

# **Bioterrorism in Medical and Healthcare Administration**

# PUBLIC ADMINISTRATION AND PUBLIC POLICY

## A Comprehensive Publication Program

*Executive Editor*

**JACK RABIN**

Professor of Public Administration and Public Policy  
School of Public Affairs  
The Capital College  
The Pennsylvania State University—Harrisburg  
Middletown, Pennsylvania

1. *Public Administration as a Developing Discipline (in two parts)*, Robert T. Golembiewski
2. *Comparative National Policies on Health Care*, Milton I. Roemer, M.D.
3. *Exclusionary Injustice: The Problem of Illegally Obtained Evidence*, Steven R. Schlesinger
4. *Personnel Management in Government: Politics and Process*, Jay M. Shafritz, Walter L. Balk, Albert C. Hyde, and David H. Rosenbloom
5. *Organization Development in Public Administration (in two parts)*, edited by Robert T. Golembiewski and William B. Eddy
6. *Public Administration: A Comparative Perspective, Second Edition, Revised and Expanded*, Ferrel Heady
7. *Approaches to Planned Change (in two parts)*, Robert T. Golembiewski
8. *Program Evaluation at HEW (in three parts)*, edited by James G. Abert
9. *The States and the Metropolis*, Patricia S. Florestano and Vincent L. Marando
10. *Personnel Management in Government: Politics and Process, Second Edition, Revised and Expanded*, Jay M. Shafritz, Albert C. Hyde, and David H. Rosenbloom
11. *Changing Bureaucracies: Understanding the Organization Before Selecting the Approach*, William A. Medina
12. *Handbook on Public Budgeting and Financial Management*, edited by Jack Rabin and Thomas D. Lynch
13. *Encyclopedia of Policy Studies*, edited by Stuart S. Nagel
14. *Public Administration and Law: Bench v. Bureau in the United States*, David H. Rosenbloom
15. *Handbook on Public Personnel Administration and Labor Relations*, edited by Jack Rabin, Thomas Vocino, W. Bartley Hildreth, and Gerald J. Miller
16. *Public Budgeting and Finance: Behavioral, Theoretical, and Technical Perspectives, Third Edition*, edited by Robert T. Golembiewski and Jack Rabin
17. *Organizational Behavior and Public Management*, Debra W. Stewart and G. David Garson
18. *The Politics of Terrorism: Second Edition, Revised and Expanded*, edited by Michael Stohl
19. *Handbook of Organization Management*, edited by William B. Eddy
20. *Organization Theory and Management*, edited by Thomas D. Lynch
21. *Labor Relations in the Public Sector*, Richard C. Kearney
22. *Politics and Administration: Woodrow Wilson and American Public Administration*, edited by Jack Rabin and James S. Bowman
23. *Making and Managing Policy: Formulation, Analysis, Evaluation*, edited by G. Ronald Gilbert

