

Preface

The attacks on the World Trade Center (WTC) and the Pentagon and the first major use of bioterrorism that coincided in the fall of 2001 are now infamous. The Al Qaeda perpetrators of the horrible attacks on the WTC and Pentagon were clear in their intent. However, to date we have not achieved a similar clear understanding regarding the distribution of anthrax spores in the US postal system. We know neither exactly who perpetrated this crime, nor the perpetrators' exact intent. What is known is that the anthrax letter attacks cost billions of dollars to clean up, caused major disruptions in the everyday lives of countless citizens, undermined the trust and confidence that citizens have long held in this bastion of everyday life, and resulted in the deaths of innocent citizens. The impact was felt not only in the United States but also in countries around the world, as panic was precipitated by the possibility of innocuous "white powder" being an infectious agent.

The scientists and leadership within the US Department of Defense (DOD) played a unique role in mitigating this event by performing the initial identification of the infectious material (anthrax) as well as advising and participating in the decontamination process in the Hart Senate office building. Indeed, it can be argued that the DOD was the only federal agency capable of fully responding to this threat at that time because of its long-standing mission to provide the means to defend against a biological weapons attack. This critical mission has now transitioned into the newly established Department of Homeland Security (DHS).

The DOD biological defense program and similar defense programs in other countries have long involved research aimed at countering the use of biological and chemical weapons. The United States also had an active offensive biological program from the 1950s until 1969, when it was terminated by President Nixon.

Given the experience and history of the defense-associated programs in the development of countermeasures and in planning for future research in this area, *Biological Weapons Defense: Infectious Disease and Counterbioterrorism* is heavily represented by researchers who work within the biological defense community. However, we have also included contributors from other communities, including academia, the Centers for Disease Control and Prevention, the Department of Energy (DOE), and the Department of Health and Human Services (DHHS). Most of these groups have been working with various aspects of bioterrorism for the past four years. The intensity and urgency of those efforts have increased since the 2001 attacks. Also, within the DHHS, funding has been greatly increased for bioterrorism research and for the development of medical countermeasures. It is anticipated that this increase in funding will yield further discoveries that will enhance national defense.

Even with the warnings of experts and the years of funding and preparation for an act of bioterrorism, the United States was not fully prepared for the anthrax attacks. Because of the decades of research and development that DOD scientists and physicians had accomplished in the treatment, prevention, and diagnosis of these rare diseases, many individuals and research centers within the DOD were asked to "step up" in that time

of national crisis. This is an indication of the professionalism and capabilities of this relatively small group of people. It was against this backdrop that *Biological Weapons Defense: Infectious Disease and Counterbioterrorism* was written. The purpose of this volume is to cover many aspects of the defense against biological agents that we, as members of the human community, must address on a continuing basis. We have divided this volume into four parts that concentrate on the major areas of interest and research.

Part I, "Preparation and Military Support for a Possible Bioterrorism Incident," provides the reader with a view into the behind-the-scenes efforts that many people might not be aware of because they are outside the government network. This includes the policy and laws that govern the DOD and its programs. We have also included aspects of event modeling as well as a general description of the diseases of greatest concern.

Part II, "Medical Countermeasures and Decontamination," gives an account of general knowledge of these particular diseases including pathogenesis, treatment, and the unique aspect of studying the aerosol route of infection.

Part III, "Emerging Threats and Future Preparation," could have easily been titled "future directions." The number of nefarious manipulations or discovery of previously unknown threats that might be developed into biological weapons is almost unlimited. This section informs readers of these threats and describes some of the ongoing research that attempts to counter these unknown agents. This section includes genomic efforts, which describe the current rapid pace of information that is gleaned from analysis of the genomes and proteomes of these agents. Following the anthrax letters, there has been a continuing effort by the National Institutes of Health, DOD, and DOE in the area of biodefense genomics. This research has the potential to accelerate many aspects of preparation against the use of biological weapons, including future threats, diagnostics, therapeutics, vaccinations, pathogenesis, genotyping, and forensics.

Finally, Part IV, "Diagnostic Development for Biowarfare Agents," discusses the many aspects of the development and use of our current technology to identify and characterize these infectious organisms.

Although it was not possible to cover every aspect of biodefense in this volume, we hope readers will gain a greater understanding of the diseases caused by these organisms and develop a sense of the scope of issues that must be overcome to develop necessary medical countermeasures to bioterrorism. Readers should also understand the status of current programs and future plans regarding specific diseases as well as future technology or future threats.

A quote from retired US Army Major General Phillip K. Russell could be considered a theme for this book: "Deficiencies in our scientific knowledge and a paucity of experts will ultimately limit our capability to rapidly and precisely identify agents and respond effectively in a crisis" (1). *Biological Weapons Defense: Infectious Disease and Counterbioterrorism* is intended to give readers a sense of where we are on this issue and where we are moving in the future. We hope that you will find our book informative.

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REFERENCES

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