NATO
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Defence Policy and Planning Division

Division Politique et plans de défense

NON-BINDING GUIDELINES FOR CIVIL-MILITARY MEDICAL COOPERATION IN RESPONSE TO CHEMICAL, BIOLOGICAL, RADIOLOGICAL AND NUCLEAR (CBRN) MASS CASUALTY INCIDENTS

Enablement and Resilience Section

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Foreword

The COVID-19 pandemic demonstrates the unpredictable nature of the Chemical, Biological, Radiological and Nuclear (CBRN) environment that NATO faces. Beyond the pandemic, NATO and its member countries must be prepared to address the full spectrum of CBRN threats and hazards, from human-induced disasters to bioterrorism to the proliferation or use of Weapons of Mass Destruction.

National authorities are responsible for the protection of their population and critical infrastructure, including against CBRN incidents. Consistent with the principles and aims outlined in the Strengthened Resilience Commitment that NATO Heads of State and Government issued at the 2021 NATO Summit in Brussels, these non-binding guidelines assist national authorities to improve planning and preparedness to respond to a CBRN mass casualty event.

Developed within NATO's Defence Against Terrorism Programme of Work, these guidelines have broader value in building national health systems' resilience against the full range of CBRN and biosecurity threats, regardless of their origin. In addition to supporting national planning and preparedness, they also address the need to complement the 'just in time' commercial delivery model, as has been the case for the supply chain for medical countermeasures in the COVID-19 context, with a 'just in case' approach to preparedness. Close civil-military medical cooperation has also been a key aspect in many Allies' response to the pandemic, and will also be important to address future CBRN incidents.

I would like to express my sincere appreciation for the tireless efforts of Dr. Steven Bland, the United Kingdom's Defence Consultant Advisor in CBRN Medicine and the NATO Chair of the CBRN Medical Working Group, in developing these guidelines. I also welcome the joint efforts of NATO's civil and military medical communities, namely the Civil Emergency Planning Committee's Joint Health Group and the Committee of the Chiefs of Military Medical Services in NATO, on this contribution to best practice in this field.

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Introduction

This document provides non-binding guidelines and shares best practice to support civil-military cooperation, especially within healthcare sectors, in order to respond effectively to CBRN mass casualty incidents and to enhance national and Allied resilience to a credible, evolving and high consequence threat.

This document articulates the health consequences of a large-scale CBRN incident based on a range of scenarios; outlines the potential challenges and opportunities for civil-military cooperation; describes the ten civil-military consensus statements and supporting recommendations; highlights areas of best practice and existing publications, and identifies areas for capability development and resilience including education, training and exercises.

Background

Since the use of chemical agents during World War I, CBRN threats have been continuously evolving, as seen by the use of nerve agents by terrorists in Japan, as well as the more recent resurgent use by state actors, including in Syria and for assassination attempts in the UK. Over the last century, CBRN threats have moved from battlefields to the civilian environment and now pose a significant and credible threat to civilian populations.

CBRN defence expertise, including medical countermeasures (MedCM) development, mainly resides in the military. In contrast, the civil sector usually deals with infectious disease and outbreak management, as well as delivering health care in response to a CBRN incident. Recent events such as the west African Ebola outbreak in 2015 and the Salisbury incident in 2018 underlined the need for comprehensive civil-military cooperation at the international and national levels. These events were led by civilians but recognised the expertise and specialist capabilities provided by the military. The lessons from previous events identified the enduring requirement for a framework for civil-military medical cooperation, the potential establishment of standardised medical interventions, equipment and stockpiling medical equipment, personal protective equipment (PPE), MedCM and diagnostics. In the case of a CBRN mass casualty incident, this cooperation is likely to require Allied, regional and wider international cooperation across all health sectors and supporting disciplines.

This document on CBRN contributes to the wider baseline requirement for national resilience to deal with mass casualties and disruptive health crises, based on recommendations from the guidance documents referenced above and linked to CEPC guidance to civilian CBRN first responders[1] from 2014.[2,3]

1 Within the context of this publication, the term 'first responders' refers to on-scene personnel from the fire brigades, police and health services acting to minimize the consequences of a CBRN incident.

2 Guidelines for First Responder to a CBRN Incident - https://www.nato.int/nato_static_fl2014/assets/pdf/pdf_2016_08/20160802_140801-cep-first-responders-CBRN-eng.pdf.

3 International CBRN Training Curriculum for Trainers of first Responders to CBRN Incidents - https://www.nato.int/nato_static_fl2014/assets/pdf/pdf_2016_08/20160826_160825-cbrn-curriculum-eng.pdf.

I. CBRN Threat and Health Risk

Resources for military and civil CBRN defence are often based upon a perceived threat, however, medical responses should also factor in health consequences and therefore should be more risk-based rather than threat-based. During periods where the CBRN threat is low, there are greater vulnerabilities and the lack of awareness and specific training. In the case of an incident, the consequences would require significant medical risk mitigation even if at the strategic and operational levels to support the tactical response.

During low threat periods, the most likely indication of a CBRN incident is through national healthcare systems. This is based on a suspected or confirmed clinical diagnosis recognising indicative syndromes (toxidromes), clinical investigations including laboratory services and diagnostic imaging and pattern recognition supported by health surveillance systems and epidemiology. The preservation of life will be the priority for all elements of the CBRN response and the health response will therefore also be the principle risk mitigation.

