

REPORT DOCUMENTATION PAGE			<i>Form Approved</i> <i>OMB No. 0704-0188</i>		
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1. REPORT DATE (DD-MM-YYYY) May 1965		2. REPORT TYPE		3. DATES COVERED (From - To)	
4. TITLE AND SUBTITLE Guide to the Management of BZ Casualties			5a. CONTRACT NUMBER		
			5b. GRANT NUMBER		
			5c. PROGRAM ELEMENT NUMBER		
6. AUTHOR(S)			5d. PROJECT NUMBER		
			5e. TASK NUMBER		
			5f. WORK UNIT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Directorate of Medical Research US Army Edgewood Arsenal Chemical Research and Development Laboratories Edgewood Arsenal, MD 21010			8. PERFORMING ORGANIZATION REPORT NUMBER S05-0038.1		
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSOR/MONITOR'S ACRONYM(S)		
			11. SPONSOR/MONITOR'S REPORT NUMBER(S)		
12. DISTRIBUTION / AVAILABILITY STATEMENT Distribution Statement A - Approved for Public Release.					
13. SUPPLEMENTARY NOTES Released to the public via RDECOM FOIA Request FA-13-0038.					
14. ABSTRACT BZ is a very potent psychoactive compound that is employed in chemical munitions to produce mental and physical incapacitation. Its pharmacological action is similar to that of other anticholinergic drugs (atropine, scopolamine, etc.) but longer lasting. If used in a chemical munition, BZ, in the form of an aerosol, would enter the body by inhalation. Its effects would begin to become evident 30-60 minutes after exposure, and its maximum effect would be reached in 4 to 8 hours. Signs and symptoms are increased heart rate, dry skin and mouth, mydriasis and blurred vision, ataxia, disorientation and confusion, progressing to stupor. If casualties are untreated, then 3 or 4 days are required for full recovery from the effects of BZ intoxication. It is important that all medical personnel not only understand the action of BZ but be fully prepared to handle BZ-induced mass casualties. The purpose of this booklet is to serve as a guide to the management of BZ casualties and to the medical materiel requirement.					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT UU	18. NUMBER OF PAGES 12	19a. NAME OF RESPONSIBLE PERSON
a. REPORT U	b. ABSTRACT U	c. THIS PAGE U			19b. TELEPHONE NUMBER (include area code)

S05-0038.1



5681

SAFETY
S05-0038

**GUIDE TO THE MANAGEMENT
OF BZ CASUALTIES**

May 1965



Directorate of Medical Research
US Army Edgewood Arsenal
CHEMICAL RESEARCH AND DEVELOPMENT LABORATORIES
Edgewood Arsenal, Maryland 21010

ETH 505

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Edgewood Arsenal, Maryland 21010.~~

~~The information in this document has not
been cleared for release to the general
public.~~

INTRODUCTION

BZ is a very potent psychoactive compound that is employed in chemical munitions to produce mental and physical incapacitation. Its pharmacological action is similar to that of other anticholinergic drugs (atropine, scopolamine, etc.) but longer lasting. If used in a chemical munition, BZ, in the form of an aerosol, would enter the body by inhalation. Its effects would begin to become evident 30-60 minutes after exposure, and its maximum effect would be reached in 4 to 8 hours. Signs and symptoms are increased heart rate, dry skin and mouth, mydriasis and blurred vision, ataxia, disorientation and confusion, progressing to stupor. If casualties are untreated, then 3 or 4 days are required for full recovery from the effects of BZ intoxication.

It is important that all medical personnel not only understand the action of BZ but be fully prepared to handle BZ-induced mass casualties. The purpose of this booklet is to serve as a guide to the management of BZ casualties and to the medical materiel requirement.

GUIDE TO THE MANAGEMENT OF BZ CASUALTIES

BZ is a typical anticholinergic compound, except for its very high potency. This chemical affects the central nervous system as well as the organs of circulation, digestion, salivation, sweating, and vision.

Symptoms and Signs

Small doses of BZ cause sleepiness and decreased alertness. Diagnosis can be made by noting an elevation in heart rate, dry skin and lips, drowsiness, increased pupil size, and elevated skin temperature.

Large doses produce a progressive intoxication in the untreated individual, as follows:

- | | |
|------------------------|--|
| <u>1 to 4 hours:</u> | Tachycardia, dizziness, ataxia, vomiting, dry mouth, blurred vision, confusion, sedation, progressing to stupor. |
| <u>4 to 12 hours:</u> | Inability to respond effectively to the environment or to move about. |
| <u>12 to 96 hours:</u> | Increasing activity, random unpredictable behavior; gradual return to normal 48 to 96 hours after exposure. |

Evacuation

Individuals who cannot stand must be lifted to a litter and strapped in. Individuals who are ambulatory must be regarded as potentially capable of resisting and must be approached with this in mind.

Physical Measures

To prevent the patient from injuring himself or others, restrictive care must be provided. Confine and separate, if possible, in a safe area. In the field, if no other means are available, restrain by tying to a tree.

Treatment

The most important single medical consideration is the possibility of heat stroke, because the patient cannot sweat. Remove excessive clothing if the environmental temperature is above 70°F (21°C). There is usually no danger of severe dehydration in the first 12 hours unless persistent vomiting occurs. Give fluids only when the patient is able to drink unassisted. Check for bladder distention if voiding does not occur within 12 hours.

Physostigmine salicylate

This drug is of limited effectiveness before 4 hours following exposure to BZ; after this time, it is highly effective. However, treatment does not shorten the

duration of BZ intoxication, and premature discontinuation of therapy will result in relapse.

