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MARINE CORPS MCRP 4-11.1C**

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**FIELD MANUAL**

**TREATMENT OF  
BIOLOGICAL WARFARE  
AGENT CASUALTIES**

**HEADQUARTERS, DEPARTMENTS OF THE ARMY, THE NAVY, AND  
THE AIR FORCE, AND COMMANDANT, MARINE CORPS**

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 DEPARTMENTS OF THE ARMY,  
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 AND COMMANDANT, MARINE CORPS  
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TREATMENT OF BIOLOGICAL WARFARE AGENT CASUALTIES

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## PREFACE

### Purpose

This publication serves as a guide and a reference for trained members of the Armed Forces Medical Services and other medically qualified personnel on the recognition and treatment of biological warfare

(BW) agent casualties. Information contained in this publication may also be relevant for the diagnosis and treatment of patients with naturally acquired diseases or illnesses due to pathogens with BW potential.

## Scope

- a.* This publication—
- (1) Classifies and describes potential BW agents.
  - (2) Provides procedures for collecting, handling and labeling, shipping, and identifying potential BW agents.
  - (3) Describes procedures for medical diagnosing, treating, and management of BW casualties.
  - (4) Describes medical management and treatment in BW operations.
- b.* The material in this publication is applicable to both the conventional battlefield and the integrated environment of the battlefield. (For the purpose of this publication, the “integrated environment” is intended to mean warfare and/or contingency operations where nuclear, biological, and chemical [NBC] weapons/agents are being employed or have a high probability of being employed in addition to conventional weapons.)
- c.* The treatment modalities contained in this manual differ from standard textbooks in that they apply to BW agent exposures. The method of exposure for most BW agents is by inhalation; whereas, the endemic disease exposure (if applicable) is by other means. Some are by ingestion, some by arthropod bites, and others by dermal contact with the agent. This does not preclude service members becoming BW casualties by these means.
- d.* The use of the term “level of care” in this publication is synonymous with “echelon of care” and “role of care.” The term “echelon of care” is the old North Atlantic Treaty Organization (NATO) term. The term “role of care” is the new NATO and American, British, Canadian, and Australian (ABCA) term.

## Standardization Agreements

This manual is in consonance with the following NATO Standardization Agreements (STANAGs) and ABCA Quadripartite Standardization Agreements (QSTAGs):

TITLE	NATO STANAG	QSTAG
Warning Signs for the Marking of Contaminated or Dangerous Land Areas, Complete Equipments Supplied and Stores	2002	
Reporting Nuclear Detonations, Biological and Chemical Attacks, and Predicting and Warning of Associated Hazards and Hazard Areas	2103	187
First Aid and Hygiene Training in NBC Operations	2358	

### **User Comments**

Users of this publication are encouraged to submit recommendations to improve the publication. Comments should be keyed to the page, paragraph, and line(s) of the text where the change is recommended. The proponent for this publication is the United States (US) Army Medical Department Center and School (AMEDDC&S). Comments should be forwarded to: **Commander, AMEDDC&S, ATTN: MCCS-FCD, 1400 East Grayson Street, Fort Sam Houston, Texas 78234-6175.**

### **Gender Statement**

Unless this publication states otherwise, masculine nouns and pronouns do not refer exclusively to men.

### **Use of Trade Names/Trademarks**

Use of trade names/trademarks in this publication is for illustrative purposes only. Their use does not constitute endorsement by the Department of Defense (DOD).

### **References**

References listed should be consulted for details beyond the scope of this publication.

## CHAPTER 1

# INTRODUCTION

### 1-1. The Threat of Biological Warfare Agents Against United States Forces and Civilian Populations

*a.* Biological warfare is the intentional use of viruses, bacteria, other microorganisms, or toxins derived from living organisms to cause death or disease in humans, animals, or plants.

*b.* In 1943, the US began research in and experimentation with several human and plant pathogens for use as BW weapons. In 1969, the US adopted a policy to cease offensive BW research and never again to produce, stockpile, weaponize, or use biological agents. By 1970 all offensive BW research was terminated. The US biological arsenal was destroyed by the end of 1972. In addition, the US is a party of the 1972 Biological Weapons Convention (BWC), which prohibits offensive BW agent research, stockpiling, weaponization, and use. However, several foreign governments and terrorist organizations have continued to develop offensive BW programs. The US conducts research to develop vaccines, chemoprophylaxes, diagnostic tests, and therapies to minimize the potential impact of a BW attack.

*c.* Biological warfare has interested several foreign governments and terrorist organizations for a number of reasons—

- Biological warfare agents are relatively easy to obtain. Naturally occurring viruses and bacteria which cause disease are obtainable from soil, water, animal reservoirs, clinical specimens, and clinical and research laboratories. Also, the development of recombinant genetic engineering has introduced the potential to genetically modify viruses and bacteria to enhance their ability to cause disease. Such modifications may include antibiotic resistance, enhanced invasiveness or toxin production, or enhanced ability to evade host immune defenses.

- Biological warfare agents are relatively easy and inexpensive to produce. The technology used to produce antibiotics, vaccines, and other industrial and food products can easily be converted to BW agent production. Such technology is readily available and is commonly used by industry; therefore, production of BW agents may be easily concealed.

### 1-2. Modes of Delivery

*a.* Biological warfare agents are unconventional weapons and can be delivered by unconventional means. Conventional explosive munitions are inefficient delivery systems for BW; the heat generated by the explosion will inactivate most of the BW agent. In addition, an explosion will generate a wide range of particle sizes with only a fraction of the weaponized BW agent being aerosolized in particles of a size suitable for deposition in the lower respiratory tract. The efficiency of explosive munitions delivering a viable BW agent is in the range of 1 to 2 percent.

*b.* Biological warfare agents are most effectively delivered as an aerosol. Aerosolized particles 1 to 5 microns ( $\mu$ ) in diameter are most efficiently delivered to their target (the air sacs of the lung). Larger particles either settle onto environmental surfaces, or are deposited in the upper respiratory tract and eliminated by mucociliary clearance. Due to the aerodynamics of particle flow through the respiratory tract, most particles smaller than 1  $\mu$  in diameter are exhaled and result in inefficient delivery to the lung.