24. *Public Administration: A Comparative Perspective, Third Edition, Revised*, Ferrel Heady
25. *Decision Making in the Public Sector*, edited by Lloyd G. Nigro
26. *Managing Administration*, edited by Jack Rabin, Samuel Humes, and Brian S. Morgan
27. *Public Personnel Update*, edited by Michael Cohen and Robert T. Golembiewski
28. *State and Local Government Administration*, edited by Jack Rabin and Don Dodd
29. *Public Administration: A Bibliographic Guide to the Literature*, Howard E. McCurdy
30. *Personnel Management in Government: Politics and Process, Third Edition, Revised and Expanded*, Jay M. Shafritz, Albert C. Hyde, and David H. Rosenbloom
31. *Handbook of Information Resource Management*, edited by Jack Rabin and Edward M. Jackowski
32. *Public Administration in Developed Democracies: A Comparative Study*, edited by Donald C. Rowat
33. *The Politics of Terrorism: Third Edition, Revised and Expanded*, edited by Michael Stohl
34. *Handbook on Human Services Administration*, edited by Jack Rabin and Marcia B. Steinhauer
35. *Handbook of Public Administration*, edited by Jack Rabin, W. Bartley Hildreth, and Gerald J. Miller
36. *Ethics for Bureaucrats: An Essay on Law and Values, Second Edition, Revised and Expanded*, John A. Rohr
37. *The Guide to the Foundations of Public Administration*, Daniel W. Martin
38. *Handbook of Strategic Management*, edited by Jack Rabin, Gerald J. Miller, and W. Bartley Hildreth
39. *Terrorism and Emergency Management: Policy and Administration*, William L. Waugh, Jr.
40. *Organizational Behavior and Public Management: Second Edition, Revised and Expanded*, Michael L. Vasu, Debra W. Stewart, and G. David Garson
41. *Handbook of Comparative and Development Public Administration*, edited by Ali Farazmand
42. *Public Administration: A Comparative Perspective, Fourth Edition*, Ferrel Heady
43. *Government Financial Management Theory*, Gerald J. Miller
44. *Personnel Management in Government: Politics and Process, Fourth Edition, Revised and Expanded*, Jay M. Shafritz, Norma M. Riccucci, David H. Rosenbloom, and Albert C. Hyde
45. *Public Productivity Handbook*, edited by Marc Holzer
46. *Handbook of Public Budgeting*, edited by Jack Rabin
47. *Labor Relations in the Public Sector: Second Edition, Revised and Expanded*, Richard C. Kearney
48. *Handbook of Organizational Consultation*, edited by Robert T. Golembiewski
49. *Handbook of Court Administration and Management*, edited by Steven W. Hays and Cole Blease Graham, Jr.
50. *Handbook of Comparative Public Budgeting and Financial Management*, edited by Thomas D. Lynch and Lawrence L. Martin
51. *Handbook of Organizational Behavior*, edited by Robert T. Golembiewski
52. *Handbook of Administrative Ethics*, edited by Terry L. Cooper
53. *Encyclopedia of Policy Studies: Second Edition, Revised and Expanded*, edited by Stuart S. Nagel
54. *Handbook of Regulation and Administrative Law*, edited by David H. Rosenbloom and Richard D. Schwartz
55. *Handbook of Bureaucracy*, edited by Ali Farazmand
56. *Handbook of Public Sector Labor Relations*, edited by Jack Rabin, Thomas Vocino, W. Bartley Hildreth, and Gerald J. Miller
57. *Practical Public Management*, Robert T. Golembiewski
58. *Handbook of Public Personnel Administration*, edited by Jack Rabin, Thomas Vocino, W. Bartley Hildreth, and Gerald J. Miller
59. *Public Administration: A Comparative Perspective, Fifth Edition*, Ferrel Heady