II. Indicative Planning Assumptions for CBRN Mass Casualties

Within the scope of this document:

a. The term casualty refers to any person who is declared dead, wounded, injured or diseased.

b. Casualties that enter the medical care system for diagnosis/treatment are also referred to as patients.

c. The planning assumptions for CBRN incidents can also be applied to toxic industrial accidents and public health emergencies such as outbreaks.

For conventional catastrophic mass casualty events, the benchmark number of casualties is 1000 with a breakdown of 20% fatalities, 30% seriously injured and 50% treated and discharged; summarised as 20:30:50.[4] This ratio may vary depending on the type of attack and mechanism of injury (blast vs penetrating vs blunt trauma). More recent terrorist attacks have seen a ratio of 25:50:25.

For CBRN incidents the scenarios are more complex and varied, both in number of casualties and ratios with agent-specific morbidity and prolonged end-of-life care. This is a significant challenge when planning and preparing for a high impact CBRN incident with no generic planning scenario. CBRN fatalities will also be a challenge for healthcare and mortuary facilities, in terms of managing any post-mortem hazards while also supporting a criminal investigation which may require a post-mortem examination.

As well as the physical effects of the CBRN and trauma exposure (intoxication, infection, irradiation and injuries), casualty hazards are also a possibility due to the type of incident and hazard. This may result in the casualty being either contaminated or contagious (risk of person-to-person transmission of an infectious disease); both requiring decontamination and isolation respectively.

In order to enable planning and preparedness, the following planning assumptions are made:

a. The number of casualties may be an order of magnitude above and below the benchmark for conventional mass casualties although the associated severity of cases may be reversed (smaller numbers of critical patients and larger numbers of incapacitated patients).

4 Based on a review of terrorist attacks between 1946-2016, 16 of the top 25 had between 800-1100 casualties.

b. The lower casualty estimation is 100 casualties assuming a significant mortality and morbidity rate. This may therefore result in all patients requiring a high level of critical care including ventilation (respiratory) support and other organ-replacement therapy such as renal dialysis (i.e. 100 critical care patients with no fatalities).

c. The upper indicative casualty estimation is 10,000, which may have a broad casualty ratio from 50:0:50 (high lethality and short onset; patients who survive do not require critical care) to 0:0:100 (debilitating but non-fatal biological outbreak).

d. Chemical incidents are likely to have a rapid onset and short duration (hours to days) potentially with a trigger event[5], while biological incidents are more likely to be relatively slow in emerging and long in duration (days to months). The nature of a radiation incident is more likely to follow that of a biological incident but may have a trigger event such as the detection of a radiation source or deliberate notification; this may alert medical staff to look for symptoms and signs that may be normally overlooked.

e. Patients with combined injuries (CBRN and trauma exposure) will compound the demands on casualty management including the management of physical effects and any delay in receiving medical care due to the requirement for decontamination, or reduced patient access due to the requirement for isolation or PPE. Combined physical effects may have synergistic effects which will complicate medical management and survivability, examples include the potential interaction of nerve agent on anaesthetic agents used to facilitate surgery and critical care, and the poor prognosis of thermal burns and blast injury with concurrent acute radiation exposure.

f. Unlike traumatic incidents, death may not be immediate but may occur after a prolonged period of time following complications requiring critical care such as overwhelming infection or multi-organ failure.[6] This has significant resource and ethical implications, especially in some cases where medical care may be futile or compromises the management of other patients with a greater chance of survival. This highlights the requirement for pragmatic, ethical and compassionate triage including, where possible, an evidence-based approach that may be applied to both CBRN incident patients and patients with other acute or long-term healthcare needs including critical care.

g. Following a CBRN incident, it is highly likely that individuals may seek healthcare advice and reassurance due to a perceived/suspected exposure with or without any specific symptoms. These low risk persons sometimes referred to as the 'worried well' will have justifiable reasons for accessing healthcare systems. However, the effect, if not managed correctly, may have a disproportionate effect on the wider delivery of healthcare to CBRN casualties and continuity of healthcare delivery. The current assumption based on previous incidents is that the ratio of casualties

5 A trigger event may be an explosion, obvious release with visible signs, smells or immediate symptoms, or detection indication.

6 Advances in civilian and military healthcare system over recent decades have seen a significant shift to the left in the trimodal distribution of traumatic deaths.

to low risk persons following a chemical incident is 1:4 while following a radiological or biological incident this may rise to 1:20. Credible and consistent strategic and public communication is therefore vital.

