

NATO STANDARD

AMedP-7.2

**CHEMICAL, BIOLOGICAL,
RADIOLOGICAL AND NUCLEAR
(CBRN) FIRST AID HANDBOOK**

Edition A, Version 2

JULY 2026



NORTH ATLANTIC TREATY ORGANIZATION

ALLIED MEDICAL PUBLICATION

Published by the
NATO STANDARDIZATION OFFICE (NSO)
© NATO/OTAN

INTENTIONALLY BLANK

NORTH ATLANTIC TREATY ORGANIZATION (NATO)

NATO STANDARDIZATION OFFICE (NSO)

NATO LETTER OF PROMULGATION

23 July 2026

1. The enclosed Allied Medical Publication AMedP-7.2, Edition A, Version 2, CHEMICAL, BIOLOGICAL, RADIOLOGICAL AND NUCLEAR FIRST AID HANDBOOK, which has been approved by the Allies in the MILITARY COMMITTEE MEDICAL STANDARDIZATION BOARD (MCMedSB), is promulgated herewith. The agreement of nations to use this publication is recorded in STANAG 2358.
2. AMedP-7.2, Edition A, Version 2, is effective upon receipt and supersedes AMedP-7.2, Edition A, Version 1, which shall be destroyed in accordance with the local procedure for the destruction of documents.
3. This NATO standardization document is issued by NATO. In case of reproduction, NATO is to be acknowledged. NATO does not charge any fee for its standardization documents at any stage, which are not intended to be sold. They can be retrieved from the NATO Standardization Documents Database (<https://nso.nato.int/nso/>) or through your national standardization authorities.
4. This publication shall be handled in accordance with C-M(2002)60.



Thierry POULETTE
Major General, FRA (A)
Director, NATO Standardization Office

INTENTIONALLY BLANK

RESERVED FOR NATIONAL LETTER OF PROMULGATION

INTENTIONALLY BLANK

RECORD OF RESERVATIONS

[illegible]

INTENTIONALLY BLANK

RECORD OF SPECIFIC RESERVATIONS

[illegible]

INTENTIONALLY BLANK

SUMMARY OF CHANGES

This new version is a technical and editorial update. The key changes to this publication are:

1. The implementation of the NATO CBRN Defence Policy (2022).
2. The implementation of recommendations of the CBRN Medical Deep Dive.
3. The establishment of a CBRN Medical ETEE Programme including the CBRN Enhanced First Aid (EFA) course.
4. The implementation of CBRN medical lessons learned from recent operations and exercises.
5. The realignment of CBRN first aid with NATO Tactical Combat Casualty Care (TCCC) AMedP-8.15 [STANAG 2122], *Requirement for Training in Casualty Care for all Military Personnel*.
6. The increased focus on hot zone casualty care.
7. The update of initial casualty care in a CBRN environment.
8. The addition of a riot control agent (RCA) casualty care guideline.
9. The addition of an opioid casualty care guideline.
10. The update of SRD 1 to AMedP-7.2, *Aide Memoire*.

TABLE OF CONTENTS

SUMMARY OF CHANGES	VII
CHAPTER 1 INTRODUCTION.....	1-1
1.1. AIM.....	1-1
1.2. CONTEXT	1-1
1.3. SCOPE.....	1-1
1.4. RELATED DOCUMENTS	1-2
1.5. DEFINITIONS.....	1-3
1.6. STRUCTURE OF AMedP-7.2.....	1-3
1.7. RESPONSIBILITIES FOR INITIAL CBRN CASUALTY CARE.....	1-3
1.7.1. Provision of CBRN First Aid.....	1-3
1.7.2. Provision of Casualty Decontamination	1-4
1.7.3. Fatality Management.....	1-4
1.7.4. Provision of CBRN First Aid Training.....	1-4
1.8. LEVELS OF CBRN FIRST AID TRAINING	1-4
1.9. CONTRIBUTIONS, ACKNOWLEDGEMENTS & POINTS OF CONTACT	1-5
CHAPTER 2 PRINCIPLES OF CBRN FIRST AID	2-1
2.1. INTRODUCTION.....	2-1
2.2. THE PRINCIPLES OF CBRN CASUALTY CARE.....	2-2
2.3. FUNCTIONAL ZONES OF CBRN CASUALTY CARE	2-2
2.4. PRIORITIES FOR CBRN FIRST AID	2-3
2.5. TRIAGE IN A CBRN ENVIRONMENT	2-5
2.5.1. Recognition of the T1 Casualty.....	2-5
2.5.2. Recognition of Death	2-6
2.5.3. Expectant Category (T4)	2-7
2.6. CASUALTY HAZARD MANAGEMENT.....	2-7
2.7. CASUALTY EVACUATION AND HANDOVER.....	2-9
2.7.1. Casualty Evacuation.....	2-9
2.7.2. CBRN Casualty Protective Equipment (CPE)	2-9
2.7.3. Casualty Handover	2-10
CHAPTER 3 FIRST AID PROCEDURES IN A CBRN ENVIRONMENT	3-1
3.1. RECOGNITION OF A CBRN INCIDENT	3-1
3.2. IMMEDIATE ACTIONS FOLLOWING CBRN RECOGNITION.....	3-1
3.3. CBRN INCIDENT INITIAL REPORTING	3-3
3.3.1. CBRN Methane Report.....	3-3
3.3.2. CBRN1 Report	3-4
3.4. CASUALTY ASSESSMENT IN A CBRN ENVIRONMENT	3-4
3.4.1. 'Quick Look'.....	3-4
3.4.2. Trauma Assessment.....	3-4
3.4.3. CBRN CRESS Assessment.....	3-5
3.5. CHEMICAL-RELATED FIRST AID	3-5
3.6. BIOLOGICAL-RELATED FIRST AID	3-10
3.6.1. Assessment of a Biological Casualty	3-11
3.6.2. Management of a Biological Casualty.....	3-11
3.7. RADIATION-RELATED FIRST AID	3-12
3.8. TRAUMA-RELATED FIRST AID AND COMBINED INJURIES	3-12
3.8.1. Assessment of Trauma in a CBRN Environment	3-12
3.8.2. Management of Trauma in a CBRN Environment.....	3-13

3.8.3.	Management of Trauma in a CBRN Environment.....	3-14
3.9.	HEAT-RELATED FIRST AID	3-15
3.10.	PSYCHOLOGICAL CASUALTIES.....	3-16
3.10.1.	Significant Causes for Psychological Illness in a CBRN Environment....	3-16
3.10.2.	Psychological Triage in a CBRN Environment.....	3-16
3.10.3.	Initial Management of Psychological Casualties	3-17
3.11.	CASUALTY HANDOVER	3-18
ANNEX A	CBRN FIRST AID TRAINING REQUIREMENTS.....	A-1
ANNEX B	CBRN FIRST AID MATERIEL REQUIREMENTS	B-1
ANNEX C	CBRN CASUALTY PROTECTIVE EQUIPMENT	C-1
ANNEX D	CBRN FIRST AID TRAINING MATERIEL	D-1
ANNEX E	INITIAL CASUALTY MANAGEMENT IN A CBRN ENVIRONMENT	E-1
ANNEX F	CBRN CASUALTY REPORT FORM	F-1
ANNEX G	LEXICON	G-1

INTENTIONALLY BLANK

CHAPTER 1 INTRODUCTION

1.1. AIM

The aim of this Allied Medical Publication (AMedP) is to provide a standardised approach to the initial management of any casualty in a CBRN environment¹ by non-medical personnel, or medical personnel in a non-permissive CBRN environment (hot zone), from point of exposure until handover to medical personnel at a casualty collection or exchange point.

1.2. CONTEXT

Non-medical personnel on operations at risk from physical trauma or CBRN exposure should be able to recognise and initially manage life-threatening conditions. The principles of CBRN casualty management, as described in AMedP-7.1: *Medical Management of CBRN Casualties*, underpin the provision of first aid especially in the first ten minutes. The level of first aid training will depend on an individual or unit's role (i.e. generalist, CBRN specialist, special operations forces (SOF), and medical personnel). CBRN first aid includes initial recognition, self-administered CBRN medical countermeasures (MedCM), immediate therapy MedCM, and conventional first aid skills applied in a CBRN environment. Additional enhanced competencies (CBRN Enhanced First Aid (EFA)) may be required for personnel at greater risk of sustaining CBRN casualties (i.e. CBRN specialists), or where there are special operational constraints including prolonged care (e.g., SOF).

1.3. SCOPE

1. This AMedP describes the provision of first aid in a CBRN environment by non-medical personnel or medical personnel in a non-permissive environment (hot zone). The focus for CBRN first aid is the management of a trauma or chemical casualty due to immediate or short-onset effects, or combination (combined injuries). CBRN EFA training should also include the recognition and reporting of biological and radiological casualties.²

2. Heat illness is a known risk from the use individual / personal protective equipment (IPE/PPE) and personnel should be able to recognise and manage heat-related injuries including heat stroke. Psychological casualties may also occur for several reasons and may need to be managed initially at a unit level.

¹ For the purposes of this document, a CBRN environment is an operational environment where there is a potential, suspected or confirmed release or presence of a CBRN substance. This may require the responder and/or casualty to be wear IPE or PPE. This may be threat driven or in response to a specific incident.

² This publication recognises that the scope of practice for non-medical and medical personnel will vary between nations.

3. Unlike previous CBRN first aid publications, this guidance is applicable not only to CBRN defensive operations but any CBRN response in a civilian or military environment. However, specific incident management is outside the scope of this document but details on medical CBRN incident management can be found in AMedP-7.1 Part 2, *The Medical Management of CBRN Incidents* in support of AD 83-4, *Allied Command Operations CBRN Medical Support Directive*.
4. This AMedP also provides an outline of the training requirement and first aid materiel for use in a CBRN environment including casualty protective equipment (CPE) for the initial response and unit level casualty evacuation (CASEVAC).
5. CBRN considerations and first aid for military working dogs (MWD) is outside the scope of this publication but is covered in STANAG 2538 *Animal Care and Welfare and Veterinary Support during all phases of Military Deployments* – AMedP-8.4.

1.4. RELATED DOCUMENTS

1. This publication is linked to a suite of CBRN medical publications (AJMedP-7 series) and conventional first aid publications. These include:
 - a. AD 83-4, Allied Command Operations (ACO) CBRN Medical Support Directive.
 - b. STANAG 2596, ALLIED JOINT CHEMICAL, BIOLOGICAL, RADIOLOGICAL AND NUCLEAR (CBRN) MEDICAL SUPPORT DOCTRINE – AJMedP-7.
 - c. STANAG 2461, THE MEDICAL MANAGEMENT OF CBRN CASUALTIES – AMedP-7.1.
 - d. STANAG 2954, TRAINING OF MEDICAL PERSONNEL FOR CHEMICAL, BIOLOGICAL, RADIOLOGICAL AND NUCLEAR (CBRN) DEFENCE – AMedP-7.3.
 - e. STANAG 2564, MENTAL HEALTHCARE DURING DEPLOYMENT – AMedP-8.6.
 - f. STANAG 2126, FIRST AID DRESSINGS, FIRST AID KITS AND EMERGENCY MEDICAL CARE KITS – AMedP-8.7.
 - g. STANAG 2122, REQUIREMENT FOR TRAINING IN CASUALTY CARE FOR ALL MILITARY PERSONNEL – AMEDP-8.15.
 - h. STANAG 2538, ANIMAL CARE AND WELFARE AND VETERINARY SUPPORT DURING ALL PHASES OF MILITARY DEPLOYMENTS – AMedP-8.4.
2. AMedP-7.2 also incorporates the previous editions of:

- a. STANAG 2358 (Edition 4), First Aid and Hygiene Training in a CBRN or TIH Environment.
 - b. STANAG 2871 (Edition 4), *First Aid Materiel for Chemical Injuries*.
3. Changes and revisions of this publication will reflect best practice including:
- a. Lessons identified reports from national, NATO and international exercises and operations including the Exercise CLEAN CARE series.³
 - b. Research publications from the NATO Science and Technology Organisation especially the Human Factors and Medicine (HFM) Panel.
 - c. Recommendations from the *NATO CBRN Medical Deep Dive* conducted by the Committee of the Chiefs of the NATO Military Medical Services (COMEDS) Future Advisory Board (CFAB) and the COMEDS CBRN Medical Working Group.
 - d. This publication supports the new CBRN Medical ETEE programme developed as part of the 2022 NATO CBRN Defence Policy Implementation Plan.

1.4. DEFINITIONS

CBRN defence and medical terms and definitions are consistent with the NATO Terminology Database unless otherwise stated.

1.6. STRUCTURE OF AMedP-7.2

This publication consists of three chapters and supporting Annexes including guidance on training (Annex A), first aid materiel (Annex B), CPE supporting CBRN first aid (Annex C), CBRN First Aid Training Materiel (Annex D), initial CBRN casualty management guidance (Annex E), and casualty handover form (Annex F). This publication is supported by the SRD-1 to AMedP-7.2, *CBRN First Aid Tactical Aide-Memoire*.

1.7. RESPONSIBILITIES FOR INITIAL CBRN CASUALTY CARE

1.7.1. Provision of CBRN First Aid

1. First aid is a unit level responsibility, and this also applies to initial casualty care in a CBRN environment. This provision of casualty care includes the recognition of the effects of a CBRN substance, providing life-saving interventions (LSI) such as immediate therapy MedCM, CASEVAC and handover to medical personnel.

³ The Exercise Clean Care series remains the key NATO exercise for the testing of concepts, doctrine, procedure and interoperability for CBRN casualty care. This is part of a wider Lessons Learned cycle including capability development, training, observations and analysis.