60. *Handbook of Debt Management*, edited by Gerald J. Miller
61. *Public Administration and Law: Second Edition*, David H. Rosenbloom and Rosemary O'Leary
62. *Handbook of Local Government Administration*, edited by John J. Gargan
63. *Handbook of Administrative Communication*, edited by James L. Garnett and Alexander Kouzmin
64. *Public Budgeting and Finance: Fourth Edition, Revised and Expanded*, edited by Robert T. Golembiewski and Jack Rabin
65. *Handbook of Public Administration: Second Edition*, edited by Jack Rabin, W. Bartley Hildreth, and Gerald J. Miller
66. *Handbook of Organization Theory and Management: The Philosophical Approach*, edited by Thomas D. Lynch and Todd J. Dicker
67. *Handbook of Public Finance*, edited by Fred Thompson and Mark T. Green
68. *Organizational Behavior and Public Management: Third Edition, Revised and Expanded*, Michael L. Vasu, Debra W. Stewart, and G. David Garson
69. *Handbook of Economic Development*, edited by Kuotsai Tom Liou
70. *Handbook of Health Administration and Policy*, edited by Anne Osborne Kilpatrick and James A. Johnson
71. *Handbook of Research Methods in Public Administration*, edited by Gerald J. Miller and Marcia L. Whicker
72. *Handbook on Taxation*, edited by W. Bartley Hildreth and James A. Richardson
73. *Handbook of Comparative Public Administration in the Asia-Pacific Basin*, edited by Hoi-kwok Wong and Hon S. Chan
74. *Handbook of Global Environmental Policy and Administration*, edited by Dennis L. Soden and Brent S. Steel
75. *Handbook of State Government Administration*, edited by John J. Gargan
76. *Handbook of Global Legal Policy*, edited by Stuart S. Nagel
77. *Handbook of Public Information Systems*, edited by G. David Garson
78. *Handbook of Global Economic Policy*, edited by Stuart S. Nagel
79. *Handbook of Strategic Management: Second Edition, Revised and Expanded*, edited by Jack Rabin, Gerald J. Miller, and W. Bartley Hildreth
80. *Handbook of Global International Policy*, edited by Stuart S. Nagel
81. *Handbook of Organizational Consultation: Second Edition, Revised and Expanded*, edited by Robert T. Golembiewski
82. *Handbook of Global Political Policy*, edited by Stuart S. Nagel
83. *Handbook of Global Technology Policy*, edited by Stuart S. Nagel
84. *Handbook of Criminal Justice Administration*, edited by M. A. DuPont-Morales, Michael K. Hooper, and Judy H. Schmidt
85. *Labor Relations in the Public Sector: Third Edition*, edited by Richard C. Kearney
86. *Handbook of Administrative Ethics: Second Edition, Revised and Expanded*, edited by Terry L. Cooper
87. *Handbook of Organizational Behavior: Second Edition, Revised and Expanded*, edited by Robert T. Golembiewski
88. *Handbook of Global Social Policy*, edited by Stuart S. Nagel and Amy Robb
89. *Public Administration: A Comparative Perspective, Sixth Edition*, Ferrel Heady
90. *Handbook of Public Quality Management*, edited by Ronald J. Stupak and Peter M. Leitner
91. *Handbook of Public Management Practice and Reform*, edited by Kuotsai Tom Liou
92. *Personnel Management in Government: Politics and Process, Fifth Edition*, Jay M. Shafritz, Norma M. Riccucci, David H. Rosenbloom, Katherine C. Naff, and Albert C. Hyde
93. *Handbook of Crisis and Emergency Management*, edited by Ali Farazmand
94. *Handbook of Comparative and Development Public Administration: Second Edition, Revised and Expanded*, edited by Ali Farazmand
95. *Financial Planning and Management in Public Organizations*, Alan Walter Steiss and 'Emeka O. Cyprian Nwagwu

96. *Handbook of International Health Care Systems*, edited by Khi V. Thai, Edward T. Wimberley, and Sharon M. McManus
97. *Handbook of Monetary Policy*, edited by Jack Rabin and Glenn L. Stevens
98. *Handbook of Fiscal Policy*, edited by Jack Rabin and Glenn L. Stevens
99. *Public Administration: An Interdisciplinary Critical Analysis*, edited by Eran Vigoda
100. *Ironies in Organizational Development: Second Edition, Revised and Expanded*, edited by Robert T. Golembiewski
101. *Science and Technology of Terrorism and Counterterrorism*, edited by Tushar K. Ghosh, Mark A. Prelas, Dabir S. Viswanath, and Sudarshan K. Loyalka
102. *Strategic Management for Public and Nonprofit Organizations*, Alan Walter Steiss
103. *Case Studies in Public Budgeting and Financial Management: Second Edition, Revised and Expanded*, edited by Aman Khan and W. Bartley Hildreth
104. *Handbook of Conflict Management*, edited by William J. Pammer, Jr., and Jerri Killian
105. *Chaos Organization and Disaster Management*, Alan Kirschenbaum
106. *Handbook of Gay, Lesbian, Bisexual, and Transgender Administration and Policy*, edited by Wallace Swan
107. *Public Productivity Handbook: Second Edition, Revised and Expanded*, edited by Marc Holzer and Seok-Hwan Lee
108. *Handbook of Developmental Policy Studies*, edited by Gedeon M. Mudacumura and M. Shamsul Haque
109. *Bioterrorism in Medical and Healthcare Administration*, Laure Paquette

*Additional Volumes in Preparation*

*Principles and Practices of Public Administration*, edited by Jack Rabin, Robert F. Munzenrider, and Sherrie M. Bartell

*International Public Policy and Management: Policy Learning Beyond Regional, Cultural, and Political Boundaries*, edited by Eran Vigoda-Gadot and David Levi-Faur

**ANNALS OF PUBLIC ADMINISTRATION**

1. *Public Administration: History and Theory in Contemporary Perspective*, edited by Joseph A. Uveges, Jr.
2. *Public Administration Education in Transition*, edited by Thomas Vocino and Richard Heimovics
3. *Centenary Issues of the Pendleton Act of 1883*, edited by David H. Rosenbloom with the assistance of Mark A. Emmert
4. *Intergovernmental Relations in the 1980s*, edited by Richard H. Leach
5. *Criminal Justice Administration: Linking Practice and Research*, edited by William A. Jones, Jr.



