance increasingly came to focus on using data as a tool to control disease rather than simply a requirement for reporting. Jean Roy summarized the benefit that this new strategy brought to the United States, saying, “I think the legacies of smallpox are tremendous. You would not have had measles control in the United States. We all came back, in ‘69 to ‘71, to the United States. ... We knew about containment, and so we started closing down schools with measles in the United States ... doing search and destroy.”²⁶

22 Foege, *House on Fire*, 138, © 2011, the Regents of the University of California.

23 Foster, Peace Corps interview, February 18, 2014.

24 Taye, LinkedIn recommendation, accessed April 9, 2013.

25 Foege, Millar, and D. A. Henderson, “Smallpox Eradication in West and Central Africa,” 219, and Ogden, *CDC and the Smallpox Crusade*, 41.

26 Jean Roy, “Oral History,” *Global Health Chronicles*.

Dr. Halfdan Mahler, WHO director-general from 1973 to 1988, articulated the importance of this global achievement in September 1987, in these words:

Since smallpox is the first major human disease to have been eradicated, and since the battle against it was waged in remote areas far from the gaze of television cameras, the younger generations may have difficulty in appreciating the nature and magnitude of the task of global eradication. Yet, when the history of the 20th century is written from the standpoint of the 21st, the eradication of smallpox will undoubtedly be ranked with the mastery of flight, the harnessing of nuclear energy, and the first steps in the exploration of space.

- *Quoted by Jonathan Roy* (*Smallpox Zero*, inside cover, © 2010)

Peace Corps Service Launches Careers in Public Health

The legacy of the program also extended to the reputation of Peace Corps Volunteers as health workers. Many of the key figures in smallpox eradication went on to other major public health initiatives at WHO and PAHO in guinea worm eradication (Dr. Don Hopkins), the global Expanded Programme on Immunization (EPI) at WHO (Dr. Rafe Henderson), and polio eradication (Dr. Ciro de Quadros).²⁷

While Don Hopkins, Rafe Henderson, Ciro de Quadros were not Volunteers or staff, they interacted with a large number of Volunteers during their work overseas. ... They returned to the United States and to “upper echelon” assignments knowing the value of Volunteers in the field. Hence, they reached out for Volunteers in guinea worm, polio, and other disease programs.

-*Jean Roy* (Peace Corps interview, March 6, 2014)

For many of the Volunteers and RPCVs who were involved in smallpox eradication, the experience launched their careers as public health professionals at CDC, WHO, USAID, the U.S. Public Health Service, the Health Resources and Services Administration (HRSA), the Department of Veterans Affairs, the National Library of Medicine, CARE, the Red Cross, and other organizations. Their formative experiences in smallpox eradication profoundly shaped how they thought about and worked in public health throughout their careers.

Vince Radke credited his service with setting him “on the road to public health. ... When I got into the program and to see how a public health program could indeed benefit many people, to me that was very gratifying.”²⁸

27 Jean Roy, “Oral History, Global Health Chronicles; Breman, “A Miracle Happened There,” 22; and Rafe Henderson, “Oral History,” Global Health Chronicles.

28 Radke, “Oral History,” Global Health Chronicles.

Lenore Sheridan wrote that she worked for the Veterans Administration in medical research doing data management on multicenter clinical trials. She also volunteers with the San Francisco AIDS Foundation distributing clean syringes and safe injection kits. She said, "I was attracted to the program because of the preventive aspect in stopping the spread of HIV and hepatitis C. I volunteer in a storefront operation and on an outreach team where we go from one homeless encampment to another offering syringes and supplies. It reminds me of going house to house and village to village the way we did in Afghanistan. It is extremely satisfying work."²⁹

Judith Johnson Sandberg credited her experience in Afghanistan and her close work with a nurse who helped to train Judith's group with setting her on the path to become a nurse. She wrote:

After I went home from Afghanistan, I enrolled at the University of Washington in Seattle to get a nursing degree. I would have never thought of doing this if I hadn't been a vaccinator, and I was specifically motivated by ... an RN [Jan Kutney, one of the nurses who participated in the pilot test of the smallpox eradication program.] ... I thought that with a nursing education I could be so much more help—Afghans were always asking for medical help and information outside our vaccinating sphere, and it was sometimes frustrating not being able to be of more assistance.

– *Quoted by Kristina Engstrom* (email to author, August 8, 2016)

Many also created life-long connections with one another. This networking chain continued among Volunteers as well: Several of the RPCVs who were interviewed for this report described seeking out the next generation of Volunteers in the countries where they were working, such as the example of Robert Steinglass seeking Volunteers in Yemen to help document the eradication of smallpox.

Dr. D. A. Henderson wrote that:

Peace Corps contributions were significant in a number of countries, but I have come to believe that one of its most important contributions has been to introduce our young people to the needs and realities of many countries around the world and to realize how much could be accomplished in the fields of health, education, and agriculture with even the limited resources that are available. It has become apparent to me that it was an important magnet in attracting some of the very best to consider careers in public health, including the international health field.