2. Once a casualty is handed over to medical personnel, the patient becomes the responsibility of the medical support organisations (JMED) and includes medical evacuation (MEDEVAC). Medical personnel in this environment are likely to be limited to CBRN EFA also, until it is safe to deliver more technical levels of casualty care (e.g. CBRN emergency medical treatment (EMT), followed by CBRN advanced medical care (AMC)).

1.7.2. Provision of Casualty Decontamination

The responsibility and provision for casualty decontamination will vary between nations and require agreement and rehearsal during operational and mission planning and collective training. Following handover to medical personnel, the CBRN EFA provider may be required to support casualty decontamination, especially in austere environments.

1.7.3. Fatality Management

Fatality management in a CBRN environment will be challenging and remains an executive and logistic function. AMedP-7.1 provides a more detailed description of CBRN fatality management.

1.7.4. Provision of CBRN First Aid Training

Depending on national policies, medical services may be responsible for the delivery of CBRN-related first aid training, either as special-to-role or pre-deployment training. This may be incorporated into CBRN enhanced training, or as part of a broader first aid or operational medicine training programme.

1.8. LEVELS OF CBRN FIRST AID TRAINING

1. The levels of care delivered depend on the training of the individual. Annex A provides a competency framework for CBRN first aid while AMedP-7.3, *CBRN Medical ETEE* describes training requirements for medical personnel. First aid training may be combined with other CBRN defence training including the use of IPE.

2. The levels of CBRN first aid training are:

a. *All deployed personnel on CBRN defensive operations (CBRN generalist)*. Chemical first aid including self / buddy-administration of immediate therapy MedCM, basic airway management, heat injury management, and handover to medical personnel. For CBRN defensive operations, all personnel must have this level of training and may be achieved by annual training or pre-deployment training.

b. *CBRN Specialist or Enhanced CBRN role*. CBRN EFA providers may also be required to support walking and stretcher casualty decontamination. For CBRN

EFA, it is recommended that 1 in 4 personnel should deliver this level of care but is proportionate to the CBRN threat and risk. This may be delivered as pre-deployment training or special-to-role.

c. *Deployed medical care.* AMedP-7.1 provides the overarching principles and framework for CBRN casualty / patient care for medical personnel, including first aid. Although this publication focuses on CBRN first aid, it is applicable to medical personnel in a non-permissive CBRN environment (hot zone).

1.9. CONTRIBUTIONS, ACKNOWLEDGEMENTS & POINTS OF CONTACT

1. Contributions for this publication were through the COMEDS CBRN Medical Working Group, the Biological Defence Medical Expert Panel, CBRN Medical Training Panel, the Joint CBRN Defence Centre of Excellence (JCBRND-COE), and participants of Exercise CLEAN CARE.

2. The custodian and point of contact for this Allied Publication is:

Surgeon Captain Steven Bland
Defence Medical Services
Ministry of Defence
Whitehall
London SW1A 2HB
United Kingdom

INTENTIONALLY BLANK

CHAPTER 2 PRINCIPLES OF CBRN FIRST AID
--

2.1. INTRODUCTION

1. Non-medical personnel in a CBRN environment should be able to recognise and treat both CBRN and trauma-related life-threatening conditions. The principles of CBRN casualty management apply to first aid and are particularly relevant to the initial management of casualties in the *first 10 minutes* or at a *forward casualty collection point* (CCP) before the arrival of medical personnel.

2. Due to the immediate effects or short latency period, the management of trauma and chemical exposures are the focus for CBRN first aid training. However, training should also include the recognition of biological and radiological effects, and the reporting of significant symptoms and signs to medical personnel.

3. During a conventional medical incident response, triage is conducted only when there are multiple casualties. However, the CBRN triage tool is applicable for individual casualties in a CBRN environment. This is to identify T1 casualties with life-threatening conditions and prompt early life-saving interventions (LSI). Early interventions in more permissible environments may also prevent deterioration. Some personnel may also be managed with simple interventions, observation, and returned to duty (RTD).

4. The management of trauma in a CBRN environment remains a priority and uses a modified approach to combat casualty care described in AMedP-8.15. Chemical casualty management will follow this general approach although some chemical agents will also have more agent-specific guidance as described in Chapter 3 and require MedCM (antidote) immediate therapy (see Annex B). These chemical agents include:

- a. Nerve agents.
 - b. Blister (vesicants) agents.
 - c. Pulmonary (choking) agents.
 - d. Cyanides (blood) agents.⁴
 - e. Incapacitating agents, including opioids and riot control agents (RCA).
5. Additional first aid considerations include:
- a. The recognition and initial management of atropine overdose.
 - b. The recognition of heat illness and the initial management of heat stroke.
 - c. The recognition of a severe biological casualty (sepsis).

⁴ Also known as metabolic poisons or chemical asphyxiants.

- d. The recognition of acute radiation syndrome (ARS) and local radiation injury including the reporting of any radiation exposures or dosimetry.
- e. The recognition and initial management of psychological casualties.

2.2. THE PRINCIPLES OF CBRN CASUALTY CARE

1. The provision of CBRN casualty care may start at the point of exposure (PoE) or injury (PoI) and continues through to rehabilitation or RTD. Casualty care in a CBRN environment is dependent on the responder and their first aid or medical training, the hazards (CBRN or conventional) present, and any IPE / PPE worn by either the casualty or the responder. The presence of CBRN hazards define the *functional zones of casualty care* (see next section).
2. The principles of CBRN casualty management across the continuum of care are:
 - a. Recognition (detection and diagnosis).
 - b. Safety (personal, casualty and collective protective measures).
 - c. Self-aid & first (buddy) aid.
 - d. Triage.
 - e. Casualty assessment 'Quick Look', including the CRESS⁵ assessment.
 - f. Life-saving interventions.
 - g. Casualty hazard management (see Section 2.6).
 - h. Advanced medical care (see AMedP-7.1).
 - i. Rehabilitation (see AMedP-7.1).

2.3. FUNCTIONAL ZONES OF CBRN CASUALTY CARE

1. Casualty care is split into functional zones based on the presence of a CBRN hazard:
 - a. *Hot Zone* – this is an area where there is a hazard in the environment. Casualty care in this zone is limited to first aid only and delivered only to the most severe (T1 – immediate triage category) casualties.
 - b. *Warm Zone* – this is a buffer (decontamination) area where there is a risk of contamination from personnel, equipment and casualties leaving the hot zone. Within this zone, medical personnel can perform emergency medical treatment. Within this zone, *casualty hazard management* also takes place (see below).

⁵ The CRESS is an assessment tool for CBRN-related casualties based on consciousness, respiration, eyes, secretions, and skin features.

Casualties leave the warm zone by crossing the *clean / dirty line* (CDL) into the clean (permissive) zone.

2. The level of care is determined by the zone and is illustrated in Figure 1. Within the hot zone, casualty care is limited to first aid and is a unit responsibility as well as casualty evacuation. The forward CCP is an extraction and focal point for the handover to medical personnel. Within the warm zone, medical personnel will deliver EMT and casualties will then enter the medical evacuation (MEDEVAC) chain as well as casualty decontamination area (CDA) (as required), before crossing the CDL.

2.4. PRIORITIES FOR CBRN FIRST AID

1. The priorities for treatment are listed below but will be constrained by the functional zone. The priorities are:

- a. Control of massive bleeding (M).
- b. Basic airway management (A).
- c. Antidote (MedCM) administration (A) (see [Annex B](#) for an overview).
- d. Respiratory support and oxygen delivery, where possible (R).
- e. Remove some the hot zone (r), followed, in the warm zone, by
 - (1) Circulatory support (by medical personnel), if required.
 - (2) Decontamination (removal of clothing and residual contamination).
 - (3) Other interventions for the management of environmental exposures (cold - hypothermia, heat - hyperthermia), and head injuries.

Note: Circulation and decontamination are warm zone functions as part of EMT. However, to manage the airway effectively and assess for life-threatening injuries, some immediate decontamination ('*expose to treat*') may be required, if safe to do so.

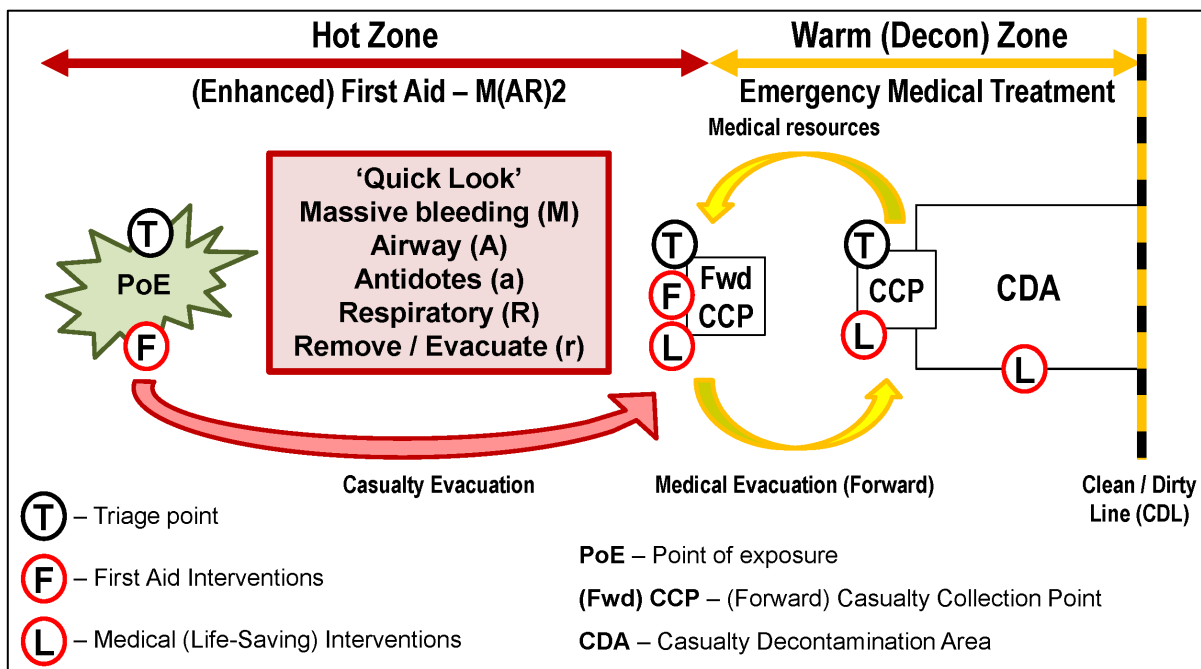


Figure 1: CBRN First Aid Pathway

2. *Non-T1 interventions.* As well as life-saving interventions, self-aid may include the use of MedCM either to prevent the effects of exposure to a CBRN substance (post-exposure prophylaxis MedCM) or prevent deterioration if already unwell (immediate therapy MedCM). Details of specific MedCM are detailed in [Annex B](#).
3. *Wound management.* Any open wound is considered a route for exposure for CBRN substances. A contaminated wound, whether conventional or CBRN, should be washed out if there is no risk of dislodging a clot and causing further bleeding. Wound dressings, as well as stopping bleeding and providing protection, may also have a role to decontaminate and are described as part of CBRN casualty protective equipment (CPE) (see [Annex C](#)).
4. *Environmental (heat and cold exposure) injuries.* In addition to CBRN casualties and the management of trauma in a CBRN environment, first aid providers must be aware of the risks from environmental exposures. This includes:
 - a. Risk of heat injuries from physical activities in PPE, heat stress related to both chemical substances and some MedCM (e.g., atropine).
 - b. Risk from hypothermia from the removal of clothing, decontamination, and central neurological effects of some chemical substances.
 - c. Increased risk of hypoxia (low oxygen levels) at altitude in addition to any CBRN exposure.
5. *Combined casualties.* A CBRN combined casualty is a person with physical trauma in combination with the suspected or confirmed effects of CBRN substances.

In general, the combined effects of trauma and CBRN substances, including potential contamination, may complicate initial casualty assessment and alter the priorities and management of the casualty.

2.5. TRIAGE IN A CBRN ENVIRONMENT

Triage is required for all casualties in the CBRN environment. This is to identify the most severe (T1 - immediate) and act as a prompt for immediate LSI in the hot zone. The reporting of a triage category is a useful way of communicating the severity of the incident based on numbers and severity. In a CBRN incident, the conventional triage categories are adapted, as listed in Table 1.

Category	Term	Description
T1	Immediate	Requires life-saving interventions (LSI)
T2	Delayed	Stretcher casualty but not requiring LSI, or casualty is incapacitated (physically or mentally)
T3	Minimal	Walking and not incapacitated
Dead	Dead	Casualty declared or diagnosed as dead (see para. 2.5.2)

Table 1: CBRN triage categories.

2.5.1. Recognition of the T1 Casualty

1. Casualty management in the hot zone is limited to T1 casualties requiring LSI. A triage system must be simple and quick. An all-hazards system is used until a specific agent is identified and agent-specific triage criteria are used. Criteria for T1 triage category include:

- a. Massive bleeding (or tourniquet in situ).⁶
- b. Obstructed airway (or required an airway manoeuvre).
- c. Respiratory distress (fast (>30 per minute), slow (<10 per minute) or irregular).
- d. Unconscious or seizures.
- e. Where heart rate monitoring is present, a heart rate < 40 or > 120 per minute.⁷

2. A triage sieve (algorithm) for use in the hot zone for both trauma and CBRN casualties is shown in Figure 2.

⁶  **Lesson learned.** On exercises, it has been observed that once casualties have a tourniquet in place and bleeding has stopped the triage category T2 is sometimes incorrectly applied. The application of tourniquet requires urgent reassessment at a medical facility and the casualty should remain T1.

⁷  **Lesson learned.** Attempting to feel for a pulse is unreliable for triage (and signs of life) in a CBRN environment while wearing IPE.

