Preparing for Bioterrorism

The Alfred P. Sloan Foundation's Leadership in Biosecurity

Gigi Kwik Gronvall • Foreword By D. A. Henderson

Author Gigi Kwik Gronvall, PhD, an immunologist by training, has been a scholar in biosecurity since 2000, when she was a National Research Council Postdoctoral Associate at USAMRIID in Fort Detrick, Maryland. She was a founding member of the Johns Hopkins University Center for Civilian Biodefense Strategies in 2001, and has been a Senior Associate with the Center for Biosecurity of UPMC since its inception in 2003.

Although Dr. Gronvall's research addresses an array of topics in biosecurity and biodefense, she has focused on characterizing the role of scientists in biodefense and defining responsible policy for governance of science. She has also published extensively on the challenges of developing medical countermeasures for biodefense. Dr. Gronvall has testified before the US Congress on the safety and security of high-containment biological laboratories in the United States, served as the Science Advisor of the Commission on the Prevention of Weapons of Mass Destruction Proliferation and Terrorism from April 2009 until the commission ended in February 2010, and investigated and presented policy recommendations on the governance of science to the 2003, 2005, and 2006 Biological Weapons Conventions in Geneva, Switzerland.

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Afterword by Tom Inglesby

Contributing author Madeline Drexler

This book is dedicated to Ralph Gomory and Paula Olsiewski,
with gratitude for their vision, leadership, and dedication.

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Foreword

D. A. Henderson

On September 11, 2001, terrorists on suicide missions flew planes into the World Trade Center and the Pentagon. A stunned, appalled country had only begun to pick up the pieces when desperately ill patients with a strange pneumonia like disease were reported first from Florida, then New York and New Jersey, and, finally, Washington, DC. Anthrax organisms were found in a white powder in some letters. Immediately, white powders, wherever they were found, became suspect. Public health laboratories were swamped with thousands of samples from all parts of the country samples that were not at all dangerous: powdered sugar from doughnuts, powdered cleaning preparations, and white cosmetic powders. Suspicious samples resulted in buildings being evacuated and employees "decontaminated" with water from fire hoses and showers. Information about what was occurring, even for government officials, had

to be gleaned from fragmentary reports on CNN and local television. There were no clinicians who had experience in treating cases of inhalation anthrax. Major cities had no plans for implementing public health measures in response to a biological attack. In short, the country was unprepared to deal with biological weapons.

Although the country was caught unprepared, there was one deeply interested organization, the Sloan Foundation, which had already made a major commitment in October 2000 to take on the mission of reducing the threat of bioterrorism. The practical initiatives they supported over ten years transformed complacency into meaningful programs. That story is the essence of this book. The Sloan funded work along with the development of federally supported programs have fostered a significant change in a country that is still all too prone to rapidly forget and put aside unpleasant memories of past catastrophes.

My own concerns about bioterrorism began in the 1990s. At that time, fears of terrorism were stoked by Aum Shinrikyo's chemical attack on the Tokyo subway, by the 1993 bombing of the World Trade Center, and by the startling revelation that the Soviet Union had been actively engaged in creating and perfecting biological weapons, including smallpox. President Clinton was sufficiently concerned that, in 1995, he issued a Presidential Decision Directive to all US government departments alerting them to the threat of terrorism and directing them to develop programs focused on national security. As a result, first responder teams began to be established in 120 major US cities, and funds were appropriated through the Departments of Defense and Justice to strengthen police, fire, and emergency rescue operations. But no funds were directed to casualty care or public health

response. Indeed, no provisions were made at all to deal with the threat of biological weapons; the threat was ignored by most officials. In the public health and medical communities, there was antipathy toward any activity that dealt with biological weapons, even as fears of biological attacks targeting civilian populations grew. At the time, neither the CDC nor the NIH had programs related to biological weapons.

It was clear to me that to address this problem, there had to be discussion, education, and research on this subject to be conducted by a dedicated center then called the Center for Civilian Biodefense Studies, which I founded with three colleagues in 1998. The center was conceived as a joint enterprise of the schools of public health and medicine at Johns Hopkins University. John Bartlett, then chief of the Division of Infectious Diseases, fully supported the initiative. Dr. Bartlett was also president of the Infectious Diseases Society of America (IDSA). As such, he was able to arrange on short notice a special symposium at the society's national meeting in September 1997. It attracted an exceptionally large audience. The central question we posed at the symposium was this:

> If late one night you were summoned to the emergency room as the infectious disease consultant on call and asked to deal with a dying patient with a rapidly progressing severe pneumonia or one covered with pustular lesions, would you recognize the patient with anthrax or smallpox? Bear in mind that this might be one of the first cases of a developing epidemic. Would you know what to do in treating the patient or preventing spread of the disease?