Dosage

Give 3 mg physostigmine salicylate (0.75 cc injectable solution containing 4 mg per cc) intramuscularly (I.M.).

If, after 40 minutes, the first injection does not produce a satisfactory response (lowering of heart rate, mental clearing), give a second dose of 3 mg I.M. Then maintain the patient on an oral dose of 2 to 5 mg (4 to 10 ml of a solution made by dissolving 250 mg of physostigmine powder in 500 ml of water) given every 1 to 2 hours, as necessary. For oral administration of the physostigmine, dilute with 2 or 3 oz. of fruit juice, tea, coffee, or other beverage. A water solution is satisfactory but rather bitter.

The frequency and dosage should be gradually reduced over a period of 2 to 4 days.

Guide to Regulation of Dosage

The supine heart rate will usually be between 70 and 80 beats per minute when good control has been achieved. This will be accompanied by definite clearing of mental function, which can be tested by asking the patient to serially subtract by seven, beginning with 100. If the heart rate falls

below 70, temporarily reduce the dosage by 50%. Optimum treatment effects can only be attained by close regulation under the supervision of a physician. If this is not possible, 3 mg physostigmine given orally every 2 hours will generally provide partial control with safety.

Symptoms of Overtreatment

These are profuse sweating, clammy skin, abdominal cramps, vomiting, twitching of muscles, tremors, weakness, and other cholinergic symptoms. They are usually mild and require no treatment because the half-life of physostigmine is only about 30 minutes. Generally, it is sufficient to delay the next dose by 30 minutes and to reduce subsequent doses by 1/3. Small doses of atropine (2 mg I.M.) may be given. Do not discontinue treatment altogether because the toxic delirium of BZ may rapidly return.

CAUTION

As with any cholinesterase inhibitor, a large overdose of physostigmine can result in apnea secondary to neuromuscular block. If apnea should occur under such circumstances, mouth-to-mouth resuscitation is indicated.

Psychoactive drugs other than atropine should not be given in the therapy of physostigmine overtreatment.

LOGISTICAL REQUIREMENTS FOR TREATMENT OF 1000
BZ CASUALTIES IN A FIELD SITUATION

I. Evacuation. Casualties who cannot stand or walk will require evacuation strapped to litters. Loading into trucks without individual litter may be feasible, but will be slightly more hazardous. Individuals who are ambulatory must be regarded as potentially capable of resisting and must be approached with this in mind.

A. Litters - approximately 50-80% of the casualties will have to be transported by litter.

B. Restraining straps - 50-80% of the casualties will need to be restrained throughout the course of treatment.

C. Temperature control - exposure of casualties to ambient temperatures of greater than 80°F for more than a few minutes at a time will greatly increase the danger of heat stroke.

II. Medication Package - supply adequate for the treatment of 1000 casualties.

A. Physostigmine salicylate (eserine salicylate) injectable.

Three hundred (300) 10-cc vials of a sterile solution containing 4.0 mg per cc.

- B. Twelve hundred (1200) 1.0-cc sterile disposable plastic syringes with 27-gauge needles attached.
- C. Physostigmine salicylate, U.S.P., powder for oral use. This should be packaged in small, hermetically sealed plastic or metal foil packets containing 250 mg each. A total of one thousand (1000) such packets will be needed.
- D. Twelve brown plastic 500-cc screw-top bottles will be needed for preparing the oral solution of physostigmine. The caps of these bottles should be designed to hold 4.0 cc of the solution so that they can be used to dispense single doses of this medication. Instructions for preparing and dispensing this solution should be affixed to the brown plastic bottles as follows:
 - 1. Open the physostigmine powder packet and place the entire contents in this bottle.
 - 2. Add 500 cc of water to this bottle.
 - 3. Shake well.

4. Protect contents from excess sunlight.
5. This solution can be diluted further with water or fruit juices to make it more palatable.
6. Each cc contains 0.5 mg physostigmine.
7. Average dose is 4-10 cc (2-5 mg) orally as prescribed by a physician.





DEPARTMENT OF THE ARMY
US ARMY RESEARCH, DEVELOPMENT AND ENGINEERING COMMAND
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REPLY TO
ATTENTION OF:

11 JUN 2013


RDCB-DPC-RS

MEMORANDUM THRU *AMB 11 Jun 13* Technical Director, Edgewood Chemical Biological Center (ECBC)
(RDCB-D/Mr. Joseph D. Wienand), 5183 Blackhawk Road, Aberdeen Proving Ground, MD
21010-5424

FOR Office of the Chief Counsel, US Army Research, Development and Engineering Command
(RDECOM)(AMSRD-CCF/Ms. Kelly Knapp), 3071 Aberdeen Boulevard, Aberdeen Proving
Ground, MD 21005-5424

SUBJECT: Operations Security/Freedom of Information Act (FOIA) Review Request

1. The purpose of this memorandum is to recommend the release of information in regard to RDECOM FOIA Request FA-13-0038.
2. The ECBC received RDECOM FOIA Request FA-13-0038 from Ms. Kelly Knapp, RDECOM FOIA Officer. The original request was for an operations security review and release of document "*Guide to the Management of BZ Casualties*," dated May 1965. The report is unclassified; however, the distribution is limited to government agencies only. The ECBC has no objection to the release of this document; however the current distribution level must be changed with the Defense Technical Information Center (DTIC) prior to release.
3. The point of contact is Mr. Ronald L. Stafford, ECBC Security Specialist at 410-436-6810 or ronald.l.stafford.civ@mail.mil.


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Security Manager