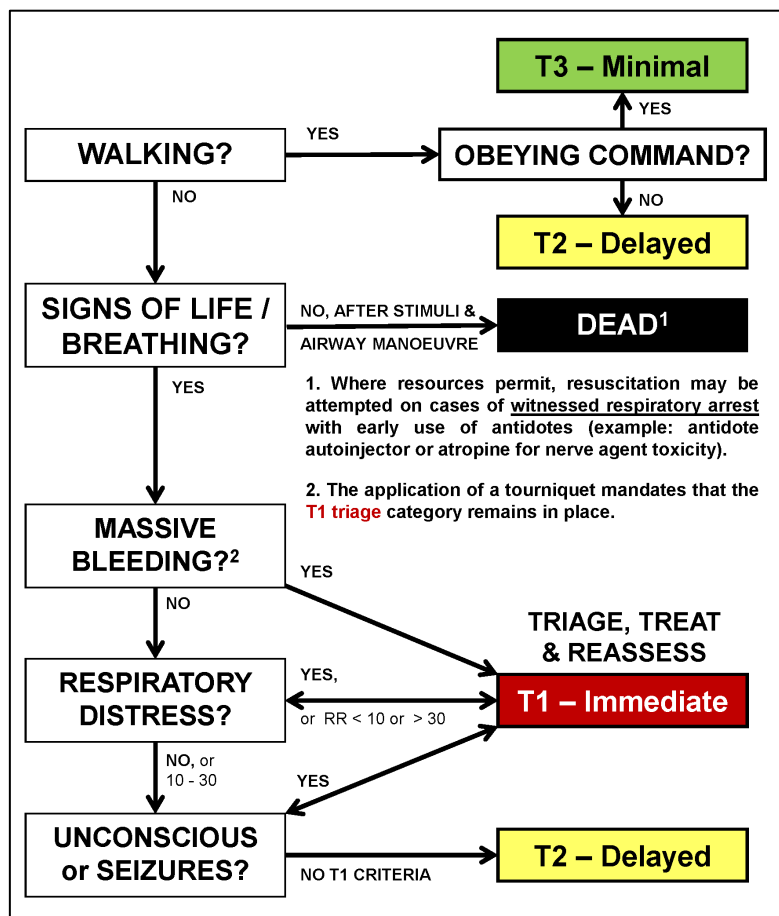


Figure 2: Hot Zone Triage Sieve and Treatment Priorities.

2.5.2. Recognition of Death

1. The level of recognition of death depends on the responder and national legal frameworks. In a CBRN environment, death may be:

- Declared* by any responder based on injuries incompatible with life and stigmata of death such as rigor mortis;
- Diagnosed* by any trained medical personnel based on the absence of life-signs and may include diagnostic equipment such as heart monitor; or
- Confirmed* by any registered medical practitioner / doctor (or other regulated person depending on nation).

2. The recognition of death in a CBRN environment is challenging. Deaths in a conventional operational environment are normally declared either due to the presence of injuries incompatible with life, signs of death (rigor mortis) or following life-sign assessment and no breathing. In a CBRN environment, life-sign assessment will be more difficult. If there is uncertainty and resources allow, initial resuscitation should

be started including immediate therapy MedCM.⁸ Where there are multiple casualties, *the absence of a response to stimuli and no breathing* are the simplest and most rapid observations to enable rapid triage and first aid to be delivered to other casualties, followed by a more formal assessment after all live casualties have been managed.

3. All casualties that have been triaged as dead must be labelled and ideally recorded with a minimum dataset. This prevents repeated assessments and triage of the same casualties by different responders. The minimum dataset is time, location and individual recognising death.⁹ Death may need to be confirmed by suitably trained medical personnel but depends on the operational threats during the initial stages of the response.

4. Further details on CBRN fatality management can be found in AMedP-7.1 Chapter 16 and Annex. Fatality management is an executive and logistics function within national (or potentially host nation) legal frameworks.

2.5.3. Expectant Category (T4)

An additional triage category (expectant - T4) may be used by medical personnel usually when a mass casualty (MASCAL) incident is declared. First aid providers would normally not be expected to use this triage category.

Note. The T4 triage category is not to be used as an alternative to using DEAD. For some nations, this has legal implications and may also lead medical facilities to prepare to receive a casualty that is believed to be still alive.¹⁰

2.6. CASUALTY HAZARD MANAGEMENT

1. Casualty hazard management is the mitigation of the two types of casualty hazards:

- a. *Contamination*; and
- b. *Contagious* (due to person-to-person transmissibility).

2. Casualty hazard management consists of:

- a. *Contain* – this is the initial holding of personnel that may be exposed in a relatively safe area.

⁸  *Lesson learned.* 25% of simulated casualties with shallow breathing were assessment as dead while responders were wearing IPE.

⁹  *Lesson learned.* The labelling of dead by the first person to triage the casualty has been a lesson identified following a number of conventional incidents and exercises.

¹⁰  *Lesson learned.* The use of T4 by on scene responders has been seen on deployed operations and also on exercises (Exercise Clean Care 16). The latter resulted in extra resources allocated to respond to a casualty that had already died.

b. *Decontamination* – this includes immediate decontamination drills, the removal of clothing (disrobing) and a combination of dry followed by wet decontamination depending on the physical properties of the contaminant (i.e. gas, vapour, liquid or particulate). Casualty decontamination is generally divided into stretcher, walking and wound decontamination procedures.

Note. A T1 casualty may require an ‘*expose to treat*’ procedure focusing on the upper body, face and airway. This depends on the presence of a hazard and risk to the casualty’s airway and ‘effort of breathing’.

c. *Isolation* – this is the containment of unwell (symptomatic) contagious casualties.

d. *Quarantine* – this is the containment (and observation) of well (asymptomatic) persons that may have been in contact or exposed to a contagious patient or biological agent.

e. *Restriction of Movement (RoM)* – this is a Command decision to quarantine a unit or area to maintain operational effectiveness of the rest of the Force.

3. Once a casualty is out of the hot zone, casualty decontamination can take place. In some circumstances, after handing over to medical personnel, the first aid provider may then become the decontamination person (‘cutter’). A summary of casualty hazard management is given in Figure 3.

2.6.1. CASUALTY DECONTAMINATION

1. Casualty decontamination is a continuum that can be split into stages. This includes:

- a. Remove from scene or remove the hazard.
- b. Remove clothing (disrobing).
- c. Remove decontamination:
 - (1) Immediate (personal) decontamination.
 - (2) Dry decontamination, if liquid contamination, followed by
 - (3) Wet decontamination (or rinse).

2. The removal of clothing may be considered part of immediate decontamination.

3. The method of casualty decontamination will depend on the physical properties of the contaminant and the severity of the casualty. This is described in more detail in Chapter 6 of AMedP-7.1.

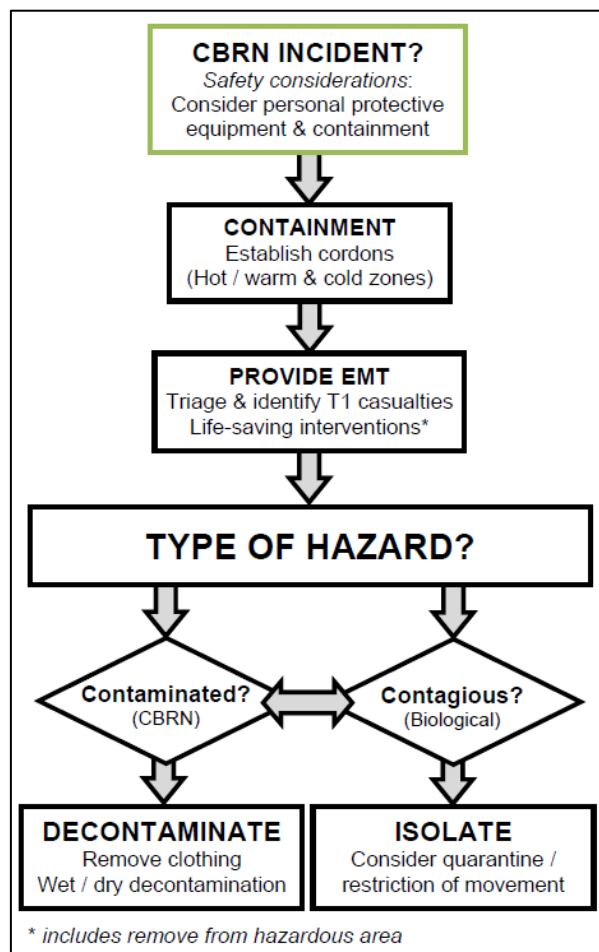


Figure 3: Casualty Hazard Management

2.7. CASUALTY EVACUATION AND HANDOVER

2.7.1. Casualty Evacuation

Casualty evacuation, as well as first aid provision, is a unit responsibility until handover to medical personnel. Casualty evacuation may be achieved either by self-extrication (escape) or rescue by responders including other unit personnel. Escape is the preferred option and is the most likely option for walking casualties. Where possible, non-walking (stretcher) casualties should be removed at the same time by any personnel (or casualties) able to move them.

Note. In the absence of life-saving interventions, evacuation from the hot zone is the most important intervention.

2.7.2. CBRN Casualty Protective Equipment (CPE)

In some cases, a casualty may not have protective equipment or be able to wear IPE. CPE may be used to enable a casualty to be evacuated through a CBRN environment.

CBRN CPE is a suite of physical protective equipment intended to facilitate the evacuation of casualties in a CBRN environment. The full suite is described in AMedP-7.1 Chapter 15: *Transport* and includes MEDEVAC equipment. CBRN first aid CPE includes respiratory and wound protective equipment and is described in more details in Annex C.

2.7.3. Casualty Handover

Casualty handover will normally take place at several locations including the hot / warm zone interface (e.g., forward CCP), casualty decontamination area (CDA) at the CDL, ambulance exchange point (AXP), or at the receiving medical treatment facility (MTF). Casualty information should be passed on using a standardised (AT-MIST-D) format described in Chapter 3 and a template (Annex F).

CHAPTER 3 FIRST AID PROCEDURES IN A CBRN ENVIRONMENT
--

3.1. RECOGNITION OF A CBRN INCIDENT

A CBRN event following recognition becomes a CBRN incident, requiring a response and recovery. Indications of a CBRN incident include:

- a. Any symptoms involving incident response or reconnaissance personnel.
- b. Multiple casualties with similar non-traumatic symptoms and signs.
- c. Unusual taste, smells or mist.
- d. Unexplained dead animals.
- e. Unexplained symptoms including:
 - (1) Altered vision
 - (2) Eye pain
 - (3) Headache
 - (4) Excessive secretions
 - (5) Chest tightness
 - (6) Difficulty in breathing
 - (7) Non-thermal burns
- f. Any unusual or unexpected symptoms, signs, illness or deaths.
- g. Abnormal patterns of disease.

3.2. IMMEDIATE ACTIONS FOLLOWING CBRN RECOGNITION

1. The initial actions, based on those for counter-improvised explosive devices (C-IED), are the 6Cs. They are summarised in Table 3-1 and are:

- a. *Confirm*. Where possible, a CBRN incident should be confirmed using visual assessment or appropriate detection equipment. Respiratory protection (e.g., mask), if available, should be worn immediately followed by a warning to others such as “gas, gas, gas”. If the incident was recognised due to casualties, where possible, the route of exposure (food, water, air or skin) should be identified and reported.
- b. *Clear*. All personnel should clear the immediate area until a formal assessment has been made. The distance and safe direction will be determined by the incident type, type of hazard and wind direction. Where there may be an airborne hazard, the scene should be cleared either in an upwind direction if moving away from the hazard, or perpendicular to the wind direction if in or under

a plume. For some hazards, e.g. explosives and radiation, an exclusion zone may be established.

c. *Cordon*. Once the immediate area has been cleared, cordons should be established (physically, virtually or conceptually) to control entry/exit into the hazardous zone. A series of cordons around the scene will be based upon hazard and security constraints.

d. *Control*. Each zone within a cordon will have a commander under the overall command of the Incident Commander. It is vital to control entry and exit into a zone across a cordon as well as limit movement downwind. Within the cordons, eating, drinking and smoking may be restricted due to contamination. The scene should also be controlled to minimise any disruption to forensic evidence. Control measures may also require the recording of any potential exposures such as time in protective equipment and the wearing of radiation dosimetry.

e. *Communicate*. Command will be informed of the type of incident (explosive, chemical, biological, radiological and nuclear) and where possible the specific agent. Any incident update should include location, wind direction and casualty numbers using a METHANE or CBRN1 report.¹¹ The report format will be appropriate to the role of the person making the report (first responder, commander, medical personnel) and line of communication. It is vital that an initial report is made as an initial action to ensure the safety of other responders and the integrity of other units including the HQ and MTF.

f. *Contain*. In order to prevent secondary contamination and identify any early medical effects, a containment area should be established for personnel and equipment after clearing the immediate area. All personnel involved in the initial incident should be assessed by an appropriate person for potential exposure and contamination risk before being allowed to leave the scene. During the initial response to a sudden onset incident, there will be no risk of a contagious illness in those personnel exposed to a biological agent. Depending on the incident, the assessment does not need to be medical.

CONFIRM	➤ Put on personal protective equipment / mask (where available) ➤ Warn others nearby ➤ Identify possible routes of exposure (e.g. airborne, skin, radiation)
CLEAR	➤ Move upwind from hazard, if gas, vapour or airborne particles ➤ Move to a safe distance (outside any exclusion zone), consider uphill
CORDON	➤ Establish hot and warm (decontamination) zones ➤ Establish a clean / dirty line (CDL)
CONTROL	➤ Stop any eating, drinking or smoking in contaminated areas ➤ Control and monitor re-entry and exit to / from zones ➤ Limit movement downwind of hazard

¹¹ The METHANE report is a standardised report based on My call sign, Exact location, Type of incident, Hazards, Access, Numbers of casualties, and Emergency response on scene or required. The CBRN1 report is the initial reporting of a suspected or confirmed CBRN incident and is detailed in ATP-45.

