CHAPTER 3

DEFENSE

SECTION I - INTRODUCTION

301. General.

In striking contrast to medical defensive measures to counter the effects of conventional, nuclear, and many chemical weapons, there exists the potential to minimize the threat of biological warfare through employment of available prophylaxis and therapy directed against specific agents.

302. Sanitation.

The importance of effective hygiene and sanitation in a biological operations environment cannot be over-emphasized. One of the primary responsibilities of all personnel is to ensure that standards of hygiene are maintained even in the most difficult circumstances. Personal hygienic measures such as frequent and adequate washing with soap and water, regular changes with laundered clothing, use of liberally disinfected toilets and field latrines (as opposed to cat-scratch methods), and post-defecation hand-washing should be emphasized.

303. Food and Water Sanitation.

Attention to published standards of safe food preparation and water purification, and protection of food and water supplies from incidental airborne contamination or sabotage, are likewise important. Standard methods of disinfection and waste disposal, effective in curbing transmission of naturally-occurring microorganisms, are equally useful in the context of biological warfare. Since biological agents may be spread by mechanical means or natural vectors, effective control of rodents and arthropods is a hygiene priority.

SECTION II - WARNING AND DETECTION

304. Detection.

Adequate and accurate intelligence is required in order to develop an effective defense against biological warfare. Once an agent has been dispersed, detection of the biological aerosol prior to its arrival over the target in time for personnel to don protective equipment, is the best way to minimize or prevent casualties. In the absence of prior warning, detectors collocated with personnel constitute the only means of detecting biological agent attacks prior to the occurrence of disease among its victims. Such detector systems are evolving and represent an area of intense interest within the research and development community. The principal difficulty in detecting biological agent aerosols stems from differentiating the artificially generated BW cloud from the background of organic matter normally present in the atmosphere.

SECTION III - PROTECTIVE EQUIPMENT

305. Individual Protection.

a. The NBC respirator, suit, gloves, and boots (IPE) will provide protection against a biological agent attack delivered by the aerosol route. Currently fielded respirators equipped with standard NBC filter canisters will protect the respiratory system against particles greater than 1-1.5 micrometers in size (mass median diameter). While the IPE clothing employed against chemical agents will also protect against biological agents, it is important to note that even standard uniform clothing of good quality affords a reasonable protection against dermal exposure to the surfaces covered.

b. Those casualties unable to continue wearing IPE should be held and/or transported within casualty wraps designed to protect the patient against chemical or biological agent exposure. Addition of a filter blower unit to provide overpressure enhances protection and provides cooling.

306. Collective Protection.

a. A dedicated hardened or unhardened shelter equipped with an air filtration unit (AFU) providing overpressure can offer collective protection (Colpro) for personnel in the biologically-contaminated environment. An airlock ensures that no contamination will be brought into the shelter. Casualties and contaminated personnel must be decontaminated prior to entering Colpro. In the absence of a dedicated structure, enhanced protection can be afforded within most buildings by sealing cracks and entry ports and providing air filtration within existing ventilation systems.

b. Due to the requirement to continue operations in a contaminated environment, much medical treatment will likely take place in Colpro. Colpro is the most effective method for protecting' patients and the medical capability in the contaminated environment. Patients whose illness is thought to be the result of a biological attack, or those who are thought to have a contagious infectious disease, will necessarily be cared for using barrier nursing techniques while inside the Colpro system.

SECTION IV - IMMUNOPROPHYLAXIS AND CHEMOPROPHYLAXIS

307. Immunoprophylaxis.

a. Prophylactic immunization is the only means of providing continuous protection against BW threats prior to, as well as during, hostile actions. Vaccines against a number of potential BW agents are available, and others are in various stages of development. Many of these vaccines were developed for the protection of laboratory workers or individuals working where the target diseases are endemic.

b. During a biological aerosol attack, the number of infectious or toxic units to which an individual is exposed may be greater than in the case of natural exposure. In addition, exposure by inhalation may represent an unnatural route of infection with

many agents. The efficiency of protection afforded by most vaccines is based on normal (that is, under natural disease conditions) inoculum size and exposure. Vaccines which generally are considered effective under natural circumstances may not provide a similar degree of protection to individuals exposed to biological aerosols.

c. Administration of vaccines to counter biological agents is complicated by the number of potential threats, the requirement to administer multiple doses of certain vaccines, the lead time necessary for stimulating immunity through vaccination, and the number of vaccines that can be administered simultaneously. The logistical burden accompanying an in-theatre vaccine administration program can be eliminated by immunization prior to initiation of hostilities. This requires formulation and implementation of an immunization policy.

d. Current or potential approaches to improving the efficiency of mass vaccination include: utilization of the jet injector, administration of vaccines via the aerosol route, use of immunopotentiators to enhance responsiveness to vaccines, development of new vaccines to accelerate the immune response, and use of multivalent vaccines.

e. Vaccine reactogenicity must be considered in the operational decision to implement a vaccination policy. Idiosyncratic reactions are associated with nearly all vaccines but affect only a very small proportion of vaccinees. The frequency and severity of reactions vary from vaccine to vaccine. With current products, significant side effects of immunization generally occur infrequently.

f. For some biological agents, the only available countermeasure might be specific antiserum. Under certain conditions, passive immunoprophylaxis with immunoglobulin products might be considered. Use may be limited by lack of adequate sources and quantities of material, limited duration of protection, and the risk of serum sickness associated with antisera not of human origin. However, recent scientific advances in products for immunoprophylaxis (for example, human monoclinal antibodies, “despeciated” equine or bovine antisera) are making this option technically more attractive.

308. Chemoprophylaxis.

a. Chemoprophylaxis using broad-spectrum antibiotics offers an additional option in the setting of a biological warfare threat. If an attack is felt to be imminent, or is known to have occurred, directed chemoprophylaxis would be appropriate for all personnel in the area. However, it is impractical, wasteful, and dangerous to place everyone located in a potential target area on prolonged, routine prophylactic antibiotics in the absence of such a threat condition.

b. For some biological agents, administration of antibiotics following exposure, but prior to appearance of symptoms, may be lifesaving. Knowledge of incubation periods and disease pathogenesis must be considered in the rationale and timing for dose and schedule of administration for a given drug. In some cases (for example, inhalation anthrax), coupling antibiotics with the post-exposure use of vaccine may offer the best alternative in those previously unvaccinated. In other cases,

administration of antibiotics at certain times following exposure serves only to prolong the incubation period (for example, Q fever). One must, therefore, be cautious in generalizing in the decisions to employ post-exposure prophylaxis.