III. Challenges and Benefits to Civil-Military Cooperation

There are a number of real and perceived challenges to civil-military cooperation across the healthcare sectors, including:

- **Constitutional barriers**. Constitutional barriers may restrict civil-military manpower, organisation and financial cooperation.
- **Institutional barriers**. There may be institutional barriers that restrict civil-military cooperation because of potential conflict of interest, competition for finite central government funding, commercial legislation and misconceptions.
- **CBRN MedCM interoperability**. The availability and accessibility of CBRN-related MedCM may be restricted or limited between civilian and military populations and providers due to misconceptions about concepts and legal frameworks for use despite international standards and medicine regulations.
- **PPE and Medical equipment interoperability**. The availability and accessibility of PPE and medical equipment between civilian and military populations may be limited for CBRN incidents and public health emergencies due to misconceptions about the concepts of use despite international standards.
- **Diagnostic capabilities**. The lack of access to clinical and reference laboratories and collaborative networks may be due to differing mandates, governance or credentialing (health vs military vs homeland defence) despite international standards.
- **CBRN medical niche capabilities**. CBRN medical support within wider national capabilities and healthcare resilience is seen as a niche area in both civilian and military sectors and cooperation may therefore not be sought due to a limited requirement for cooperation in areas of greater capability and resilience such as trauma care.
- **Perceived different populations at risk**. The extreme of age in a civilian population may lead to the false perception that civilian and military populations are so significantly different as to mandate alternative healthcare systems and duplicate effort. While the application of healthcare delivery may differ, the principles remain the same.
- **'Last resort'**. A civilian request for military assistance is often seen as a 'last resort' even following a CBRN incident, and may neglect pre-emptive planning, preparedness, and opportunity for burden sharing.

There is an increased likelihood and confluence of CBRN threats against both a civilian population at home and a military population on deployed operations, including from insurgents, terrorists, or a 'lone wolf'. There are several benefits to greater civil-military cooperation across the healthcare sectors, particularly:

- To ensure maintenance of a basis level civil and military capabilities and expertise, following considerable reductions in resources (in terms of finance, staff, equipment and facilities);
- Any civil-military cooperation will be cost-effective with common requirements, burden sharing for development and acquisition, and greater purchasing power.

- Any Article 5 or Non-Article 5 operation that has a CBRN component will require a comprehensive national response including the reception of military CBRN patients into national healthcare systems and isolation capacity that may not be routinely available in the military.
- Article 3 of the NATO and subsequent NATO summit declarations are a political mandate for a comprehensive approach to national and Allied health resilience including CBRN and public health emergencies such as NATO bio-responsiveness.
- While hazardous material incidents and public health emergencies are not considered deliberate release scenarios, the generic CBRN medical response and recovery capabilities are applicable and enhance wider 'all-hazard' health resilience.
- There is a civil-military health bridge due to the same standards of care provision and international best practice with more areas of commonality than differences.
- Despite the extremes of age, civilian and military patients are the same although the level of vulnerability may be less in the military population due to the potential use of pre-exposure medical countermeasures and a greater level of fitness and health.
- The use of civilian healthcare personnel within the military reserves provides precedence for a common health resilience framework especially for training either core healthcare skills applicable to the military or specialist skills taught in the military but distributed as best-practice into the civilian healthcare systems.
- Many nations do not have a large home-based military healthcare system and embed military personnel within civilian regional or national healthcare systems allowing for the sharing of best-practice.
- Medical training including nursing and other healthcare disciplines is based on a core requirement and practice development system which enables the provision of a CBRN medical competence framework usually based on knowledge, skills and attributes and in accordance with international standards of training development, delivery and assurance.
- The development of new MedCM, medical devices and diagnostics in two separate medical research sectors is unethical and may result in duplication of effort including the use of pre-clinical animal models and clinical trial volunteers.
- The establishment of national and regional stockpiles for MedCM, medical equipment and PPE provides some stability following local surges in use and cost-effectiveness.

IV. Guidance to National Authorities

The NATO military and civilian medical bodies (COMEDS and JHG) have agreed the following consensus statements to enable a governance framework to support Alliance and national health resilience including CBRN mass casualty management. These provide guidance to help national authorities develop national civil-military medical cooperation in response to a CBRN incident.

Statement 1 – *Institutional and Constitutional barriers should not restrict healthcare planning, preparedness and response to a CBRN mass casualty incident.*

Recommendations:

- National authorities should develop Memorandum of Understandings (or equivalent) to enable civilian-military national cooperation.
- National healthcare personnel should be credentialed to enable working across the health sectors in the event of a health emergency including a CBRN mass casualty incident or outbreak.
- National authorities could draw on the Model Technical Arrangement on the Liability of Relief Personnel to facilitate international cross-border cooperation in response to an incident.[7]

Statement 2 – *Except for the extremes of age, civilian and military patients are the same.*

Recommendations:

- Any CBRN clinical guidelines developed should consider civil-military cooperation and a paediatric population at risk.
- Any CBRN medical research should include an assessment on the utility of civil-military interoperability and application.
- CBRN scenarios and casualty estimation assumptions should be adapted to enable application in both military and civilian populations.

Statement 3 – *CBRN medical expertise is usually within national military organisations including research institutions.*

Recommendations:

- National military authorities should consider civil-military cooperation within their organisations.
- Emergency response planning should include authority to request advice from military subject matter experts.

Statement 4 – *National civil-military stockpiles for medical countermeasures, PPE and medical equipment will strengthen CBRN health resilience including the response to a CBRN mass casualty incident.*

Recommendations:

- Nations should develop strategic stockpiles in order to support public health, national health resilience, operational deployments and humanitarian response.
- Any strategic, national stockpile should be resourced to support a civilian CBRN incident of any size, operational surge on a military deployed operation, civil-military cooperation in support to a public health emergency, and regional and global response to a CBRN mass casualty incident either for initial use or resupply.
- NATO should develop logistic and regulatory mechanisms to support access to MedCM, PPE and medical equipment strategic stockpiles between nations to complement

7 Please see: https://www.nato.int/eadrcc/docs/Tech_Arr_Liability-Relief_Personnel_2014.pdf

national and regional civilian and WHO arrangements.