	➤ Protect the area for further assessment including forensics (exploitation)
COMMUNICATE	➤ Inform Command using METHANE report and / or CBRN1 incident report ➤ Warn local Medical Treatment Facilities and personnel
CONTAIN	➤ Prevent secondary contamination, if persistent hazard ➤ Prevent secondary infections, if <u>contagious</u> biological agent

Table 2: Summary of the 6Cs Initial Actions

3.3. CBRN INCIDENT INITIAL REPORTING

CBRN incident reporting and requirements may vary between operations and reporting chain in place. *When in doubt, both chains should be used.* However, medical personnel are more likely to use the CBRN METHANE Report format which emphasises casualty reporting, while CBRN operators will be trained to use the CBRN1 format. Both formats will require updates and subsequent CBRN-specific reports are detailed in Allied Technical Publication (ATP)-45: *Warning and Reporting and Hazard Prediction of CBRN Incidents (Operators Manual)*.

Note. The reporting in one format does not remove any operational requirement for a unit to also report using the alternate method. This will maximise an integrated operational response based on both CBRN and medical priorities.

3.3.1. CBRN Methane Report

The CBRN METHANE report (Table 3) is modified from the generic incident report format to include important information such as wind direction (thereby suggesting direction of access), and assessment of the scene and concurrent casualty assessment. SRD 1 to AMedP-7.2 provides a template and on scene tactical aide-memoire.

	Subject	Subject	
1	My call sign	My call sign & frequency Declaration of a major or mass casualty incident	
2	Exact location and wind direction	Location of incident Wind direction	
3	Type of incident	Conventional incident Suspected / Confirmed CBRN or hazardous material incident	
4	Hazards identified	U: Unknown or: C: Chemical - Nil (0) / Suspect (1) / Probable (2) / Confirmed (3) B: Biological - Nil (0) / Suspect (1) / Probable (2) / Confirmed (3) R: Radiological - Nil (0) / Suspect (1) / Probable (2) / Confirmed (3) E: Explosives - Nil (0) / Suspect (1) / Probable (2) / Confirmed (3)	
5	CBRN Assessment	A: Scene Assessment including DIM (Detect) B: Casualty Assessment including signs & symptoms (Diagnose)	
6	Number of casualties	T1: Requiring life-saving interventions T2: Litter (Stretcher) or Incapacitated T3: Ambulatory (Walking) (T4: Expectant (if authorised))	D: Dead X: Exposed person (well) C: Contamination hazard
7	Emergency resources	Free text: Description of resources on scene and those required (including decontamination and access to stockpiles), and treatment given.	

Table 3: Recommended CBRN METHANE Report

3.3.2. CBRN1 Report

ATP-45 provides the format for the warning and reporting of CBRN incidents.

3.4. CASUALTY ASSESSMENT IN A CBRN ENVIRONMENT

3.4.1. 'Quick Look'

'Quick Look' is a focused primary survey of T1-immediate casualties in a CBRN environment for trauma and chemical related conditions and prompts the provision of LSI at the same time. *This assessment and interventions must be achieved, if safe to do so, within ten minutes.* Casualty assessment may be supported by scene assessment with detection, identification and monitoring (DIM) equipment at the same time. A complete initial casualty care assessment and management algorithm is provided in Annex E.

3.4.2. Trauma Assessment

Trauma remains a priority within a CBRN environment and the trauma element of 'Quick Look' is modified to reflect the potential presence of a mask complicating the assessment of the airway. As a life-threatening condition is identified, it is treated. Specific traumatic conditions are listed below, but combat casualty care guidance should also be referred to.

3.4.3. CBRN CRESS Assessment

The CRESS element of the 'Quick Look' assessment is focused on CBRN-related conditions or exposures, including heat stroke. The CRESS assessment should be completed to inform the identification of the condition and LSI required (e.g., MedCM). This is completed by looking at **C**onscious level, **R**espirations, **E**yes, **S**ecretions and **S**kin and is called the CRESS assessment. A summary of the basic (first aid) version of the CRESS assessment is in Table 4). The CRESS assessment may also be used by non-medical personnel to provide a standardised method to describe an unusual casualty in a remote location to medical personnel (Table 5).

3.5. CHEMICAL-RELATED FIRST AID

Key chemical agents to identify include those with antidote or agent-specific management (nerve agent and cyanide (blood agent)), or due to other drugs e.g., atropine toxicity. Chemical agent-specific management is detailed below.

C R E S S		Nerve agent	Metabolic poison*	Opioid	Atropine / BZ	Riot Control Agent	Sepsis	Heat stroke
C	Consciousness	Seizures	Unconscious / Seizures	Reduced → unconscious	Agitated / Confused	Normal / anxious	Normal, reduced or altered	Altered
R	Respiration	Increased or reduced → stopped	Increased / stopped	Reduced → stopped	Increased	Increased	Increased	Increased
E	Eyes	Pinpoint pupils*	Normal / Large pupils	Pinpoint pupils	Large pupils / Blurred vision	Severe eye pain / redness Normal pupils	Normal	Normal / Large pupils
S	Secretions	Increased*	Normal	Normal	Dry mouth / Thirsty	Tearing (eyes) Nasal	Normal / Sputum	Normal
S	Skin	Sweaty	Pink → blue	Normal / Blue	Flushed / Dry	Irritation	Warm → pale Non-blanching rash	Varied
Other features		Vomiting Incontinence Slow pulse	Sudden onset (may be delayed)		Fast pulse	Immediate onset Short duration (< 30 minutes)	Fast pulse Fever ($>38.3^{\circ}\text{C}$) Bio-syndrome* No radial pulse	High temperature ($>38^{\circ}\text{C}$)

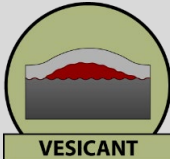
* Pinpoint pupils (and/or increased secretions) may be delayed if skin absorption or eye protection worn. ♦ includes 'blood agent'.
♦ 'Bio-syndrome' includes: respiratory, cutaneous (skin), lymphadenopathy, haemorrhagic, gastrointestinal, and neurological (central & peripheral).

Table 4: CBRN CRESS Assessment (Basic / First Aid Version)

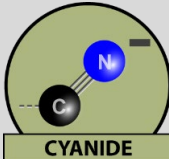
Table 5: CRESS Assessment Prompts for Non-Medical Personnel

Assessment	Symptoms described by the casualty	Signs observed on the responder
Conscious level?	Headache / Neck pain Loss of concentration / Memory loss 'Brain fog' / Confusion Loss of balance	Conscious level (<u>A</u> lert / responding to <u>V</u> oice / responding to <u>P</u> ain / <u>U</u> nconscious) Muscle weakness / Abnormal posture Seizures or abnormal movements
Respirations?	Cough (dry or producing blood or sputum) Difficulty in breathing	Respiratory rate (slow, fast, irregular) Respiratory distress Shallow breathing
Eyes?	Blurred / dimmed vision / blind Eye pain / Itching Fear of light (with or without neck pain)	Pupils – pinpoint or large, asymmetric Eyes – inflamed
Secretions?	Dry mouth or thirst	Excessive secretions (foaming from the mouth, tears, nose) Incontinence (linked to other)
Skins?	Painful / Itching / Burning Local lesions	Pallor / Cyanosed (Blue) / Erythematous (Pink / Red) (Note: for some populations, look at skin creases) Dry / Sweating Local lesions (infectious / burns-like)
Other features?	Palpitations / Pre-syncopal Constipation / Diarrhoea	Pulse (slow / fast / irregular) / BP Incontinence

	NERVE AGENTS (e.g. tabun, sarin, soman, VX, Novichok)			
Mechanism of action: Nerve agents cause over-stimulation of multiple parts of the nervous system with lethal effects. Lethal effects include seizures, respiratory distress with excessive secretions, slow heart rate, and paralysis.				
CRESS ASSESSMENT (bold type indicates a significant diagnostic feature)				
Consciousness	Respiration	Eyes	Secretions	Skin
Seizures Unconscious	Increased → Reduced / Stopped	Pinpoint pupils	Increased	Sweating
Other features	For skin exposure – localised muscle twitching, delayed pinpoint pupils (and secretions). Slow heart rate, vomiting, incontinence DUMBELS (diaphoresis (sweating), urination, miosis (pinpoint pupils), bradycardia, emesis (vomiting), lachrymation (tears), sweating)			
SEVERITY OF EFFECTS – TRIAGE				
Severe (T1)	Moderate (T2)		Mild (T3)	
Unconscious, seizures, respiratory distress, respiratory arrest, very slow heart rate < 40, cyanosis (blue).	Not walking. Excessive secretions, confusion, not obeying commands, wheezing, vomiting, diarrhoea.		Walking. Pinpoint pupils, dimmed vision, eye pain.	
	+ Remove from scene + Immediate decontamination + Clear any secretions or vomit (suction airway, if equipment available) + Nerve agent MedCM as auto-injector or equivalent + If seizures, administer anti-seizure MedCM, if available. + Place in recovery (semi-prone) position			

	VESICANTS (BLISTER AGENTS) (e.g. sulphur mustard, Lewisite)			
Mechanism of action: Sulphur mustard – Damage to biological molecules resulting in cell and tissue death including skin, airway and lungs. Lewisite – Arsenic (lethal) poisoning causing acid type burns and systemic toxicity. Lethal effects include arsenic poisoning (lewisite), airway obstruction due to chemical burns, delayed lung damage (sulphur mustard), and heart effects (some acids).				
CRESS ASSESSMENT (bold type indicates a significant diagnostic feature)				
Consciousness	Respiration	Eyes	Secretions	Skin
Normal	Normal or increased	Inflamed	Normal or mildly increased	Inflamed (reddened) → Blisters
Other features	Onset: Sulphur mustard has delayed onset with reddening followed by blisters (6 - 24 hrs); Lewisite effects are immediate, painful and possible silvery grey lesions.			
SEVERITY OF EFFECTS – TRIAGE				
Severe (T1)		Moderate (T2)		Mild (T3)
Airway burns / obstruction Respiratory distress Burn surface area: sulphur mustard > 25%; lewisite > 5%		Not walking. Burn surface area (sulphur mustard 10-25%), airway irritation, hoarse voice, cough; eye pain AND reddening.		Walking. Reddened skin, eye pain.
	Immediate pain – consider Lewisite or caustic agent (acid / alkali) Delayed redness (6-12 hours) – consider sulphur mustard + Remove from scene and immediate decontamination drills + Monitor exposed area for redness and irritation, especially eyes and airway + Report any difficulty with breathing or swallowing, including hoarse voice or cough + Administer Lewisite (arsenic) MedCM , if available.			

	PULMONARY (CHOKING) AGENTS (e.g. chlorine, phosgene, ammonia, hydrogen sulphide)			
Mechanism of action: Direct irritation of airways. Damage to cell membranes of the respiratory tract and lungs either directly or by the formation of free radicals.				
CRESS ASSESSMENT (bold type indicates a significant diagnostic feature)				
Consciousness	Respiration	Eyes	Secretions	Skin
Agitated	Increased	Normal, or inflamed (chlorine)	Respiratory secretions ± blood	Normal → Blue (cyanosed)
Other features	<i>Chlorine</i> – smell of swimming pool and immediate discomfort. <i>Phosgene</i> – smell of freshly mown hay, immediate discomfort only at high concentrations. Phosgene effects may be delayed (up to 12-24 hours depending on concentration) or worsen with exertion.			
SEVERITY OF EFFECTS – TRIAGE				
Severe (T1)		Moderate (T2)		Mild (T3)
Respiratory distress, blue or pale (grey white) skin, unconscious.		Not walking. Persistent cough ± blood.		Walking. Eye pain, airway irritation.
	✚ Remove from scene; avoid exertion ✚ If respiratory distress AND hazard cleared, remove respirator ✚ If liquid contamination or T1, remove clothing ✚ Basic airway management including head tilt and chin lift ✚ If respiratory secretions, allow free drainage in recovery (semi-prone) position ✚ If cyanosed (blue), give oxygen if available			

	CYANIDES (BLOOD AGENT) (e.g. hydrogen cyanide, cyanogens)			
Mechanism of action: Cyanide stops cells in the body from using oxygen resulting in sudden lactic acidosis, loss of consciousness and death.				
CRESS ASSESSMENT (bold type indicates a significant diagnostic feature)				
Consciousness	Respiration	Eyes	Secretions	Skin
Unconscious / convulsions	Increased → stopped	Normal → large pupils	Normal	Pink → blue (cyanosed)
Other features	Sudden / rapid onset			
SEVERITY OF EFFECTS – TRIAGE				
Severe (T1)	Moderate (T2)		Mild (T3)	
Unconscious, convulsions. Hyperventilation (blue skin), respiratory distress, respiratory arrest.	Not walking. Confusion, history of loss of consciousness, hyperventilation, transient pink skin.		Walking. Nausea, dizziness, mild agitation.	
	+ Remove from scene immediately + If breathing and symptomatic, give oxygen (if available) + Start cardiopulmonary resuscitation if cardiac arrest witnessed or within 10 minutes (<i>avoid mouth to mouth resuscitation</i>) + Administer cyanide immediate therapy MedCM, where available			