# **Bioterrorism in Medical and Healthcare Administration**

**Laure Paquette**

*Lakehead University  
Thunder Bay, Ontario, Canada*



**CRC Press**

Taylor & Francis Group

Boca Raton London New York

---

CRC Press is an imprint of the  
Taylor & Francis Group, an **informa** business

First published 2004 by Marcel Dekker, Inc.

Published 2019 by CRC Press  
Taylor & Francis Group  
6000 Broken Sound Parkway NW, Suite 300  
Boca Raton, FL 33487-2742

© 2004 by Taylor & Francis Group, LLC  
CRC Press is an imprint of Taylor & Francis Group, an Informa business

No claim to original U.S. Government works

ISBN 13: 978-0-8247-5651-2 (hbk)

This book contains information obtained from authentic and highly regarded sources. Reasonable efforts have been made to publish reliable data and information, but the author and publisher cannot assume responsibility for the validity of all materials or the consequences of their use. The authors and publishers have attempted to trace the copyright holders of all material reproduced in this publication and apologize to copyright holders if permission to publish in this form has not been obtained. If any copyright material has not been acknowledged please write and let us know so we may rectify in any future reprint.

Except as permitted under U.S. Copyright Law, no part of this book may be reprinted, reproduced, transmitted, or utilized in any form by any electronic, mechanical, or other means, now known or hereafter invented, including photocopying, microfilming, and recording, or in any information storage or retrieval system, without written permission from the publishers.

For permission to photocopy or use material electronically from this work, please access [www.copyright.com](http://www.copyright.com) (<http://www.copyright.com/>) or contact the Copyright Clearance Center, Inc. (CCC), 222 Rosewood Drive, Danvers, MA 01923, 978-750-8400. CCC is a not-for-profit organization that provides licenses and registration for a variety of users. For organizations that have been granted a photocopy license by the CCC, a separate system of payment has been arranged.

**Trademark Notice:** Product or corporate names may be trademarks or registered trademarks, and are used only for identification and explanation without intent to infringe.

**Visit the Taylor & Francis Web site at**  
**<http://www.taylorandfrancis.com>**

**and the CRC Press Web site at**  
**<http://www.crcpress.com>**

**Library of Congress Cataloging-in-Publication Data**

A catalog record for this book is available from the Library of Congress.

*To Kim Richard Nossal, with thanks for his rare generosity.*



## Preface

*Bioterrorism in Medical and Healthcare Administration* explains how to cope with the increased threat of bioterrorism. This book will be of use to health and medical services administrators and health professionals engaged in the emergency planning process. It will also be of interest to students of health administration, students in the regulated health professions, hospital and clinic managers, patient groups, other pressure groups, governments at the local, regional, and national level, students of terrorism and/or low intensity conflict, and organizations concerned with national and international security. It enters a field with many distinguished contributions. *Science and Technology of Terrorism and Counterterrorism* (Tushar K. Ghosh et al., eds. New York : Marcel Dekker, 2002.) discusses the technological innovations in biological, chemical, and nuclear terrorism, but not how to adapt emergency planning to it. Henderson, Thomas, and O'Toole's *Bioterrorism: Guidelines for Medical and Public Health Management* (American Medical Association Press, 2002) addresses issues primarily for physicians rather than for health professionals more broadly. Roland Moreau's *La menace terroriste NBC : nucléaire, biologique, chimique: comment faire face et se protéger* (Monaco: Rocher, 2002) and Alexander and Hoenig's *Super Terrorism: Biological, Chemical, and Nuclear* (Ardsley, NY: Transnational Publishers, 2001) discuss the protection against nuclear, biological, and chemical terrorism, but does not distinguish between a single-event response and broad emergency planning. Health administrators and health professionals are certainly not without advice, at least fifty books in health services administration are published each year. Dowding and Barr's *Managing in Healthcare* (Prentice Hall, 2001) was developed primarily for nurses and midwives in the United Kingdom, rather than to the wider audience of health professionals and health administrators. Couto and Eken's *To Give their Gifts* (Vanderbilt UP, 2002) provides case studies of community health services in the United States in ethnically diverse circumstances. Leebov and Scott's *The Indispensable Health Care Manager* (Jossey-Bass, 2002) provides managers in the field a guide to thriving in the current, highly competitive healthcare management environment. Lee Craven's *Transforming the NHS* (Prentice Hall, 2002) focuses on the particular experience of

change and the lessons learned, rather than on a generic process of change for health services administration, as does this book.