- Nations should consider contributing to a physical or virtual strategic stockpile or stock exchange to support Allied resilience to a CBRN mass casualty incident.
- NATO should develop a common standard for the different levels of PPE, focusing on generic CBRN suit and highly contagious diseases (airborne and strict precautions).
- JHG should make recommendations, as necessary, to the EADRCC for strengthening the Inventory of National CBRN Consequence Management Capabilities.

Statement 5 – *A common CBRN medical response and training framework will support civil-military cooperation.*

Recommendations:

- National authorities should publish a common CBRN casualty/patient care pathway to support civil-military interoperability, provide health resilience and support rehabilitation.
- A common multidisciplinary CBRN medical curriculum or competence framework is developed and mapped to the common CBRN medical response framework.

Statement 6 – *Pragmatic evidence based CBRN casualty decontamination will support civil-military interoperability.*

Recommendations:

- Evidence based guidance of casualty decontamination should be developed using an all-hazards approach and mapped to the CBRN patient care pathway.
- Evidence based guidance on the management of contaminated wounds should be developed.
- Guidance on the management of contaminated and contagious patients and maintaining a safe environment in healthcare facilities during CBRN mass casualty events should be developed.

Statement 7 – *Triage during a CBRN mass casualty incident must optimise care so that the "best can be done for the most".*

Recommendations:

- An ethical framework for the triaging of CBRN mass casualties should be developed before a CBRN incident, which should be adapted following a CBRN incident and confirmed cause, based on pragmatic and humane principles.
- Guidance using evidence-based criteria or consensus for the use of expectant triage category including palliative care and ceiling of care during a CBRN mass casualty incident including support to a public health emergency of international concern should be developed, where possible.[8]

8 Medical planners should consider thresholds for the implementation of the expectant triage criteria based on the severity and complexity of the incident and survivability. This is to ensure that the management of patients not expected to survive is not detrimental to those patients more likely to survive. This may include two threshold levels for expectant management: 1) following a mass casualty incident the threshold should be based on futility (i.e. > 95% mortality or survivability < 5%); 2) following a catastrophic CBRN mass casualty incident (mortality > 50%) including criteria such as > 8Gy acute radiation dose; acute radiation syndrome and > 40% burns or truncal major trauma; sepsis with more than 3 organ failure and sequential organ failure assessment (SOFA) score of > 15 or > 12 (e.g. > 90% or > 50% mortality respectively) or increasing over the first 48 hours (> 50% mortality).

Statement 8 – *All military CBRN medical research should consider civilian applicability.*

Recommendations:

- New CBRN medical research projects should consider civilian use, standards and/or civil-military interoperability.
- New CBRN medical countermeasure projects should consider civilian use including in a paediatric population, where appropriate and/or practicable.
- New CBRN medical countermeasure projects should consider the repurposing of licensed pharmaceuticals or medical equipment as a route to capability development.

Statement 9 – *A comprehensive CBRN medical exercise programme will support national and Alliance health resilience.*

Recommendations:

- Where possible, civil-military medical exercises should consider the addition of CBRN scenarios.
- Any civilian or military CBRN medical exercise should consider civil-military cooperation.

Statement 10 – *CBRN incidents remain rare and therefore best practice and lessons should be shared across all health sectors as it would be unethical to withhold information which may save lives in the future.*

Recommendations:

- Nations should share best practice and lessons across health sectors through academic symposia and papers subject to appropriate security, legal and patient confidentiality guidance.

V. CBRN Medical Incident Management Framework

This document provides a CBRN medical incident management framework adapted from conventional mass casualty guidance.[9] The key reference is provided by Part 2 of AMedP-7.1: Medical Management of a CBRN Incident (summarised in Figure 1).

The medical response to a CBRN incident at the tactical level is similar to a response to an incident involving conventional means with the exception of additional hazard and safety considerations. There are similarities to counter-terrorism and counter-insurgency responses with explosive devices and the use of cordons. During the response, civilian and military operational commanders will consider the following tactical priorities:

- Safety of responders;
- Saving of lives;
- Exploitation by the collection of forensic evidence and criminal investigation/ attribution;
- Recovery to the pre-incident state.

The Command structure for any incident response from the tactical level through to governmental and international command and coordination should remain the same. The modified principles of a CBRN medical incident response (SC3AT3ER) are:

- **Safety**. CBRN is an additional on-scene hazard with the potential for contaminated and contagious casualties. Initial safety considerations are adapted from counter-improvised explosive device drills as the six Cs: confirm,

9 AMedP-1.10 - Medical Aspects in the Management of a Major Incident / Mass Casualty Situation.

clear, cordon, control, communicate and contain. Communicate and contain are additional to the conventional four Cs and reinforce the requirement to inform other responders and healthcare facilities of any potential secondary hazards. For all incidents, personal and collective safety is of paramount importance and safety assessments should be dynamic.