	ATROPINE OVERDOSE OR MENTAL (PSYCHOTROPIC) INCAPACITANTS (e.g. 3-quinuclidinyl benzilate (BZ), D-lysergic acid diethylamide (LSD)) Mechanism of action: Atropine and some mental incapacitating agents cause alterations to the central system and non-muscle parts of the nervous system. This causes hallucinations, peripheral effects and risk of heat illness. (*)			
CRESS ASSESSMENT (bold type indicates a significant diagnostic feature)				
Consciousness	Respiration	Eyes	Secretions	Skin
Agitated / Confused	Increased	Large pupils / Blurred vision	Dry mouth / Feeling of thirst	Flushed / Dry skin
Other features	Effects may be caused or mistaken for heat illness including dehydration and heat stroke.			
SEVERITY OF EFFECTS – TRIAGE				
Severe (T1)	Moderate (T2)		Mild (T3)	
Unconscious, extreme agitation or violent behaviour, convulsions, chest pain. Temp > 40°C.	Not walking. Confusion, not obeying command, hallucinations. Temp > 39°C.		Walking. Dry mouth, blurred vision, mild agitation.	
	+ Remove any weapons from casualty + Remove from scene, if chemical agent + Immediate decontamination, if chemical agent + Reassure casualty, and avoid physical restraint due to risk of heat illness + Manage in a cool, calm and sheltered environment			

	OPIOIDS (including high potency fentanyl analogues) Note: first aid guidance is for military context and not for habitual drug users. Mechanism of action: Opioids are narcotics, including morphine, which are used for pain relief. In excess that will cause euphoria, reduced consciousness, coma and respiratory arrest.			
CRESS ASSESSMENT (bold type indicates a significant diagnostic feature)				
Consciousness	Respiration	Eyes	Secretions	Skin
Reduced or unconscious	Reduced or stopped	Pinpoint pupils	Normal	Normal or blue (low oxygen)
Other features				
SEVERITY OF EFFECTS – TRIAGE				
Severe (T1)		Moderate (T2)		Mild (T3)
Unconscious. Respiratory rate less than 8 per minute.		Not walking. Confusion, not obeying command.		Walking.
	+ Remove weapon, if confused + Remove from scene + Immediate decontamination + Clear any airway obstruction or secretions / vomit, if present + Opioid MedCM (e.g., naloxone) as auto-injector or equivalent + Place in recovery (semi-prone) position			

	RIOT CONTROL AGENTS (e.g. CS, pepper spray)			
Mechanism of action: Low-toxicity irritants causing immediate but short direction (less than 30 minutes) effects. These are usually used for training and law enforcement.				
CRESS ASSESSMENT (bold type indicates a significant diagnostic feature)				
Consciousness	Respiration	Eyes	Secretions	Skin
Normal / anxious	Increased	Severe eye pain & red / normal pupils	Tearing (eyes) / Nasal	Irritation
Other features	Immediate onset / Short duration (usually less than 30 minutes).			
SEVERITY OF EFFECTS – TRIAGE				
Severe (T1)		Moderate (T2)	Mild (T3)	
Unconscious, respiratory distress, blue skin colour.		Not walking. Wheezing (noisy breathing).	Walking. Blistering Symptoms greater than 30 minutes. <i>Otherwise, consider return to duty.</i>	
	+ Remove from scene and into fresh air. + Reassure casualty + Clothing should be changed and showered, where possible Return to duty: Symptoms should disappear within 30 minutes.			

3.6. BIOLOGICAL-RELATED FIRST AID

Biological agents have a longer onset period (latency) compared to chemical agents as described in AMedP-7.1. An illness due to a biological agent (BA) should be suspected if there is a raised temperature (pyrexia) and associated 'bio-syndrome'. The seven bio-syndromes and initial prodrome are shown with their related symptoms in Figure 4.

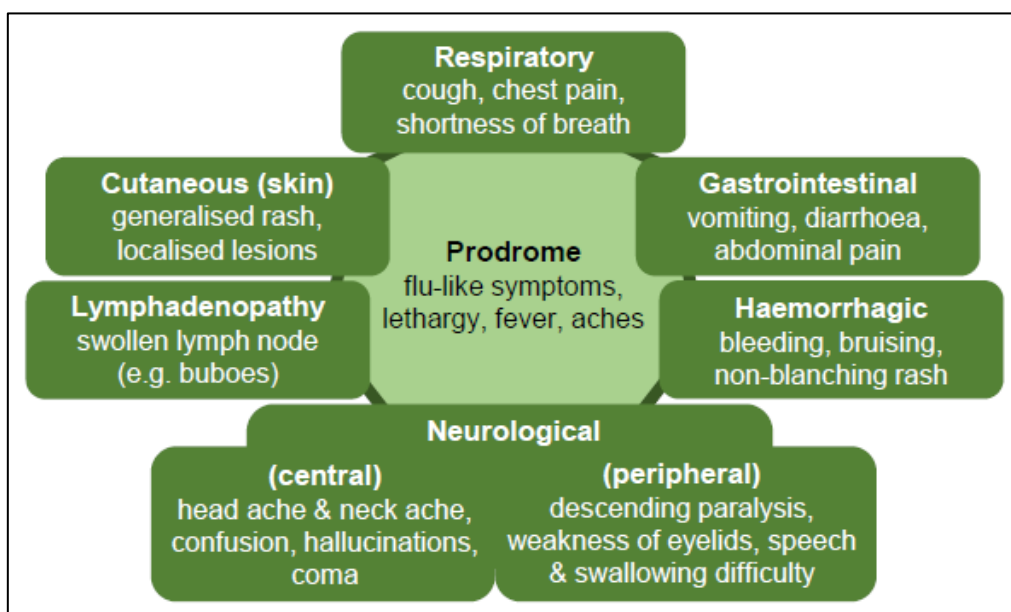


Figure 4: Biological Syndromes

3.6.1. Assessment of a Biological Casualty

In addition to a temperature and bio-syndrome, a severe (T1) infection ('sepsis') should be considered and reported to medical personnel as soon as possible, if two of the following are present:

- a. Respiratory rate > 22 per minute;
- b. Blood pressure < 100mmHg (or weak / no radial pulse);
- c. Altered conscious level; or
- d. Non-blanching rash.¹²

3.6.2. Management of a Biological Casualty

The initial management of a biological casualty includes:

- a. **Safety** – Assessment of the risk of person-to-person transmission (contagious disease) followed by:
 - (1) Wearing appropriate protective equipment; and
 - (2) Establishing isolation either by distance or physical separation.
 - (3) Consider contact tracing and quarantining personnel with exposure risk.
- b. **Casualty triage / assessment** – Casualty management for biological should be focused on the T1 casualty although early medical review for all infections is recommended:
 - (1) Monitoring vital signs including pulse rate, respiratory rate, temperature and level of consciousness.
 - (2) Identifying the type of biological syndrome (see Figure 3-2).
- c. **Casualty treatment** – Depending on the severity of illness, and where required:
 - (1) **If sepsis**, start the 'Sepsis-3' (intravenous fluids, oxygen, and intravenous antibiotics – as appropriate and scope of practice).
 - (2) Give an anti-pyretic to control fever.
 - (3) Rehydrate orally ('little and often'), if intravenous is not possible, and
 - (4) Give antibiotics as directed by medical personnel (usually oral).
- d. **For prolonged field care** – Monitor markers of hydration including conscious level, pulse, and urine colour and output (based on 0.5 ml/kg/hr over appropriate

¹² A rash is assessed by applying pressure to the skin (ideally with a glass) for five seconds and releasing. If there is no effect due to the pressure on the skin, the rash is described as non-blanching.

time (i.e. 80kg person should produce a minimum volume of 240mls if 6 hours intervals).

e. *Communicate* - Report findings and seek advice from medical personnel until handover.

3.7. RADIATION-RELATED FIRST AID

1. Radiological incidents, excluding nuclear detonations and accidents, are likely to be irradiation only (e.g. point exposure), exposure and contamination (e.g. damaged orphan source), or combined with trauma (radiological dispersal device ('dirty bomb')). While radiation exposures may vary between incidents and individual cases, very high exposures resulting in acute radiation injury (whole body or local) are very unlikely. This risk can be further mitigated by the appropriate deployment of radiation DIM equipment.

2. The priorities for immediate management of radiological casualties:

a. *Safety* – Assess the on scene hazard from high dose rate radiation exposure and any contamination. Reduce risk of irradiation by use of *time*, *distance*, *shielding* and *control measures*. This includes the 6C and establishing a cordon based on dose rate.

b. *Triage* – Identify any T1 casualties primarily based on the presence of trauma with or without a high dose radiation exposure (> 2 Gray).¹³

c. *Casualty assessment* – Identify and manage any life-threatening trauma (see Table 3-4) and assess for any prodromal symptoms or signs.

d. *Dose assessment*:

(1) Record any physical / personal dosimetry.

(2) Record the proximity and duration near to known source.

(3) Record the onset time of any nausea, vomiting and / or diarrhoea.

(4) Record any use of anti-sickness or stable iodine medication.

Note. The first priority for the management of a combined radiological and trauma casualty is to treat any life-threatening trauma first.

3.8. TRAUMA-RELATED FIRST AID AND COMBINED INJURIES

3.8.1. Assessment of Trauma in a CBRN Environment

1. Even within a CBRN environment, trauma remains a priority for casualty care. Assessment will be complicated if the casualty is wearing IPE and especially a mask. Life-threatening conditions include:

¹³ A Gray (Joules per kilogramme) is a measurement of absorbed radiation dose used to assess the risk of acute radiation syndrome and local radiation injury (deterministic effects).

- a. Massive bleeding:
 - (1) Limb trauma and compressible.
 - (2) Torso trauma.
- b. Airway:
 - (1) Airway obstruction due to trauma or mask.
 - (2) Unconscious leading to an unprotected airway.
- c. Respiratory:
 - (1) Respiratory difficulty / distress and low oxygen levels.
 - (2) Sucking chest wound.
 - (3) Tension pneumothorax (trapped air under increasing pressure within the chest).
 - (4) Increased work of breathing combined chest injury and wearing mask.
- d. Circulation:
 - (1) Loss of blood leading to low blood pressure (minimise by control of bleeding).
- e. Head injury, leading to either:
 - (1) Loss of consciousness and unprotected airway.
 - (2) Risk of seizure.

3.8.2. Management of Trauma in a CBRN Environment

1. Lifesaving first aid interventions, subject to the provider's scope of practice, include:

- a. Massive bleeding:
 - (1) Application of pressure dressing (and hemostatic dressings).¹⁴
 - (2) Application of tourniquet(s).¹⁵
- b. Airway:
 - (1) Consider removal of mask (see below).

¹⁴ In the hot zone, where there is a continuing risk of contamination, it is recommended that hemostatic dressings are avoided until any contamination have been removed. The threshold for tourniquet use is therefore lower but then converted to a dressing during casualty decontamination.

¹⁵ Any tourniquet applied in a contaminated environment will be required to be changed or reassessed for a replacement with a hemostatic or pressure dressing.

(2) Basic airway management.

c. Respiration:

(1) Application of oxygen, if patient appears cyanosed (blue).

(2) Management of sucking chest wound, such as application of dressing with valve.

2. **Mask Removal.** In addition to first aid interventions, first aid management must include a risk assessment on the continuing requirement to wear as mask. The removal of the mask may be temporary or prolonged. However, a removed mask should be decontaminated and travel with the casualty in case of the requirement for further use. The risk assessment considers:

a. Continuing presence of a CBRN hazard (hot zone).

b. Risk of further CBRN substance release.

c. Requirement to assess the airway.

d. Risk of airway compromise due to increased secretions or vomiting while wearing mask.

e. Risk of increase work of breathing due to chest injury and increase breathing resistance due to the mask.

3. More details are provided in Annex E.

3.8.3. Combined Injuries

The presence of combined injuries will make assessment and management of a casualty more complex. Figure 3-2 provides a trauma, CBRN and combined injuries algorithm to support assessment, treatment and decision making. Annex E combines this with safety considerations, the CRESS assessment, and specific trauma and CBRN interventions. AMedP-7.1 Chapter 7 provides more details on combined injuries.

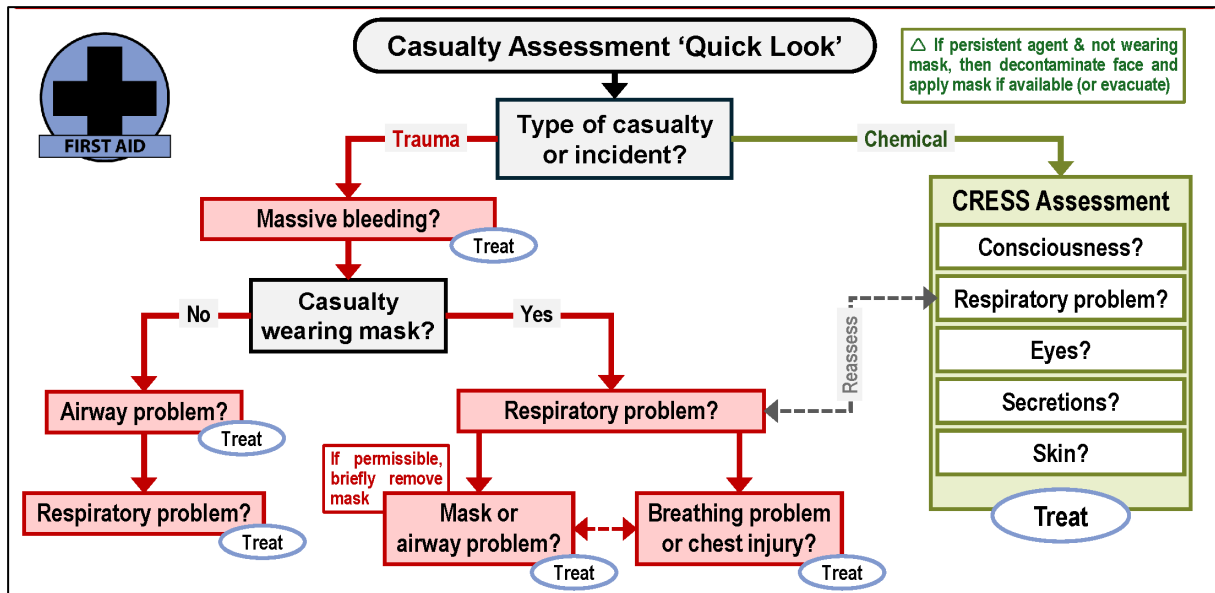


Figure 5: Trauma and CBRN First Aid Algorithm

3.9. HEAT-RELATED FIRST AID

1. Heat illness may present in a number of ways ranging from thirst through to heat stroke. It includes heat rash, heat cramps, heat syncope and heat exhaustion. Heat stroke is the most severe form and is a life-threatening condition. It is associated with altered brain function (confusion, convulsions and unconsciousness) due to a high core body temperature ($>40^{\circ}\text{C}$).