Symposium participants quickly understood that they would be wholly unprepared for such a scenario. Although much was being invested in a

national program for first responders, medical and public health practitioners, the true first responders to bioterrorism, had been overlooked in planning, funding, and education.

The center had important work to do, but there was no support to be found. Foundations interested in public health turned us away because they were not interested in work related to terrorism or in the morally repugnant topic of biological weapons. Foundations focused on national security related topics thought our work belonged in the public health and health policy domains. Academic institutions did not welcome discussion of and research on biological weapons. We invited other institutions comparable to Hopkins to join us in this effort and were turned down by all.

After the IDSA special symposium, my center colleagues and I traveled the country to give invited presentations at other meetings and conferences. We next decided to convene a national symposium on bioterrorism, specifically targeted to the public health and medical communities. Nothing like this had been held before, and we wondered how we would fill a hall that seated 1,000 people. Notices and publicity began in November 1998, only eleven weeks before the symposium. The center was new and unknown, and interest in the subject itself was uncertain. However, one week before it was to begin, we found we had to turn people away. Nevertheless, despite the success of the symposium, foundations continued to turn down our proposals and resources began to run out.

That changed after a personal meeting in New York with Ralph Gomory, then president of the Sloan Foundation. It was immediately clear that we shared similar concerns. He invited me to submit a proposal, and we submitted a generous one that was fully funded within weeks. One of the

Hopkins center's first joint efforts with Sloan was the simulated exercise *Dark Winter*. It was dramatically effective in acquainting key political leadership with the potentially dire consequences of a smallpox virus attack. Senator Sam Nunn played an especially important role in the exercise and then took it upon himself to brief both House and Senate leadership on the implications of a biological weapons attack. The last briefing in the Senate occurred in early September 2001, just days before 9/11.

After 9/11 and the anthrax letters that followed, the US government acted quickly. In November 2001, a new Office of Public Health Emergency Preparedness was created in the Office of the Secretary of HHS. Two months later, a special appropriation of more than $3 billion was provided to HHS to develop a program for civilian preparedness and response to a serious biological threat posed by a terrorist or by nature.

Soon after, others joined the Sloan Foundation and the center in the effort to build US biosecurity. It has been a long road from complacency to where we are today, and much has been accomplished along the way. Unquestionably, the country is better prepared now to deal with a biological weapons attack and with other large scale hazardous events.

But I should temper that statement and rewrite the sentence to say "was better prepared." In 2012, as this book is being written, federal budgets for public health preparedness are once again being significantly reduced for states, counties, hospitals, and the CDC. Public health laboratories are losing staff; epidemiologist positions have been cut; community liaisons who help mobilize schools, industries, and health departments are leaving. Memories of events like the anthrax attacks, Hurricane Katrina, pandemic influenza, and SARS are fading rapidly.

The Sloan Foundation fostered significant change. The major milestones in that history are recounted in this book. Sloan played a major role in laying the foundation for the nascent field of biosecurity and supported most of the key players who nurtured its development over the decade that followed the 2001 attacks. The nation should capitalize on the gifts of progress afforded by Sloan's generous ten year investment by continuing the good work that has been started and expanding on the achievements already realized. There remains much yet to be done to ensure our preparedness for future threats and disasters that threaten US biosecurity. We should build on the work recounted here and defend vigorously against anything that will undermine these accomplishments.

D. A. Henderson, MD, MPH, is a distinguished scholar at the Center for Biosecurity of UPMC and professor of public health and medicine at the University of Pittsburgh. He is dean emeritus and professor of health policy and management at the Johns Hopkins School of Public Health and the founding director (1998) of the Johns Hopkins Center for Civilian Biodefense Strategies.