- **Cordons**. Cordons include the establishing of hot (non-permissive), warm (semi-permissive) and clean zones, decontamination areas and a formal or conceptual clean-dirty line or cordon. For a significant biological incident with risk of person-to-person transmission, cordons may be supported by the restriction of movement of at risk populations, this may be at a local, regional or national level regulated by the International Health Regulations 2005 (IHR 2005).
- **Control & Communications**. Each zone and area will require a vertical and horizontal command and control structure to support interoperability between responders and headquarters. During a civil-military response, horizontal coordination is vital to ensure any parallel civilian and military responses are coherent underpinned by comprehensive strategic direction at the cross-government and Alliance level. The chain of communication parallels the chain of command and the same principles of CBRN warning and reporting (knowledge management and situational awareness) apply to the medical management of an incident as well as support by coherent risk and strategic community including public health advice.
- **Assessment**. Assessment supports the recognition of any hazard present and informs the situational awareness of the incident response organisation. It highlights the importance of a joint scene and casualty assessment, using detection and diagnostic capabilities respectively. Any report of a CBRN substance must include the source of the information (environmental sampling, diagnosis) and the confidence of the assessment (suspected, probable or confirmed).
- **Triage**. Any incident with multiple casualties requires triage. Conventional triage is adequate for generic casualty discrimination. However, as resource and casualty care requirements differ for CBRN, a modified CBRN triage will optimise the incident and casualty management especially in the most hazardous areas such as the hot zone. In extreme situations, such as a CBRN mass casualty incident, triage will also support decision making including the use of the expectant triage category.
- **Treatment**. At the individual level, casualty care follows the principles recommended in the next section. The specific treatment guidance for each type of chemical, biological or radiological casualty is supported by Part 3, 4 and 5 of AMedP-7.1 respectively.
- **Transport**. The presence of a CBRN hazard and risk of secondary contamination or infection has significant implications for the transportation of CBRN patients especially by air. Some transport methods may also be limited by aviation and international regulations and require specialist equipment such as casualty protective equipment (CPE) including an Air Transportable Isolator (ATI) for long distance or international transport of patient with highly transmissible infectious disease (HTID).

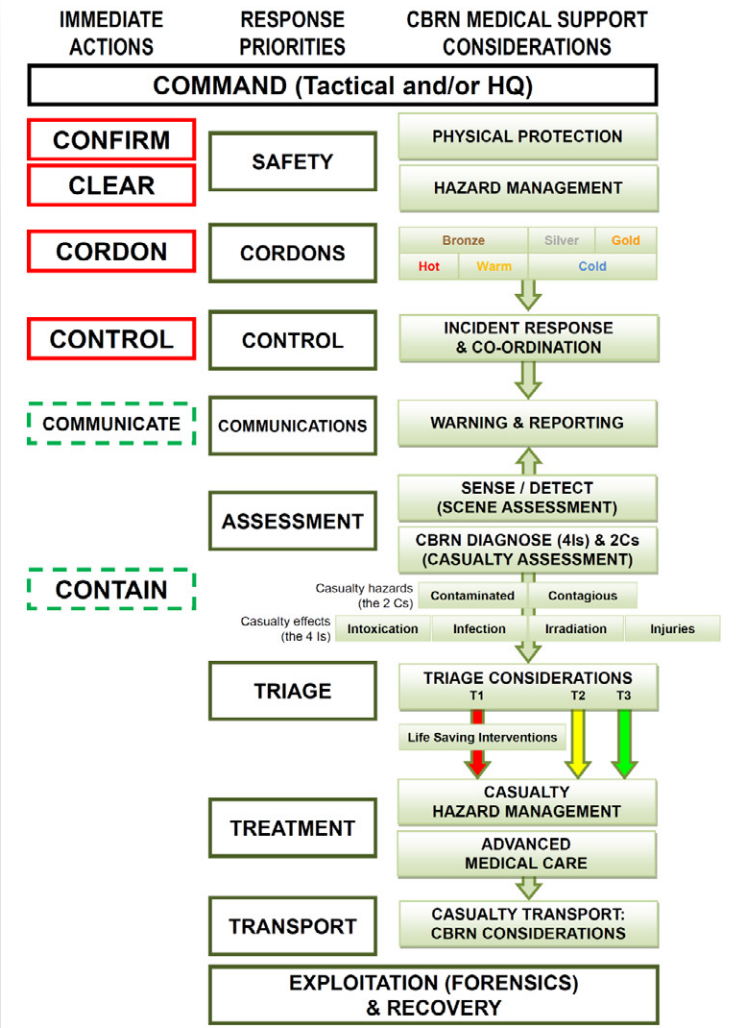
Table 1 - CBRN triage categories and features

Triage Category		Description
	NATO	
T1	**Immediate** 'Severe'	Requires life-saving intervention.
T2	**Delayed** 'Moderate'	Not walking and/or not obeying command but does not require life-saving interventions. Stretcher decontamination.
T3	**Minimal** 'Mild'	Walking and obeying command. Walking decontamination.
T4	**Expectant**	This category is only used during a mass casualty incident and when authorised at a strategic level.
Dead	**Dead**	Declared dead due to injuries incompatible with life, or respiratory or cardiac arrest in presence of trauma or overwhelming demand.