Note. Heat illness including heat stroke may occur in cold climates especially in IPE and with physical exertion.

2. The initial actions on suspecting a heat stroke casualty is:
 - a. Stop activity, and check for any use of atropine (nerve agent antidote).
 - b. Evacuate to a cooler environment (consider shade or basement area).
 - c. Relax IPE state, if permissible.
 - d. Strip, soak, fan and fluids (SSFF), if permissible.
 - e. Rehydrate but avoid drinking large volumes ('little and often').
 - f. Record any altered level of conscious, confusion or agitation.
 - g. Record core body temperature, where possible.
 - h. Consider the risk of heat injury in other members of the unit.
3. Cooling is the normal management of a heat casualty in a conventional environment; in a CBRN environment this is a challenge. The greatest thermal burden is the IPE suit rather than the respirator and as a compromise this could be relaxed depending on the immediate CBRN threat. If the CBRN threat is high, finding shelter

or CASEVAC should be a priority so as not to compromise IPE, although drinking cool fluids should be encouraged.

3.10. PSYCHOLOGICAL CASUALTIES

In a CBRN operational, the risk of psychological casualties will be increased due to several reasons. These may be due to the:

- a. Direct effects of the CBRN agent such as mental incapacitating agents;
- b. Indirect effects such as IPE degradation causing heat injury or claustrophobia;
- c. Reactive, in response to a confirmed or suspected exposure to a CBRN agent; or
- d. Psychogenic (or sociogenic), where there is no agent exposure but symptoms are experienced by individuals or groups respectively.

3.10.1. Significant Causes for Psychological Illness in a CBRN Environment

1. Symptoms and signs of psychological dysfunction may be rapid onset or insidious, and there is a spectrum described as the mental health continuum model (healthy – reacting – injured – ill). A battle stress reaction (BSR) is a disorder of psychological function which is a normal response to an abnormal situation experienced *during combat*, and which may cause a temporary inability to perform duties [AMedP-8.6].

Note. In a CBRN environment, BSR is a diagnosis of exclusion until other life-threatening conditions have been ruled out.

2. Potentially life-threatening or reversible conditions with psychological dysfunction include:

- a. Direct effects of a chemical agent including mental incapacitants.
- b. Use of MedCM (incorrect use, overdose or side effect), including atropine.
- c. Heat illness especially heat stroke.
- d. Delirium due to an infection (usually associated with temperature).
- e. Claustrophobia due to wearing IPE (a sub-group of BSR).

3.10.2. Psychological Triage in a CBRN Environment

The initial management of a casualty and urgency will depend on a number of factors. Some criteria may assist with initial triage and decision making in a CBRN environment. As part of the all-hazards approach, the same triage categories may be used and incapacitation is already a criterion in the generic CBRN triage sieve / algorithm. Table 6 provides guidance for each category.

Category	Term	Description
T1(Ψ)	Immediate	Behaviour is an immediate risk to self or others
T2(Ψ)	Delayed	Casualty is physically or mentally incapacitated and/or unable to function (may still be walking)
T3(Ψ)	Minimal	Anxious / reacting and able to function, but requires a unit or medical assessment or intervention
Unclassified	Exposure risk	Exposed to a 'Potentially Traumatic Event'. Does not require intervention but may be registered as 'at risk' depending on national health surveillance policies. This may also include responders and body handlers / mortuary affairs.

Table 6: CBRN Psychological Triage Categories

3.10.3. Initial Management of Psychological Casualties

1. The management of psychological casualties is described in detail in AMedP-8.6. It details the management as a layered approach consisting of:

- a. Level 1 – Self and buddy help (unit level aid) underpinned by proximity, immediacy and expectancy including return to duty.
- b. Level 2 – Consultation with psychological support professions or trained peers (primary health care, forward mental health team).
- c. Level 3 – Treatment by psychological support professionals.

2. The initial management of psychological casualties is to rapidly assess the casualty and the situation for potential causes. Irrespective of the causes, immediate actions include:

- a. Remove any weapon system and ensure casualty is safe.
- b. Assess and manage any life-threatening trauma, heat or chemical exposure.
- c. Triage casualties with severe symptoms to the most appropriate care provider (unit, forward mental health team or medical facility) (see Table 3-6).
- d. Manage all non-urgent, self-caring and compliant psychological casualties, where possible, within the unit to prevent medicalisation of the reactions which may be normal or appropriate to the precipitating event, and avoid evacuation.
- e. Some exposed persons may only require self-referral advice. They should be provided with information on normal reactions as well as indications to seek further help and who to approach (unit, forward mental health team, medical officer or other person). This may also be supported by post-incident risk communication including informed advice of future risks of mental and physical disease e.g. contextual cancer and genetic risk following a radiation exposure which may even be reassuring. Any exposed person should still be recorded as part of health surveillance.

3.11. CASUALTY HANDOVER

The casualty handover follows a standardised format also used for trauma casualties and is detailed as a NATO format in Table 7 with a more detailed CBRN casualty report form in Annex E. The handover consists of:

A	Age (or adult)
T	Time of incident, injury or exposure
M	Mechanism of injury / exposure
I	Presence of Injuries, Intoxication, Infection or Irradiation (4Is)
S	Symptoms and signs including any vital signs
T	Treatment given
D	Decontamination status (no contamination, residual contamination, wound)

Table 7: AT-MIST-D Report.

ANNEX A CBRN FIRST AID TRAINING REQUIREMENTS
--

A.1. INTRODUCTION

1. Training of first aid in a CBRN environment to non-medical personnel may be delivered at two levels:
 - a. Basic (Generalist) CBRN First Aid.
 - b. CBRN Enhanced First Aid (EFA).
2. Both levels require CBRN first aid providers to:
 - a. Recognise a CBRN casualty or incident.
 - b. Use self-administered immediate therapy MedCM.
 - c. Recognise and initially manage atropine overdose.
 - d. Manage life-threatening conditions (e.g. airway obstruction) in a CBRN environment.
 - e. Recognise and manage heat illness in a CBRN environment especially when wearing PPE / IPE.
 - f. Handover to medical personnel.
3. CBRN Enhanced First Aid includes the above, but also includes:
 - a. Deliver chemical agent-specific first aid.
 - b. Management of life-threatening trauma in a CBRN environment.
 - c. Recognise and initially manage a severe biological casualty (sepsis).
 - d. Recognise acute radiation syndrome and local radiation injury including the reporting of any radiation exposures or dosimetry.
 - e. Recognise and initially manage psychological casualties.
 - f. Operate CBRN casualty protection equipment, as required.
 - g. Support casualty decontamination (T1 casualties), as required.
4. Individual scopes of practice are a national responsibility but a basic level of CBRN first aid is expected for all personnel deploying on CBRN Defensive Operations and/or where CBRN immediate therapy has been deployed and distributed.

A.2. CBRN FIRST AID COMPETENCY FRAMEWORK

5. The Training Objectives (TO) and associated tasks (standards) are listed below for the provision of basic / generalist (gen) and enhanced (enh) first aid including

battlefield trauma and chemical first aid (see Figure A-1). This may contribute to national training requirements, and are consistent with the five TO described in AMedP-7.3:

CBRN First Aid Training Objectives	Role	
	Gen	Enh
1. Manage any casualty in a CBRN environment (basic level)		
The CBRN first aid provides should be able to:		
1.1 Recognise a CBRN casualty or incident	✓	✓
1.2 Carry out personal safety procedures	✓	✓
1.3 Assess a casualty in a CBRN environment	✓	✓
1.4 Treat life-threatening CBRN and traumatic conditions (including heat stroke)	(✓)	✓
1.5. Perform casualty hazard management (T1 decontamination) (as required)		✓
2. Manage the medical aspects of a CBRN incident (basic level)		
The CBRN first aid provides should be able to:		
2.1 Identify any on-scene CBRN hazards	✓	✓
2.2 Mitigate any on-scene CBRN hazards (scene safety – ‘6Cs’)	✓	✓
2.3 Triage casualties in a CBRN environment (identify the T1 casualty)		✓
2.4 Handover casualty to medical personnel	✓	✓
3. Manage a chemical casualty (basic level)		
The CBRN first aid provides should be able to:		
3.1 Assess a casualty for life-threatening chemical intoxication	Self*	✓
3.2 Treat a casualty with life-threatening chemical intoxication	Self*	✓
4. Manage a biological casualty including sepsis (awareness)		
The CBRN first aid provides should be able to:		
4.1 Recognise signs of life-threatening or significant biological exposure		✓
5. Manage a radiological casualty including nuclear (awareness level)		
The CBRN first aid provides should be able to:		
5.1 Recognise signs of acute radiation exposure or local radiation injury		✓
5.2 Treat a combined radiological casualty (manage trauma)		✓

*Self refers to Self-Administered Immediate Therapy MedCM.

(✓) refers to variation between nations and scope of practice for basic CBRN first aid providers.

6. The conditions that the training objectives and standards should be taught to include:

- In the pre-hospital operational environment.
- At a Casualty Decontamination Area.
- At a Role 1 Medical Facility.
- Using CBRN first materials described in Annex B.

- e. In the land, maritime and air operational environment.
- f. During day and night.
- g. In all climatic conditions.
- h. As an individual or as part of a team.

A.3. CBRN FIRST AID TRAINING DELIVERY METHODS

The delivery of CBRN first aid will vary between nations, roles and operations. The following are recommendations but are not exclusive. Individual training is a national responsibility and includes national MedCM capabilities.

A.3.1. BASIC (GENERALIST) CBRN FIRST AID TRAINING

This level of first aid training may be combined with other CBRN basic training. Recommended training delivery methods include:

- a. Annual CBRN training (linked to IPE and other drills).
- b. Pre-deployment training.
- c. On issuing of immediate therapy MedCM.
- d. Distributed learning (e-Learning).

Note. Nations should avoid the delivery of CBRN first aid training within the Joint Operational Area (unless at a safe staging area) due to the potential targeting of points of disembarkation and risk to untrained personnel.

A.3.2. CBRN ENHANCED FIRST AID TRAINING

This level of first aid training may be combined with other CBRN basic training. Recommended training delivery methods include:

- a. Special-to-role training.
- b. Pre-deployment training.
- c. Broader enhanced medic training package including trauma, disease, CBRN and prolonged care.

A.3.3. COLLECTIVE TRAINING AND EXERCISES

Collective training is vital for communications and interoperability. Key areas in the casualty chain for lessons identified include handover points between non-medical and medical personnel, as well as different national capabilities. Training and tactical aide-memoires with standardised reporting formats should be utilised to support general

communication and the transmission of key casualty information including the severity of the casualty, mechanism of injury, treatment given and safety issues.¹⁶

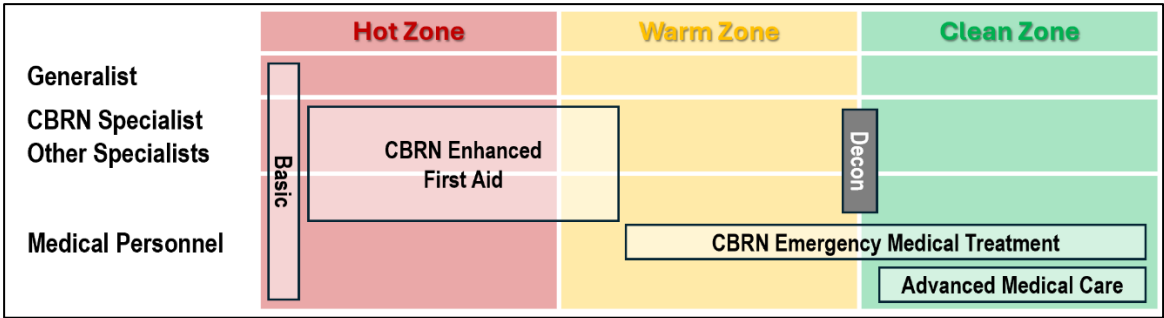


Figure A-1 – CBRN First Aid Competencies

¹⁶ ☒ *Lesson learned.* Communications and Interoperability were the two most frequent observations on Ex Clean Care 16 and most comments were focussed around the CDA. This is a major challenge for casualty handover and requires a multi-national approach that includes individual and collective training.

ANNEX B CBRN FIRST AID MATERIEL REQUIREMENTS
--

B.1. INTRODUCTION

1. The following items are recommendations for planning the medical response including CBRN first aid provision. Specific MedCM are a national responsibility but should be declared to Allied Nations in order to optimise interoperability and minimise adverse drug reactions.

- a. Triage Equipment
- b. Casualty Decontamination Materiel
- c. CBRN Agent-Specific and Supportive MedCM
- d. CBRN First Aid Equipment
- e. CBRN Casualty Protective Equipment
 - (1) CBRN Casualty Respiratory Protection
 - (2) CBRN Wound Dressing
- f. CBRN First Aid Training Materiel

2. SRD 1 to AJMedP-7 provides a recommended list of CBRN medical countermeasures including those for use during CBRN first aid provision.