–*Dr. D. A. Henderson* (email to author, Jan. 9, 2014)

²⁹ Quoted by Engstrom, email to author, August 11, 2016.

Personal Growth and Fulfillment

Even the Volunteers and RPCVs who did not go on to public health careers recalled their experience fighting smallpox as a pivotal one in their lives. They described learning to appreciate other cultures, learning to recognize the impact of culture on attitudes and behavior, and learning to accept that people from other cultures may have different values and priorities—lessons that all Peace Corps Volunteers share. One of the Volunteers in Afghanistan, in particular, spoke about the important life lessons that she took from her Peace Corps service: affection for her Afghan counterparts, a deep appreciation for the Afghan people and their way of life, and gratitude for their unfailing hospitality. “They had so little, and they gave so much.”³⁰

For so many of the RPCVs who were interviewed for this report by the Peace Corps or who had been interviewed at CDC and Emory University for the Global Health Chronicles, their experiences in the smallpox eradication work proved to be a watershed event in their lives and a source of great personal fulfillment. Robert Steinglass spoke of the sense of pride in having been “part of the greatest public health achievement in history.”³¹ He described his experience as “life changing,” launching his career in major international immunization programs funded by WHO and USAID.

David Bourne said about the sense of accomplishment that he gained and how rewarding it was, “You would leave a village and know that they’ve had or that area had smallpox for maybe 2,000 years and will never have smallpox again.”³²

In closing, perhaps the best summary of the impact of this experience on the lives of the Volunteers and returned Volunteers and the sense of personal fulfillment was expressed by Alan Fiske when he wrote these words:

It was an amazing team. If I never did or do anything else of significance in my life, my participation in the smallpox eradication campaign makes it a life worth living. I am honored to have been a part of it. Few people have the chance to do anything quite so meaningful, or so unequivocally good.

—Alan Fiske (email to author, March 3, 2014)

³⁰ Eccles, Peace Corps interview, February 19, 2014.

³¹ Steinglass, Peace Corps interview, November 22, 2013.

³² Bourne, “Oral History,” Global Health Chronicles.

Appendix A: Glossary of Terms

Bifurcated needle	A two-pronged needle that was used to scratch the skin of a patient's arm so that the drop of vaccine between the prongs could be absorbed.
Case fatality rate	The proportion of people with a disease (cases) who die from the disease. A case fatality rate of 30 percent, such as was seen with smallpox, meant that 30 people out of every 100 people with the disease died from it.
Endemic	A disease or microorganism that is present in a population at all times. This term is used in this report to distinguish between the indigenous transmission of the smallpox virus and its (re)importation from neighboring countries.
Epidemic Intelligence Service	This service was developed at CDC in 1951 to train physicians in epidemiology and surveillance skills that would be needed in the event of biological warfare. Dr. Alexander Langmuir, director of the CDC epidemiology branch and founder of the EIS, had himself volunteered for a mission to assist Bangladesh in fighting smallpox in 1958.
Epidemiology	The study of patterns of diseases in defined populations. The use of epidemiological methods and concepts in the Smallpox Eradication Programme (such as working backward to trace the sources of an outbreak) was instrumental in developing a picture of the way that the disease was spreading, thus allowing health workers to target their efforts more effectively.
Herd immunity	A concept in public health that describes the indirect protection that occurs when a large percentage of a given population has been vaccinated or becomes immune to an infectious disease, thereby making it less likely that individuals who are not yet immune will contract the disease.

Jet injector	An electric device that used high pressure to shoot a small amount of vaccine through skin without a needle.
Mass vaccination	Programs designed to vaccinate large proportions of the population in a geographic area.
Monkeypox	A disease caused by an orthopox virus similar to the one which causes smallpox. It is known to be transmitted by monkeys and small rodents, but it is rarely transmitted between people.
Outbreak	The rapid increase and spread of cases of a disease from a central origin. In smallpox eradication, outbreaks were defined in relation to a central “index” case from which the virus had spread to other people or areas. This concept was used to understand how and where the disease was spreading so that transmission could be interrupted.
Ped-O-Jet	A type of jet injector that used a foot pedal to generate enough hydraulic pressure to shoot a small amount of vaccine through skin without a needle.
Ring vaccination	A virtual circle of protection formed around a location where a smallpox case is found so that all family and visitors are vaccinated to prevent the spread of the disease.
Rotary lancet	A five-pronged metal plate that was used for vaccination. The tool was pressed into the skin over a drop of vaccine and then twisted to create scratches. The punctures allowed the vaccine to penetrate deeply enough so that the body was stimulated to develop antibodies.
Smallpox warriors	This term was coined by the public health workers who sought to eradicate smallpox as an analogy for the semi-militaristic way in which the global “battle” was fought.
Surveillance and containment	A strategy developed in the Smallpox Eradication Programme to identify new cases and contain outbreaks by tracking down all of the people who had some contact with an infected person while he or she was capable of transmitting the disease. These contacts

were then vaccinated to protect them as well as to prevent them from transmitting the virus to others. The goal of containment was to interrupt smallpox transmission within 14 days of the detection of an outbreak.