The present book provides tools for change that can be used by anyone, inside or outside the health care system, at any level and in a unit of any size. It also provides everyone in a particular organization with a common set of ideas and a common vocabulary, a good starting point when it comes to bioterrorism. The chapters in the first half of the book set out how to analyze events of significance to the management, how to control responses to bioterrorism, how to develop counterstrategies, if they prove necessary, and what tactics are most likely to be useful in that process. It explains how to analyze significant single events regarding bioterrorism. It also explains how to react to that event, if necessary. The book also presents a method for designing a broad, institution-wide plan to deal with a bioterrorist threat, as well as a method for responding to more specific threats of bioterrorism, should these be known. A personnel training program is also included, so that various professionals can participate in the planning and response process as required. There is an outline on how to use strategy to keep working relationships (even among individuals or groups whose viewpoints are opposed) as positive and productive as possible, something which proves useful when considering the new partners which might now share interests and have to interact. This portion of the book closes on a discussion of how to adapt the general theory proposed here to any particular situation. In this first part of the book, readers have two options. The first is to start a response from scratch, using Chapter 3. The second is adapting an existing emergency preparedness plan to the demands of the new bioterrorist threat, using Chapter 2.

The second half of the book provides semi-fictional case studies. These case studies are semi-fictional because they represent composites of actual situations modified so that they better illustrate the uses of strategy and tactics and so that they can be used by the reader to train in analysis. These cases are deliberately imperfect, and their strategies less than ideal, since that illustrates the worth of strategy in realistic circumstances and since it makes for a more challenging set of exercises. These case studies provide hypothetical scenarios for: a bioterrorist attack; planned or actual responses to bioterrorism; the use of strategy and tactics by a group within a country by a hospital; the response to bioterrorism by a state within the United States, illustrating the role of a non-national government; the response to bioterrorism of a group operating in more than one country; the response of a country's response to bioterrorism; and finally the response of a group of states collectively dealing with bioterrorism through international treaties and mutual aid programs.

Laure Paquette

# Contents

<i>Preface</i>	v
Part I How to Develop or Adapt Emergency Plans for Bioterrorist Threats	1
Chapter 1 Strategy and Bioterrorism	3
Chapter 2 Strategic Intervention: Tactical Analysis and Countervailing Tactics for Bioterrorism and Its Consequences	11
Chapter 3 Bioterrorism's Threat and Planned Response: Strategic Analysis and Design	31
Chapter 4 Counteracting a Bioterrorist Strategy: Overcoming the Inevitable Obstacles to Change	59
Chapter 5 A Coordinated Response to Bioterrorism: In-House Training and Planning for Staff, Professionals, and Managers	87
Part II: Semi-Fictional Case Studies	101
Chapter 6 A Hypothetical Bioterrorist Attack	103
Chapter 7 A Hospital Plans for Bioterrorism	109
Chapter 8 A State Deals with Terrorism	115
Chapter 9 An International Organization, WABO, Deals with Bioterrorism	125
Chapter 10 A Country Deals with Bioterrorism	139

<i>viii</i>	<b>Contents</b>
Chapter 11 An International Organization of States Deals with Bioterrorism	145
Chapter 12 Conclusion	155
Appendix: Solutions to the Analysis of the Cases	159
Bibliography	167
<i>Index</i>	183

# **Bioterrorism in Medical and Healthcare Administration**



# **Part I**

## *How to Develop or Adapt Emergency Plans for Bioterrorist Threats*

The next four chapters explain how to conduct the analysis necessary to determine, and then manage and control, the changes required in health services by higher threats of bioterrorism. The second chapter explains how to analyze significant single events regarding bioterrorism. It also explains how to react to that event, if necessary. The third chapter in the book explains how to design a broad, institution-wide plan to deal with a bioterrorist threat, and the fourth chapter details how to respond to more specific threats of bioterrorism, should these be known. The fifth chapter outlines a personnel training program so that various professionals can participate in the planning and response process as required. This first half of the book closes on a discussion of how to adapt the general theory proposed here to any particular situation.