B.2. TRIAGE EQUIPMENT

- 1. Recommended triage equipment for use in a CBRN environment includes:
 - a. CBRN Triage Aide-Memoire.
 - b. Monitoring equipment to support life-sign and vital sign assessment (see below).
 - c. Equipment to label a live casualty including triage category (T1 Immediate (Red), T2 Delayed (Yellow) and T3 Minimal (Green)) and any immediate treatment given.
 - d. Equipment to label a fatality (Dead (Black)) including time, location and identification of person recognising death.
 - e. Equipment to label an expectant (T4), for medical (or other) personnel only.
- 2. Optional equipment includes:
 - a. Communication and information management equipment / software to support the transmission of triage and casualty information.

- b. Recording equipment to support fatality recognition and management including Global Positioning System recording, image and video recording.

B.3. CASUALTY DECONTAMINATION MATERIEL

1. Casualty decontamination includes suitable materiel for the physical removal or neutralization of nerve and vesicant (blister) agents. A single substance capable of removing and neutralizing agents is the ideal, if available. Otherwise, separate substances may be used.
2. It is recommended that all substances used for casualty decontamination should:
 - a. Be issued in sufficient quantity to neutralize rapidly, by removal or inactivation, the toxic liquids and/or solids which cover the parts of the body exposed to chemical agents, personal weapons and, whenever possible, personal equipment.
 - b. Be sufficiently stable to allow storage for at least 5 years.
 - c. Be packed in an air and watertight container ready for immediate use.
 - d. Be easily removable from the skin after use, with ideally plain water.
3. Any casualty decontamination materiel must be:
 - a. Safe to use on naked skin or personal equipment that could touch skin.
 - b. Safe to apply around wounds without causing systemic absorption and adverse effects.
 - c. Safe if applied, deliberately or accidentally, into an open wound. Some decontaminant may have wound decontamination properties but use will be a national responsibility including notification of other nations of any specific rinsing, neutralisation or surgical management required after use.

B.4. CBRN AGENT-SPECIFIC MEDCM

B.4.1. NERVE AGENT PRE-TREATMENT

1. Nerve agent pre-treatment is an option as a threat-dependent pre-exposure MedCM which may be issued to deployed personnel as a pharmaceutical agent that enhances the efficacy of post-exposure antidote, such as pyridostigmine bromide (PB).
2. If nerve agent pre-treatment is deployed or used, supporting allied medical facilities and personnel must be informed in order to prevent potential drug interactions, e.g. some anaesthetic agents such as muscle relaxants.

B.4.2. NERVE AGENT IMMEDIATE THERAPY

1. Nerve agent immediate therapy will be used following exposure to a nerve agent and the presence of adverse effects due to the nerve agent. A nerve agent immediate therapy for use as a first aid measure must contain an efficacious antidote (or combination) for nerve agents such as:

a. *Anti-muscarinic*. An effective and rapid-acting anti-muscarinic (either as a single dose of two milligrams of *atropine* or equivalent but not be so potent as to incapacitate the individual and prevent the individual from continuing with the mission).

b. *Cholinesterase reactivator*. An effective, rapid-acting, broad-spectrum cholinesterase reactivator e.g. an *oxime* (type and dose at the discretion of the nation concerned but must inform other participating nations); and/or

c. *Anticonvulsant*. An effective and rapid-acting anticonvulsant, such as *midazolam* or other benzodiazepines (when given as a single dose is not so potent as to severely incapacitate or impair breathing).

2. The device to administer the antidote(s) should:

a. Be given by intra-muscular (IM) injection (or other effective means).

b. Be absorbed rapidly into the body within 10 minutes.

c. Operate automatically.

d. Be simple, rapid and safe to use even in the dark.

e. Be clearly identifiable from all other automatic injection devices for other uses.¹⁷

f. Allow storage for several years.

g. Allow use in operational climatic conditions. In cold climates, necessary precautions should be taken to prevent freezing of the injection solution.

h. Include a method for annotating casualty that MedCM has been used.

3. At national discretion, it is recommended that units hold a 100% reserve of nerve agent antidote to be able to resupply personnel operating in a CBRN environment.

B.4.3. NERVE AGENT MEDCM PROLONGED CARE

1. Prolonged care and continuing nerve agent MedCM therapy by enhanced CBRN first aid and medical personnel includes:

¹⁷ For colour identification, see AMedP-1.12: *Medical and Dental Supply Procedures*. [Atropine (bright yellow), oxime (light brown), anticonvulsant (grey)].

- a. Bulk vials of an effective anti-muscarinic including atropine sulphate (or equivalent) for intravenous or intraosseous use.
 - b. An effective and broad-spectrum cholinesterase reactivator (or alternatives) for intravenous or intraosseous use (type and dose at the discretion of the individual nation but in discussion with NATO medical advisor (MEDAD) for parenteral use).
 - c. An effective anticonvulsant for intravenous or intraosseous use.
2. The duration of continuing therapy is dependent on casualty estimation, CBRN medical planning and clinical timelines, based on casualty and medical evacuation constraints.

B.4.4. VESICANT (BLISTER AGENT) IMMEDIATE THERAPY

Immediate therapy for vesicants will be required for those that have early onset lethal effects (e.g. arsenic-based agents such as Lewisite) and to prevent permanent disability including blindness. A vesicant immediate therapy for use as a first aid measure includes:

- a. *For Lewisite* (or other arsenicals). An arsenic-chelating compound administered either locally to skin and eyes, as well as systemic (orally or parenterally) to mitigate:
 - (1) System toxicity.
 - (2) Chemical burns.
 - (3) Eye damage (blindness).
- b. *For eye management*:
 - (1) A fluorescein eye preparation and UV light, as available.
 - (2) A broad-spectrum antimicrobial ophthalmic ointment / preparation (e.g. chloramphenicol eye ointment).
 - (3) A mydriatic (pupil dilating) ophthalmic preparation (anticholinergic or cycloplegic).
- c. For symptomatic treatment:
 - (1) An antipruritic (anti-itching) preparation.

(2) Inhaled bronchodilators (and supporting devices) either as inhaler or nebuliser.¹⁸

B.4.5. PULMONARY (CHOKING) IMMEDIATE THERAPY

Immediate therapy for pulmonary agents will be required for those that have early onset respiratory effects. A pulmonary agent immediate therapy for use as a first aid measure includes:

- a. Inhaled bronchodilators either as inhaler or nebuliser.
- b. Inhaled steroid following exposure to some pulmonary agents (nation-specific requirements).

B.4.6. CYANIDE IMMEDIATE THERAPY

1. Cyanide immediate therapy will be used following known exposure to cyanide and the presence of adverse effects due to cyanide. In general, only T1 casualties require any MedCM other than oxygen. Due to the rapid action of cyanide and its related compounds (cyanogens), cyanide MedCM must be given as soon as safe and possible (i.e. within 10 minutes).

2. All symptomatic cyanide cases should be given oxygen, where available and within scope of practice of the first aid provider. Inhaled amyl nitrite may also be an option at this point and does not require advanced skills.

3. Cyanide immediate therapy must contain an efficacious antidote (or combination). Cyanide antidotes vary significantly between nations and there is a risk of adverse interactions. First aid management is a national responsibilities but on operations with more than one nation providing first aid and medical care, MedCM should be discussed with the MEDAD and CBRN Advisor. Cyanide immediate therapy includes:

- a. A combination of *methaemoglobin-forming compounds* (inhaled *amyl nitrite* (optional), parenteral *sodium nitrite* (or *4 dimethyl amino-phenol* (DMAP))), then followed by intravenous *sodium thiosulfate*.
- b. *Cobalt-containing antidotes*. *Dicobalt edetate* (and glucose) or *hydroxocobalamin* (pro-vitamin B12). Both may also be followed by intravenous *sodium thiosulfate*.

B.4.7. INCAPACITANT IMMEDIATE / MEDICAL THERAPY

Immediate therapy for anti-cholinergic incapacitating agents (e.g. BZ) and atropine overdose may be required but is likely to be a medical decision.

¹⁸ Considerations for nebuliser use instead of inhaler includes training of personnel, driving force to deliver the bronchodilator (gas or other measures), electrical power requirement and the requirement to administer oxygen at the same time. An alternative may be inhalers with a 'spacer' device.

B.4.8. OPIOID IMMEDIATE / MEDICAL THERAPY

Opioid immediate therapy will be used following exposure to an opioid and life-threatening respiratory depression and unconsciousness. The most common opioid antidotes is *naloxone* and is available in a number of formulations including autoinjector.

B.4.9. OXYGEN THERAPY

1. Where practicable, oxygen should be available for use by enhanced CBRN first aid providers subject to national regulation. Some nations may allow the use of oxygen by first aid providers for non-CBRN casualties with appropriate training.

2. Oxygen is an important supportive therapy for casualties with obvious respiratory distress, observed low oxygen levels (saturations) and/or cyanosis (blue skin discolouration). For some chemical agents, such as cyanide, it may also be an antidote. While there may be restrictions to the use of oxygen in some medical patients in the civilian context (e.g. chronic respiratory disorders), this is highly unlikely to be the case in the military environment.

B.5. BIOLOGICAL AGENT MEDCM

1. The two concepts for post-exposure use are prophylaxis (prevention) and treatment, and similar broad-spectrum antibiotics may be appropriate. Biological MedCM in the context of CBRN first aid may be used either as a CBRN Defence MedCM (prevention) or for immediate therapy especially if there is a delay to access to medical support. The choice of antibiotic (and/or vaccination) is a national responsibility but participating nations must inform the MEDAD of the choice and options to ensure optimal biological casualty care as well as minimise drug interactions.

2. The most likely route for administration for first aid providers as well as self-administration is oral although intramuscular injections and inhaled may also be options depending on threat and deployed MedCM. Although new generation antibiotics may be deployed, the two main antibiotics used for biological MedCM are:

- a. *Ciprofloxacin*; and
- b. *Doxycycline*.

3. Where there is a biological threat, all nations must have a sufficient stockpile and distribution plan for 100% of deployed personnel to start and continue use for one week before resupply both within theatre and strategic.

B.6. RADIOLOGICAL MEDCM

1. Post exposure radiological MedCM is unlikely within the context of CBRN first aid. However, prolonged care may require MedCM to be given before access to a medical treatment facility. Empirical use will depend of the exposure risk, effectiveness

of physical protective equipment and any supporting evidence of any internalisation of radiological contamination.

2. An example of a safe and effective MedCM used following a nuclear incident is *stable iodine*, used as a blocking agent to stop radioactive iodine accumulating in the thyroid gland and causing thyroid cancer. Some radiological MedCM may require evidence of internalisation either by nasal swabs, urine or faeces collection before the justifying the risk of any adverse drug reactions.

3. MedCM for acute radiation syndrome may include the use of an anti-emetic (e.g. *ondansetron* or *granisetron*) either to prevent or stop vomiting.

Note. Any use of an anti-emetic must be recorded and reported as this may affect dose assessment based on prodromal symptoms such as nausea, vomiting and diarrhoea.

B.7. CBRN FIRST AID EQUIPMENT

CBRN first aid will require safety and non-pharmaceutical medical equipment. Where ever possible, generic medical equipment should be used that can be applied to trauma and CBRN casualties.

B.7.1. SAFETY

The following additional items are recommended for CBRN first aid:

- a. Appropriate CBRN DIM equipment to detect CBRN agents, contamination and effectiveness of decontamination.
- b. Suitable protective gloves (e.g., butyl rubber 1.2- or 1.7-millimetre thickness, double/triple nitrile gloves).

B.7.2. MEDICAL EQUIPMENT

B.7.2.1. MASSIVE BLEEDING

The following items are recommended for CBRN first aid for use within the scope of practice of the first aid provider:

- a. Rapid application tourniquet suitable for use with butyl gloves.
- b. CBRN wound dressing (see Annex C).

B.7.2.2. BASIC AIRWAY MANAGEMENT

The following items are recommended for CBRN first aid for use within the scope of practice of the first aid provider:

- a. Equipment for suctioning.
- b. Airway adjuncts, consistent with national guidance.

B.7.2.3. RESPIRATORY SUPPORT

The following items are recommended for CBRN first aid for use within the scope of practice of the first aid provider:

- a. Portable apparatus for positive pressure resuscitation capable of delivering uncontaminated air (if sealed circuit) with supplementary oxygen and operation by semi-skilled personnel.

B.7.2.4. WOUND MANAGEMENT

The following items are recommended for CBRN first aid for use within the scope of practice of the first aid provider:

- a. Sterile saline for wound irrigation (various volumes dependent on wound size).
- b. CBRN wound dressing (see Annex C).

B.7.2.5. MEDICAL MONITORING EQUIPMENT

1. The following monitoring capabilities are recommended to support triage and CBRN first aid in the hot and warm zones within the scope of practice of the first aid provider:

- a. Heart monitoring in order to assist life-sign assessment and monitoring efficacy of nerve agent therapy.
- b. Oxygen saturation to inform oxygen requirements, efficacy of treatment and oxygen resource management.
- c. Temperature monitoring (core or peripheral) for biological casualty and heat illness assessment and management, and hypothermia prevention during and following decontamination.
- d. Agent-specific point of care testing, subject to threat and potential impact on casualty care.

2. Additional details are described in AMedP-7.1 supporting deployed physiological and environmental monitoring to inform the user, leadership, and medical personnel.

B.7.2.6. MISCELLANEOUS EQUIPMENT

The following items are recommended for CBRN first aid for use within the scope of practice of the first aid provider:

- a. Casualty warming and drying equipment (e.g. blankets) for pre- or post-decontamination.
- b. CBRN First Aid Aide-Memoire (SRD 1 to AMedP-7.2).

- c. Casualty report forms and supporting stationary or IT solution.