Third-year extension/transfer

A Peace Corps recruitment mechanism by which a Volunteer who has completed two years of service in one location can receive an extension for a third year in a different location.

Vaccination

Vaccination uses a related virus called vaccinia or “cowpox” to stimulate the body to produce antibodies to the variola virus. Unlike variolation, vaccination did not make the patient infectious to other people. This concept then broadened to describe a number of diseases that are prevented by giving the body a vaccination from an inactive form of a virus.

Variolation

Deliberate infection of a person’s skin with the smallpox virus. This was done to cause a mild case of smallpox, which was much less likely to disfigure or kill the patient than a natural (inhaled) infection. Variolated patients had an estimated 1-2 percent case fatality rate as opposed to those who had the full-blown disease of variola major. People who had been variolated were infectious to any other people who had not been treated or survived the disease. In the U.S., Cotton Mather learned to do this around 1715 from one of his African slaves.

Yaws

A tropical infection that affects the skin, bones, and joints with large, ulcerating lesions. It is spread by direct contact with fluid from the lesion of another infected person. It can cause extensive disfigurement.

Appendix B: Interview Guide

1. Can you tell us about your life and education leading up to involvement with smallpox?
- 2A. How did Peace Corps come to be involved in the smallpox work in [NAME COUNTRY]?
[or depending on whether the interviewee was a Volunteer or returned Volunteer at the time....]
- 2B. Can you tell us more about the smallpox program in terms of scope, timeline, countries, how (R)PCVs fit in, and who led it, and how that synched up with the WHO program later on?
3. Did the smallpox program roll out differently in different locations?
- 4A. Name of PCVs and how they came to be involved in smallpox?
[or depending on whether the interviewee was a Volunteer or returned Volunteer at the time....]
- 4B. What was the involvement of the Peace Corps, PCVs, or RPCVs in smallpox in these countries? What was the significance of this work /the need for it? Where did you see this effort most? Why is that?
5. How did their PC service unfold? What type of activities did they do? (Describe the fieldwork, logistics.)
6. What were the living conditions like for these Volunteers?
7. What did the HCNs think about smallpox and the eradication effort? (In other words, what kind of local beliefs affected the service of the (returned) Volunteers and/or were affected by their service?)
8. Did the national governments think of this as a priority health issue? Did they contribute local resources and staff to this effort? Counterparts?
9. What added value or unique attributes/skills did (R)PCVs bring to smallpox eradication?
10. To what factors do these (R)PCVs attribute their success?
11. What would have happened without the (R)PCVs? (the counterfactual)
12. What did the (R)PCVs take away from this experience?
13. How did this experience impact their career paths?
14. What other country experiences did the people being interviewed have with smallpox?
15. Are there any lessons learned for other Peace Corps programs or partnerships? What are they?
16. Other comments, information, or resources: _____

Appendix C:

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Engstrom, Kristina (RPCV/Philippines and former Peace Corps/Afghanistan staff), and Margaret (Maggie) Eccles (RPCV/Afghanistan). Group interview by Peace Corps staff: Karen Van Roekel (author), Shelley Smith, Jessi Libbing, and Danielle Porreca. February 19, 2014. Intermittent correspondence and clarifications from December 2013 to September 2016.

Foster, Stan (retired CDC staff). Interview by Peace Corps staff: Karen Van Roekel (author), Shelley Smith, and Danielle Porreca. February 18, 2014. Intermittent correspondence and clarifications from November 2013 to September 2016.

Kraushaar, Dan (RPCV/Ethiopia). Interview by Peace Corps staff: Karen Van Roekel (author). August 10, 2016. Intermittent correspondence and clarifications from August 2016 to September 2016.

Miner, Tim (RPCV/Swaziland, RPCV/Zaire, and CDC staff). Interview by Peace Corps staff: Karen Van Roekel (author), Shelley Smith, Danielle Porreca, and Jessi Libbing. December 17, 2013. Intermittent correspondence and clarifications from December 2013 to September 2016.

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Roy, Jean (RPCV/Cameroon and former CDC staff). Interview by Peace Corps staff: Karen Van Roekel (author), Shelley Smith, and Susan Henderson. March 6, 2014. Intermittent correspondence and clarifications from February 2014 to September 2016.

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Additional Correspondence with the Author

The author also corresponded with Dr. D. A. Henderson, VSO Volunteer Robin Dulake, and the following RPCVs: Doug Arbuckle, Bill Emmet, Jay Friedman, Ann Kirkpatrick, Mark LaPointe, Brad Otto, Richard Poole, Scott Porterfield, Alan Schnur, Jim Skelton, Marc Strassburg, Jill Vickers, Mark Weeks, and Monica Wernette. Dates of correspondence ranged from October 2013 to September 2016 and included fact-checking, clarifications, and/or permissions to use quotations from secondary sources or photographs.

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This list includes RPCVs and other global health workers whose descriptions provided additional context for this report.

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