Preface

Gigi Kwik Gronvall

Influenza, smallpox, cholera, and other infectious diseases have been a factor in warfare for centuries, but disease as a weapon has a much shorter history. It was not until advances in cell culture and fermentation allowed mass production that lethal pathogens could be added to the armaments of nations, starting with the first state sponsored biological weapons program in Germany in World War I. Afterward, biological warfare programs proliferated, culminating in the 1960s as the United States, the United Kingdom, Germany, France, the Soviet Union, and other nations directed teams of scientists to weaponize pathogens and devise the means to deliver them in combat.

Those offensive biological weapons programs had a defensive side as well: Soldiers were vaccinated, fitted with gas masks, and administered antibiotics to protect them from the weaponized pathogens of enemy nations. The focus

on defending troops against biological weapons remained sharp even after 1969, when President Richard Nixon declared that the United States would unilaterally disarm its biological weapons program, and after 1972, when the Biological Weapons Convention was signed in Geneva.

It was not until the 1990s that the possibility of biological terrorism, carried out by individual actors instead of the armies of nations, began to be widely recognized. Just as advances in microbial cell culture and vaccinology laid the groundwork at the turn of the twentieth century for development of offensive national biological weapons programs, advances in genetic engineering, biotechnology, cell culture, and aerosol technologies paved the way for terrorist use of biological weapons.

Weapons development that had previously required teams of scientists suddenly required only small groups or even an individual with the right laboratory skills and equipment. The attack range broadened as well. When nations attack nations, troops are most often the targets. When terrorists attack, civilians are often the targets. Once it became apparent that civilians were at risk, it was clear that the United States had a biological security deficit: Civilians were vulnerable to bioterrorist attack and the US government was not organized to protect or respond.

The biosecurity deficit was the motivation behind the Sloan Foundation's entry to the field. Ralph Gomory, president of the foundation, brought on Paula Olsiewski to direct Sloan's biosecurity program, which had as its mission the achievement of bioterrorism preparedness. Over the life of the program, which ran from 2000 to 2010, the Sloan Foundation awarded over $44 million to more than 150 grantees. The grantees, in turn, engaged and supported hundreds of experts, researchers, and other motivated people to

study, formulate, promulgate, enact, and rally for major gains in biosecurity and the nation's preparedness.

This book describes selected individual achievements of Sloan grantees to show the results of the foundation's leadership, commitment, and investments in national and international biosecurity. The story it tells illustrates how the Sloan Foundation's vision and its grantees' dedication and innovation left the nation demonstrably better prepared to face a biological weapons attack in 2012 than it was in 2000 before Sloan got involved.

Over its ten years in the field, Sloan awarded its biosecurity grants in ten loosely defined topic areas. Instead of trying to chronicle all of those grants, we chose a representative sample of grants from each area that, considered together, would tell the story of Sloan's major achievements in accomplishing its biosecurity mission. The goal of the book is to illustrate how biosecurity changed over the course of ten years in areas that were crucial to building civilian preparedness. Sloan grants were awarded to define and develop preparedness for civilian populations vulnerable to terrorist attacks, to update public health laws, to improve public building filtration, to prepare businesses for major epidemics, and to address many other aspects of biosecurity preparedness.

I gathered the material for the history presented here through independent research, interviews with Ralph Gomory and Paula Olswieski, and reviews of ten years' worth of grant proposals and grant reports submitted to the Sloan Foundation. Even more history was gathered from personal interviews with grantees who gave generously of their time in recounting their experiences with the Sloan Foundation and their Sloan supported projects. For that, I owe thanks to: Ron Atlas, Edward Baker, Joseph Barbera, John Barry, Al

Berman, Bruce Blythe, Harvey Brickman, David Buckeridge, Kathy Crosby, Rosemarie Curran, Malcolm Dando, Richard Danzig, Elizabeth Davis, Richard Falkenrath, David Franz, Robert Friedman, Michele Garfinkel, Larry Gostin, Richard Hatchett, D. A. Henderson, Jo Husbands, Tom Inglesby, Leslie Gielow Jacobs, Lynn Jennings, Barry Kellman, Joanne Kelly, Lynne Kidder, Randy Larsen, Richard Larson, Gene Matthews, Farzad Mostashari, Ron Noble, Lisa Orloff, Michael Osterholm, Rosalie Philips, William Raisch, Brian Rappert, Irwin Redlener, Fred Roberts, Don Schmidt, John Steinbruner, Mitchell Stern, Laura Streichert, Terence Taylor, Robert Ursano, and Michael Wagner. All took time out of demanding schedules to talk at length with me or with contributing author Madeline Drexler. Our interviews covered their work, its legacy and contribution to US preparedness, and their ideas about what should come next. Many provided careful review of the book section that described their project and offered valuable feedback.