As mentioned previously, the reader has two options. The first is to start a response from scratch, using Chapter 3. The second is adapting an existing emergency preparedness plan to the demands of the new bioterrorist threat, using Chapter 2.



# 1

## *Strategy and Bioterrorism*

Bioterrorism is the use or threatened use of microorganisms or toxins to produce disease or death in humans, animals, or plants. Terrorists undertake such actions to create fear and intimidate populations—and, indirectly, governments—in the pursuit of ideological, political, or religious goals. Bioterrorism is a particularly insidious form of terrorism. It creates a climate of fear, of course, as all terrorism does. But biological agents are hard to detect upon covert release. They are indiscriminate in causing sickness or death. Terrorists can neutralize their effects by self-protective measures, armed with knowledge denied to others.

Biological weapons themselves are well known, and their history does not offer much sense of reassurance about human nature.\* As early as the sixth century B.C.E., Assyrians poisoned the wells of their enemies with rye ergot. In the second century B.C.E., Hannibal's forces hurled earthen pots filled with serpents onto enemy decks during a naval battle. During the siege of Kaffa in 1346, the Tartar army threw its plague-ridden dead over the walls of the city. At the battle of Carolstein in 1422, bodies of plague-stricken soldiers and 2,000 cartloads of excrement were hurled into enemy ranks. During the conquest of South America in the fifteenth century, Pizarro presented clothing and bedding laden with smallpox as gifts to the natives. Napoleon attempted to force the surrender of Mantua by infecting the citizens with swamp fever. During the U.S. Civil War, soldiers poisoned ponds by dumping dead animals into them. Germans tried to spread cholera in Italy and plague in St. Petersburg during World War I. The Geneva Protocol banned biological weapons in 1924, but Japanese military officials are thought to have tried to poison League of Nations investigators in the Manchurian siege in 1931. During World War II, the British experimented

---

\*E.M. Eitzen and E.T. Takafuji, "Historical Overview of Biological Warfare," in Office of the Surgeon General, *Textbook of Military Medicine: Medical Aspects of Chemical and Biological Warfare* (Washington, DC: Dept. of the Army, 1997), 415–424.

with anthrax. The United States' anthrax program geared up again during the Korean War. In 1956, the USSR's Marshal Zhukov announced that Soviet forces had biological warfare capability. In 1969, the World Health Organization issued a report describing the unpredictability of biological weapons and associated risks due to lack of complete control.

Only in recent decades have biological weapons been used in terrorism, however. In 1972, members of the right-wing Order of the Rising Sun gained possession of 30 to 40 kilograms of typhoid cultures. September 7, 1978 saw the first known example of state-supported bioterrorism: a Bulgarian exile living in London, Georgi Markov, was injected with ricin via a specially constructed umbrella. In 1991, Iraqi authorities acknowledged that the previous year's stocks included 100 botulinum toxin, 50 anthrax, and 16 aflatoxin bombs; 13 botulinum toxin, 10 anthrax, and 2 aflatoxin Scud missile warheads; and 122-mm rockets filled with anthrax, botulinum toxin, and aflatoxin. Only a portion of the manufacturing facilities were destroyed during the Persian Gulf War. In the 1990s, on at least thirteen occasions, Aum Shinrikyo attempted to disperse anthrax, botulinum toxin, Q fever, or Ebola virus against the population in Japan, without success. In 1997 and 1999, the FBI investigated over 425 possible uses of nuclear, biological, or chemical agents; the vast majority were hoaxes. In 1999, Osama bin Laden attempted to acquire biological weapons in Sudan and Afghanistan. In 2001, cases of cutaneous anthrax turned up at ABC, CBS, the New York Times, and the New York Post, and three postal workers died of inhalational anthrax. An estimated 10,000 people were placed on antibiotic prophylaxis.