The chemical descriptors used for intoxication can be applied to triage categories as T1 (severe), T2 (moderate) and T3 (mild). The biological descriptors used for infections and sepsis can be applied to triage categories as T1 (septic shock), T2 (sepsis) and T3 (infection).
Radiological triage is based on a threshold radiation dose of > 2 Gy (T1 with combined injury or T2 without) and > 8 Gy for T4 expectant.

- **Exploitation**. Once the scene is clear of live casualties, the next phase is a transition to incident recovery. Before this can take place, the incident scene should be secured for forensics in order to investigate the circumstances of the incident as well as to gain insight into the agent, delivery system used and attribution for the subsequent criminal investigation.
- **Recovery**. Another implication of a CBRN incident is the potential loss or compromise of medical equipment and facilities. Incident recovery will require an assessment of the impact of the incident on healthcare delivery. Patient care will also transition from life-saving treatment to rehabilitation (physical, mental and social) involving multiple disciplines as well as national and international support networks and resources. Strategic stockpiles may also be accessed in order to ensure a rapid medical logistic resupply.

Figure 1 - Summary of CBRN Medical Incident Response



VI. CBRN Casualty Management Framework Principles

The principles of CBRN casualty (patient) management are:

- Recognition (detection & diagnosis);
- Safety (personal and collective protective measures);
- Self-aid & first (buddy) aid;
- Triage;
- Casualty assessment;
- Life-saving interventions;
- Casualty hazard management including:
  - Containment;
  - Decontamination;
  - Isolation;
  - Quarantine;
  - Restriction of movement (local, regional and international);
  - Fatality management.
- Advanced medical care (AMC) with:
  - Supportive treatment including critical care;
  - Definitive treatment including antidotes and surgery.
- Rehabilitation.

The considerations for CBRN casualty care start before an event with planning and preparedness including training and exercises. While CBRN casualty care is predominantly focused on the incident response phase, CBRN fatality management and patient rehabilitation of elements of the incident response phase.

Recognition of a CBRN Incident and Casualty Assessment

It is generally accepted that when the CBRN threat state is low, the healthcare system will be a primary trigger mechanism for a CBRN incident response based on either clinical recognition, clinical laboratory confirmation or pattern recognition as part of a disease or health surveillance programme. The healthcare system is also the ultimate risk mitigation for any CBRN event.

Casualty assessment may be based on a syndromic approach supported by scene assessment by other first responders using detection, identification and monitoring (DIM) equipment, and clinical laboratory confirmation. The level of confidence for any diagnosis may be suspected, probable or confirmed. Confirmation may also be at a level that may be unambiguous in order to support the forensic or criminal investigation process, but it is outside the scope of this document. Annex A provides a summary of CBRN-related syndromes based on an example of civil-military first response consensus.

Levels of CBRN Casualty Care

Effective CBRN casualty care starts from the point of exposure and will continue through to long-term post-exposure health surveillance and patient rehabilitation. The level of casualty care provision in a CBRN environment will be limited by the hazard zones, the life-saving interventions required to save life and prevent further deterioration, and the training and scope of practice of personnel delivering the care whether civilian or military.

CBRN casualty care includes the adapted management of trauma in a CBRN environment, which may be restricted by the presence of a hazard or limit medical management while wearing personal protective equipment. The care of CBRN casualties is divided into the following levels of care:

- First aid in a CBRN environment (non-medical life-saving treatment);
- CBRN Emergency Medical Treatment (e.g. pre-hospital emergency care);
- Advanced Medical Care (e.g. hospital level care); and
- Rehabilitation.

Priorities for CBRN Casualty Care

The treatment priorities are fully described in AMedP-7.1 and are:

- Management of catastrophic haemorrhage (<C>);
- (Basic) Airway management (A);
- Antidote administration (a);
- Breathing support (& oxygen delivery, where practicable) (B);
- Circulatory support (C);
- Decontamination (D); and
- Evacuation to the next level of care / functional zone (Evac).

Care delivered in the hot zone is limited to first aid and the following priorities, <C>AaB-Evac. Medical care in the hot zone will be limited to enhanced CBRN first aid and is consistent with the limitations of '*care under fire*'[10] as well as the scope of practice for non-medical first responder. The optimal timeframe for the delivery for this level of care is within the first ten minutes and is most likely to be provided by bystanders or peer group.

Tactical field care in this zone will be delivered by healthcare personnel as *CBRN Emergency Medical Treatment* and the following priorities, <C>AaBC-Evac. MedCM may also be given to prevent the deterioration of T2 / T3 casualties. The optimal timeframe for the delivery for this level of care is within the first hour.