Judging from those conversations alone, Sloan picked the right people, all of whom spoke highly of the foundation. The portrait of the foundation that emerged from these conversations was one of a nimble, open minded organization extraordinarily able and willing to adapt to rapidly changing political and scientific landscapes.

The way Sloan worked gave grantees remarkable freedom and the ability to be as influential as possible in shaping the nation's biopreparedness. It was exciting to put all of the pieces together and be able to see the whole history at once. This is a history of a new field and a new, important commitment to civilian preparedness. It is also an illustration of what foundations contribute to American society that the US government and capital investors with particular agendas cannot. Foundations provide invaluable independence.

We have included an appendix at the end of the book that lists all of the Sloan Foundation's grantees over its decade in biosecurity. It is an impressive array. Sloan was able to "punch above its weight" because the foundation was dedicated to the mission of US biosecurity and chose and supported similarly dedicated grantees. We are all better for the Sloan Foundation's leadership and investment.

Gigi Kwik Gronvall, PhD, an immunologist by training, has been a scholar in biosecurity since 2000, when she was a National Research Council postdoctoral associate at USAMRIID in Fort Detrick, Maryland. She became a member of the Johns Hopkins Center for Civilian Biodefense Studies in 2001, and has been a senior associate with the Center for Biosecurity of UPMC since its inception in 2003.

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This book would not have been possible without the support and lively encouragement of Paula Olsiewski, who gave generously of her time to reflect on the history of the biosecurity program and her most memorable experiences as director. Ralph Gomory gave generously of his time as well in an extended interview that could serve as a master class in leading and influencing large organizations. He insisted that this book describe not just the foundation's contributions to biosecurity, but also the work that remains to improve civilian preparedness.

That the many stories of individual Sloan efforts came together as a book is a testament to the talent and creativity of many of my colleagues, to whom I am grateful and indebted. D. A. Henderson, Randy Larsen, Joe Fitzgerald, Anita Cicero, and Tom Inglesby each read the completed manuscript with a critical eye and offered sage advice based on long experience. Monica Schoch Spana and Jennifer Nuzzo read the Center for Biosecurity and disease surveillance sections, respectively, and offered their valuable insights to help

make each better. Michael Mair and Penny Hitchcock reviewed the chapter on buildings and offered useful suggestions. I am grateful for the attention to detail, thought, and suggestions made by all reviewers.

Contributing author Madeline Drexler drew out many interesting and revealing quotes in this volume and drafted several of the sections. Yolanda Wolf, Paula Olsiewski's assistant, gathered and helped us organize the hundreds of grant proposals, project reports, articles, and government reports that we used to compile this history. She was instrumental in helping us launch this project.

I had a strong team behind me at the Center for Biosecurity, and I owe many thanks to my center colleagues. Tanna Liggins, as always, helped keep me organized. Kim Biasucci and Maria Jasen were very helpful in the beginning as we organized mountains of files and details gathered from Sloan's offices in New York. Crystal Franco, Tara Kirk Sell, Sam Wollner, Ryan Morhard, Kunal Rambhia, and Matt Watson served as the fact check team, chasing down and confirming myriad details and citations. Molly D'Esopo and Jackie Fox, both thoughtful and careful readers, provided valuable suggestions, skilled editing, and any other help needed through all stages of manuscript development. Ryan Morhard read the manuscript and offered the valuable feedback of someone who is new to, but up and coming in the field. Graphic designer Davia Lilly created the design and produced the book through layout and typesetting, bringing the book to life.

I was especially lucky to work with Mary Beth Hansen as editor. She shaped the book concept, organized and coordinated the team, and directed and kept on track all of the systems and processes that took this book from idea to finished product. She worked closely with me throughout to shape

the narrative and refine the text. In addition to her talents as editor, she also contributed enthusiastic encouragement and appreciation throughout, which kept the project fun and made it a delightful experience (surprisingly).

Finally, I would like to thank my husband and sons Jesper, Casper, and Felix who inspire me and bring me joy every day.