Today, at least seventeen nations are known to have programs of offensive biological weapons. A number of them are politically or economically unstable. Today it is easier than ever for terrorists to access these inadequately protected stocks of weaponized biological agents. On the other hand, turning biological agents into weapons comes with difficult requirements: effective delivery mechanisms, stabilization of the agent before and during use, a high degree of infectiousness, and a high degree of deadliness. Airborne delivery is the most likely method of dissemination, followed by water and food, but the latter means are less of a threat because of the logistics required. Effective airborne attacks require aerosolization and delivery to people's oral and nasal passages; this means that particles can be no larger than 10 microns in diameter to reach the lungs by inhalation. Once released, biological agents may degrade on exposure to ultraviolet light, temperature, or humidity, and they may also be diluted by the winds, for example.

The detection of bioterrorism is made more difficult by its covert nature. Health professionals must first recognize the clinical syndromes associated with various agents. Physicians and nurses must identify early victims and recognize unusual patterns of disease. Health services need integrated epidemiological surveillance systems capable of timely monitoring, with information shared at many levels of the health care system. And all of this has to be sustained over the long term, in case there is no period of heightened threat before an attack.

Preliminary criteria for suspicious outbreaks of disease that could indicate a possible biological weapons event include the following:

- The disease or strain is not endemic.
- The disease presents unusual antibiotic resistance patterns.
- The disease presents clinically in an atypical manner.
- The case distribution is geographically inconsistent or unusual.
- The case distribution is temporally inconsistent or unusual.

- The number of cases deviates from naturally occurring infection baselines.
- The mortality rate deviates from naturally occurring baseline.
- The morbidity rate deviates from naturally occurring baseline.

If there is a credible threat, then any occurrences that are out of the ordinary need to be assessed for possible bioterrorism. From an epidemiological standpoint, suspicion is raised in association with unusually high rates of illness, an unusual distribution of disease among the population, more virulent illnesses, unusual modes of infection or exposure, more severe diseases for a particular pathogen, infections with strains having unusual antibiotic resistance, pathogens not endemic to the geographic area, or the appearance of illness outside its normal transmission season or time period. A biological agent's potential as a weapon depends on its ability to multiply, its virulence, its lethality, its infectiousness, its mode of transmission, and its incubation period. Terrorists themselves assess potential biological agents according to their availability, ease of production, and ease of use. The Centers for Disease Control and Prevention developed the following classification of biological agents:

<b>Category A</b>	Easily disseminated or transmitted person to person; causing high rates of mortality; could cause public panic; could require special attention and public health awareness
<b>Category B</b>	Moderately easy to disseminate; causing moderate morbidity and lower mortality; requiring enhanced disease surveillance
<b>Category C</b>	Emerging pathogens; assessed on availability, ease of production, and ease of dissemination; potential for high morbidity and mortality

First understanding and then quantifying the impact of a bioterrorist attack are essential in developing public health preparedness. The Association for Professionals in Infection Control and Epidemiology constructed a model that compares the impact of three classic agents of biologic warfare (*Bacillus anthracis*, *Brucella melitensis*, and *Francisella tularensis*) released as aerosols in the suburb of a major city.<sup>†</sup> The model shows that the economic impact of a bioterrorist attack can range from an estimated US\$477.7 million per 100,000 persons exposed (brucellosis scenario) to US\$26.2 billion per 100,000 persons exposed (anthrax scenario). This scenario certainly provides economic justification for preparedness measures.

Readiness may be imperative, but the overall risks are comparatively low. This points to a real need to develop strategies to cope with the threat of bioterrorism, or a method to adapt existing emergency or disaster planning to take the new threat into account. This book presents a series of polyvalent tools of strategic and tactical analysis and forecasting that enables health professionals and health services managers to undertake the multiple tasks of coping with the threat of bioterrorism. This is also the most recent installment in a series of books and articles introducing a new general theory of

---

<sup>†</sup>Arnold F. Kaufmann, Martin I. Meltzer, and George P. Schmid, "The Economic Impact of a Bioterrorist Attack: Are Prevention and Postattack Intervention Programs Justifiable?" *Perspective*, Centers for Disease Control and Prevention, <http://www.cdc.gov/ncidod/EID/vol3no2/kaufman.htm>.