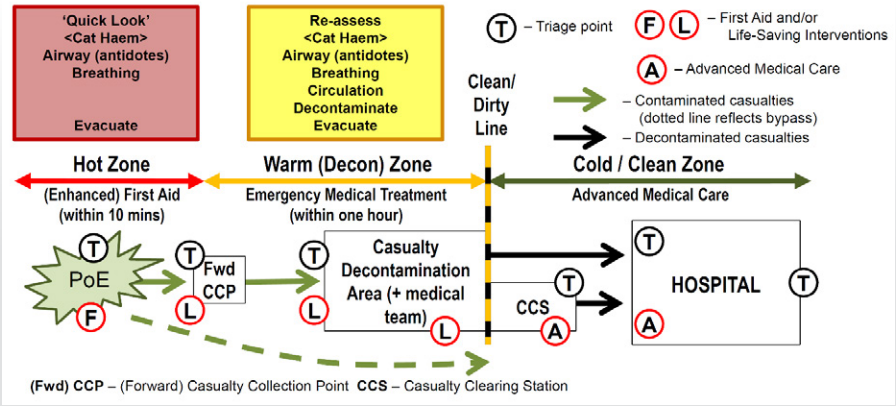
A summary of the levels of casualty care in the hot and warm zones is shown in Figure 2.

Note. The key focal point for patient handover,[11] either from first responders to medical personnel, or military or special operations personnel to the civilian healthcare system, is the casualty collection point usually at the interface of the hot to warm zone as this allows optimal patient care.

10 Care under fire describes the level of care able to be provided in a non-permissive environment whether due to the environment, presence of a CBRN hazard, explosive device or armed terrorist (e.g. London bombings (2005); Paris attacks (2016); London Bridge attacks (2017).

11 A generic patient handover format is recommended across healthcare sectors based on AMedP-7.2 using the AT-MIST-D format (Age, Time of event, Mechanism, four Is (injuries, intoxication, infection and irradiation), Symptoms and Signs, Treatment and Decontamination requirements (see Annex B).

Figure 2 - Summary of CBRN Hot and Warm Zones and Casualty Care



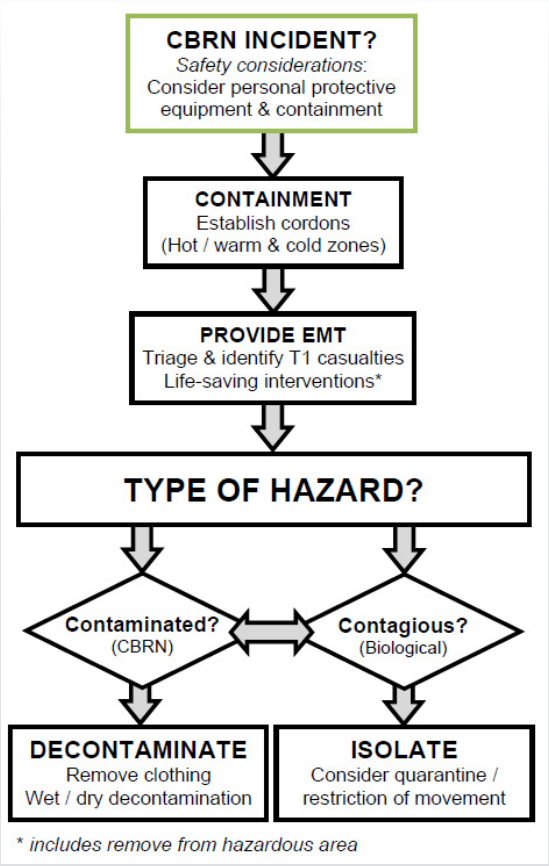
Casualty Hazard Management

Casualty hazard management is the decision-making process for the handling of casualties with a secondary exposure risk due to either contamination or a contagious illness (see Figure 3). The elements of casualty hazard management are:

- Personal safety including hazard avoidance and the use of PPE;
- Containment;
- Decontamination (external, internal (decorporation) and wound);
- Isolation - containment of contagious patients;
- Quarantine - containment of well or asymptomatic but potentially exposed persons;
- Restriction of Movement (RoM) (local, regional or international (under IHR15);
- Clinical waste management;
- Fatality management.

Life-saving interventions must take precedence over casualty hazard management although the removal of chemical agent contamination will reduce further dermal absorption and may also be life-saving.

Figure 3 - Summary of Casualty Hazard Management



CBRN Patient Rehabiliation

Rehabilitation for CBRN casualties should be anticipated to limit the long-term physical, mental and social impact of a CBRN incident. The goal of rehabilitation is the return to as normal function as possible or the mitigation of any loss of function to maximise quality of life.

Early risk communication may be required depending on the perceived consequences of any CBRN exposure as well as later medical and social considerations. Potential causes for long-term health consequences include:

- Burns (thermal, chemical and radiation):
- Eye injuries;

- Psychological effects;
- Increased risk of cancer; and
- Teratogenesis (increase birth defects).

Services delivering rehabilitation include civilian and military hospitals, mental healthcare providers, veteran services (potentially accessed by the civilian healthcare system), peer groups and charity organisations. The management of long-term effects will require a multi-disciplinary approach involving rehabilitation services and specialities including:

- Plastic surgery;
- Ophthalmology;
- Mental health services;
- Occupational physicians;
- Health (genetic) counsellors;
- Risk communication;
- Employment advice; and
- Community education.