INTENTIONALLY BLANK

ANNEX C CBRN CASUALTY PROTECTIVE EQUIPMENT
--

C.1. INTRODUCTION

1. CBRN CPE is a suite of physical protective equipment and as the overarching concept is described in detail in AMedP-7.1 Annex 15A. CBRN CPE is intended to:

- a. Protect a casualty from a CBRN environment.
- b. Protect responders and MEDEVAC platforms from contaminated or contagious live casualties / patients.¹⁹
- c. Protect the casualty from themselves (e.g. off-gassing).
- d. Enhance medical care and prevent further exposure through wounds in a CBRN environment.
- e. Protect responders, transportation platforms and infrastructure from a contamination or contagious fatality.

2. For CBRN first aid, CPE ranges from local wound protection, through to respiratory and whole-body protective systems delivered at unit level. The function of the protective system may be passive, or positive/negative pressure protection. The two systems that are relevant to CBRN first protection are:

- a. CBRN casualty respiratory protective equipment; and
- b. CBRN wound dressing.

3. Both systems should:

- a. Be self-contained and man-portable;
- b. Be able to operate in a wide number of operational climates; and
- c. Be interoperable with medical and other military materiel.

C.2. CBRN CASUALTY EVACUATION EQUIPMENT

1. CBRN casualty evacuation equipment is intended for non-medical unit level use (as well as medical personnel). Respiratory protective is the minimum level of CPE to provide respiratory and eye protection for casualties unable to wear a respirator either due to airway problems, breathing difficulty or non-compliance. The minimum requirement is the ability to:

- a. Provide protection against specified CBR hazards, and to contain casualty contamination.

¹⁹ CBRN MEDEVAC equipment is described in AMedP-7.1 Annex 15A.

- b. Be fitted by the casualty, or by CBRN first aid provider / medical personnel.
 - c. Operate effectively for at least one hour in a CBRN-contaminated environment.
 - d. Provide air filtration / exchange to prevent the build-up of any off-gassing or CO₂.
 - e. Allow continuing first aid including:
 - (1) The observation of the casualty's face, head and neck.
 - (2) Manage massive bleeding especially around the head, face and neck.
 - (3) Perform basic airway management.
 - (4) Administer immediate therapy MedCM.
 - f. Be suitable for use on casualties in specified positions upright, sitting, and lying supine (on back) and semi-prone (recovery position).
2. An option of whole-body coverage remains for nations. However, this will convert a walking casualty into a stretcher casualty. A CBRN medical evacuation system will provide whole body coverage but is a purely medical (or potentially SOF) capability and outside the scope of this publication.

C.3. CBRN WOUND DRESSING

A CBRN wound dressing provides the ability to protect wounds from CBRN agents and control bleeding. The dressing should have at least the same capability and function as a conventional wound dressing. Following wound decontamination, there may still be residual contamination that may require surgical debridement (removal of contamination and dead tissue). The CBRN wound dressing should:

- a. Provide protection against external CBR hazards.
- b. Be fitted to a casualty by a CBRN first aid provider or medical personnel.
- c. Operate effectively for at least six hours in a CBRN-contaminated environment.
- d. Control bleeding.
- e. Cover an area of injury consistent with in-service trauma bandages.
- f. Decontaminate a CBRN-contaminated wound either by adsorption or neutralisation.
- g. Inform personnel of any CBRN residual hazard associated with the wound.
- h. (Optional) Repair IPE.

ANNEX D CBRN FIRST AID TRAINING MATERIEL
--

D.1. CBRN FIRST AID TRAINING EQUIPMENT²⁰

Collective training and exercises require training equipment to support casualty care training and other combat simulation:

- a. Disposable or reusable uniform to support casualty decontamination including:
 - (1) IPE.
 - (2) Military uniform.
 - (3) Civilian clothing (including paediatric), as required
- b. Training variants of in-service medical and MedCM delivery devices including:
 - (1) Training tourniquet, or simulant.
 - (2) Wound dressings.
 - (3) Antidote auto-injectors.
 - (4) Simulation oral medication.
 - (5) Pharmaceutical products and fluids including labelling.
- c. Triage equipment or labels.
- d. Casualty simulation including:
 - (1) Casualty make-up.
 - (2) Casualty simulation manikins to support mass casualty decontamination and handling.
 - (3) High-definition simulation to support casualty assessment and interventions.
- e. Blank casualty report forms.

²⁰ *Lessons learned.* Medical and CBRN exercises have highlighted the requirements for training equipment to support effective medical exercises including casualty handover.

INTENTIONALLY BLANK

ANNEX E INITIAL CASUALTY MANAGEMENT IN A CBRN ENVIRONMENT



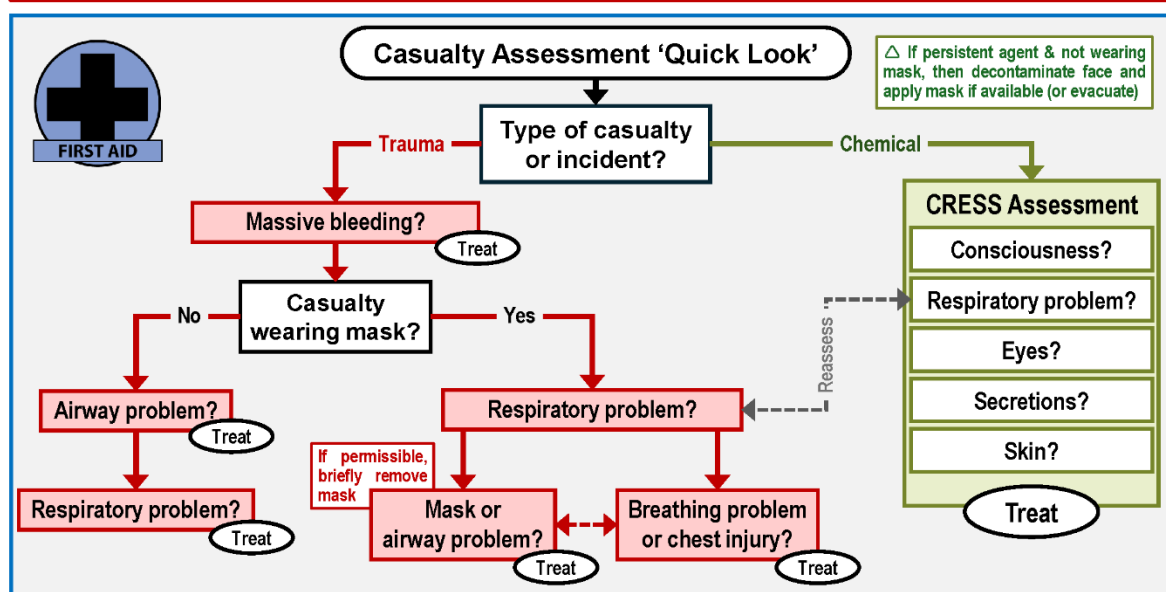
Assessment:

- Scene safety and assessment: Detectors / Visual signs / Reports of smells
- Casualty assessment: 'Quick Look' (CRESS / Trauma)

Hot Zone (T1 casualties only) - Life-saving interventions:

- Control of Massive bleeding
- Airway management & Antidote (medical countermeasure) administration
- Respiratory support

Remove – Evacuate from **hot zone**



C R E S S		Nerve agent	Metabolic poison*	Opioid	Atropine / BZ	Riot Control Agent	Sepsis	Heat stroke
C	Consciousness	Seizures	Unconscious / Seizures	Reduced → unconscious	Agitated / Confused	Normal / anxious	Normal, reduced or altered	Altered
R	Respiration	Increased or reduced → stopped	Increased / stopped	Reduced → stopped	Increased	Increased	Increased	Increased
E	Eyes	Pinpoint pupils*	Normal / Large pupils	Pinpoint pupils	Large pupils / Blurred vision	Severe eye pain / redness Normal pupils	Normal	Normal / Large pupils
S	Secretions	Increased*	Normal	Normal	Dry mouth / Thirsty	Tearing (eyes) Nasal	Normal / Sputum	Normal
S	Skin	Sweaty	Pink → blue	Normal / Blue	Flushed / Dry	Irritation	Warm → pale Non-blanching rash	Varied
Other features		Vomiting Incontinence Slow pulse	Sudden onset (may be delayed)		Fast pulse	Immediate onset Short duration (< 30 minutes)	Fast pulse Fever (>38.3°C) Bio-syndrome* No radial pulse	High temperature (>38°C)

* Pinpoint pupils (and/or increased secretions) may be delayed if skin absorption or eye protection worn. * includes 'blood agent'.

◆ 'Bio-syndrome' includes: respiratory, cutaneous (skin), lymphadenopathy, haemorrhagic, gastrointestinal, and neurological (central & peripheral).

	MASSIVE BLEEDING ➤ Attempt to apply pressure dressing. ➤ If unsuccessful: – For limb injury apply tourniquet (where available) (avoid the insertion of hemostatic dressings into wounds in the hot zone). – For torso injury manage as conventional massive bleeding. ➤ Apply appropriate dressing and markings to protect medical personnel and notify them of any potential residual wound contamination.
If casualty wearing mask and safe to do so, carry out ‘expose to treat’ procedure Decontaminate around the mask and the hood Loosen Personal / Individual Protective Equipment Remove mask (<i>do not discard mask as it may be required again</i>)	
	AIRWAY ➤ Basic airway manoeuvres, such as: – Head tilt & chin lift (non-trauma) – Jaw thrust (trauma) ➤ Suction airway, if equipment available, or allow self-drainage ➤ Place in recovery (semi-prone) position, if unconscious or secretions
	ANTIDOTES REFER TO AGENT-SPECIFIC FIRST AID
	RESPIRATORY ➤ Assess respiratory <u>r</u>ate, check for <u>i</u>njuries, and then check the <u>b</u>ack and <u>s</u>ides of the chest (RIBS assessment) ➤ Respiratory support, as resources allow – If sucking chest wound, apply appropriate dressing – If penetrating chest injury, consider tension pneumothorax – seek medical help as soon as possible – If low oxygen levels (or skin is blue), give oxygen (if available)
REMOVE ➤ (Remove from scene, if not already) ➤ Remove clothing (disrobe) ➤ Remove contamination (decontamination)	
 WOUNDS	WOUND ➤ If massive bleeding, manage as described above ➤ If no massive bleeding, wash wound with lots of water or saline and avoid dislodging any clot. ➤ <i>Apply appropriate dressing and markings to protect medical personnel and notify them of any potential residual wound contamination.</i> Note. Where there is limited sterile saline, consider using bottled or chlorinated drinking water, followed by a sterile rinse. Avoid introducing decontamination products into the wound unless permitted specifically for wound decontamination.

ANNEX F CBRN CASUALTY HANDOVER AND REPORT FORM

Identification:			
		(If known)	
A	Age of casualty (adult / child (+ age))		
T	Time of wound / exposure or time of onset of symptoms		
M	Mechanism of injury or type of incident		
I	Injuries	Intoxication	Infection
	(including injury pattern & observed injuries)	(type, route of exposure, & contamination risk)	Irradiation (including any dosimetry)
S	Symptoms and signs (including toxidromes)		Other:
	M	Consciousness	
	A	Resp	
	R	Eyes	
	C	Secretions	
	H	Skin	
T	Treatment given:	NA antidotes	Other MedCM:
		Auto-injector	
		Atropine	
		Oxime	
		Anticonvulsant	
D	Decontamination status:		
(no contamination; fully decontamination; wound contamination; internal hazard)			

INTENTIONALLY BLANK

ANNEX G LEXICON	
2-PAM	Pralidoxime Chloride
4-DMAP	4-Dimethylaminophenol Hydrochloride
AC	Hydrogen Cyanide
ACh	Acetylcholine
AJMedP	Allied Joint Medical Publication
AMC	Advanced Medical Care
AMedP	Allied Medical Publication
AP	Allied Publication
ARS	Acute Radiation Syndrome
AXP	Ambulance Exchange Point
BA	Biological Agent
BAL	British Anti-Lewisite (Dimercaprol)
BSR	Battle Stress Reaction
BZ	3-Quinuclidinyl benzilate
CASEVAC	Casualty Evacuation
CBRN	Chemical Biological Radiological and Nuclear
(Fwd) CCP	(Forward) Casualty Collection Point
CDA	Casualty Decontamination Area
CDL	Clean Dirty Line
COLPRO	Collective Protection
CPE	Casualty Protective Equipment
CRESS	Consciousness, Respirations, Eyes, Secretions and Skin (Assessment)
DIM	Detection Identification and Monitoring
DU	Depleted Uranium
EFA	Enhanced First Aid
EMT	Emergency Medical Treatment
ETEE	Education, Training, Exercise and Evaluation
Evac	Evacuation
HAZMAT	Hazardous Materials
HLS	Helicopter Landing Site
IED	Improvised Explosive Device
IPE	Individual Protective Equipment
IV	Intravenous
LSD	D-lysergic acid diethylamide
LSI	Life-Saving Intervention
M(AR)2	Massive bleeding, Airway, Antidotes, Respiratory, Remove

MASCAL	Mass Casualty
MEDAD	Medical Advisor
MedCM	Medical Countermeasure
MEDEVAC	Medical Evacuation
MO	Medical Officer
MTF	Medical Treatment Facility
NA	Nerve Agent
OPS	Operational Performance Statement
PB	Pyridostigmine Bromide
PoE	Point of Exposure
PoW	Point of Wounding
PPE	Personal Protective Equipment
PTSD	Post-traumatic Stress Disorder
RCA	Riot Control Agent
RoM	Restriction of Movement
RPS	Role Performance Statement
SIBCRA	Sampling Identification of Biological, Chemical and Radiological Agents
SOF	Special Operations Forces
SRD	Standardisation Related Document
SSFF	Strip, Soak, Fan and Fluids
STANAG	Standardisation Agreement
TO	Training Objectives

INTENTIONALLY BLANK

AMedP-7.2(A)(2)