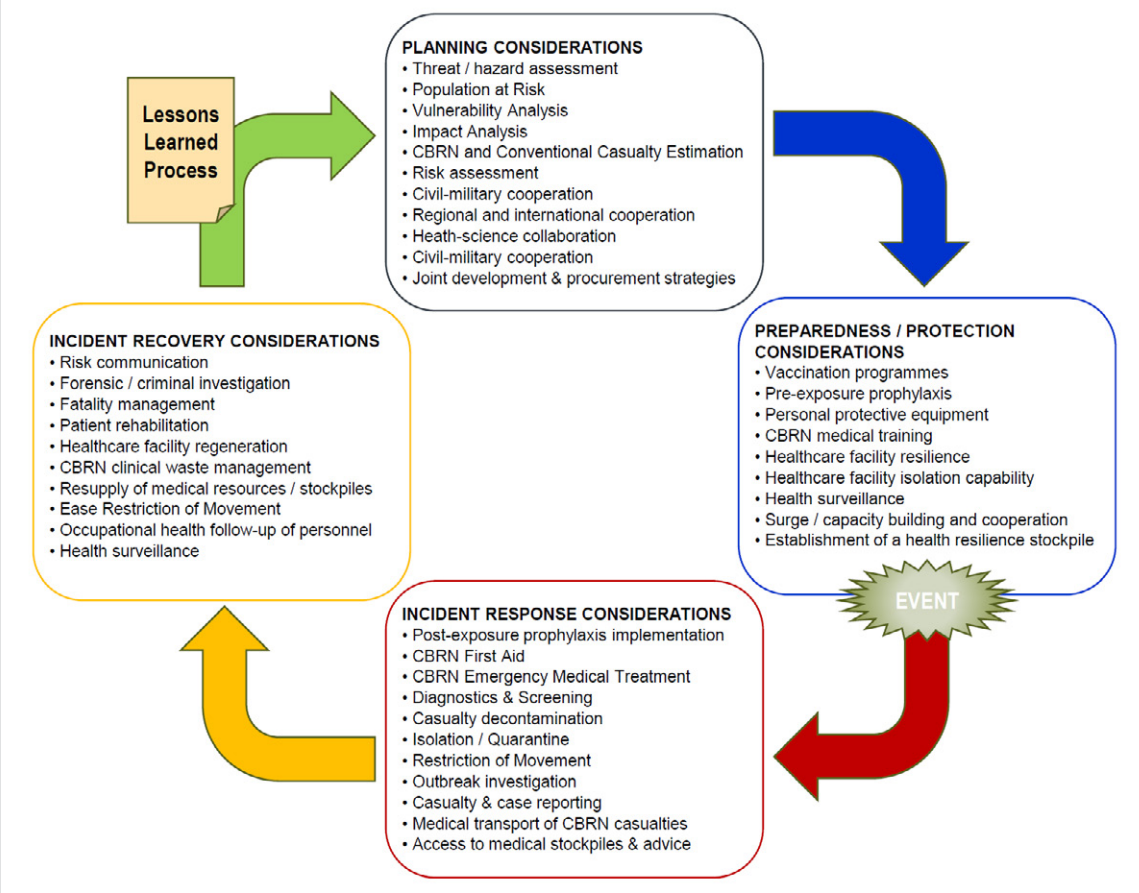
VII. Contingency Medical Planning for CBRN Incidents

Both civilian and military medical planners are required to plan for CBRN incidents at the tactical, operational and strategic levels.[12] Both healthcare sectors should have an awareness of each other's capabilities and planning assumptions and incorporate any opportunities for mutual aid into contingency and emergency plans supported by agreements such as memoranda of understanding. Both sectors should also be aware of other International Organisations' capabilities and plans (e.g., NATO, WHO, OPCW, ICRC, EU), regional centres for disease control and Non-Governmental Organisations (NGOs).

The figure below highlights areas of civil-military cooperation in a CBRN medical response from initial planning, preparedness and health protection, incident response and incident recovery. Whilst the trigger for cooperation is often the CBRN event, it is important that cooperation is pre-planned and not reactive.

12 Some nations used the alternative order of operational (bronze), tactical (silver) and strategic (gold) command levels.

Figure 4 - CBRN Medical Emergency Planning Considerations



Key areas of focus for civil-military cooperation include:

- **Regional and allied cooperation**. Planning should include regional and allied cooperation with mutual aid from regional partners e.g. NATO-Partner organisations, European Union.
- **Joint development and procurement**. Joint development and procurement of MedCM, medical equipment and PPE allows for the development of standardisation as well as provide a cost-effective procurement strategy and burden sharing.
- **CBRN medical training**. Developing joint CBRN medical training as part of CBRN medical preparedness allows for the sharing of best practice and identifying areas of training risk and potential training solutions.
- **Surge / capacity building**. Developing contingency and emergency plans allows for operational analysis to identify choke points in the civil and deployed military medical response. Mitigation of this risk may be dependent on mutual aid and using both reserve forces and military and civil defence assistance for disaster relief.
- **Healthcare facility isolation capacity**. National facilities for the isolation of HTID patients is finite in both civilian and military healthcare systems. Capacity building and sustainability may be developed using both civilian and military medical infrastructure and personnel, as required.
- **Health resilience strategic stockpile**. The development of a stockpile of MedCM, medical equipment and PPE enables surge capacity as well as a sustained response to a single event or multiple events.
- **CBRN patient rehabilitation**. Developing, maintaining and accessing medical expertise in the rehabilitation of CBRN patients will require a comprehensive approach from the military and civilian healthcare systems as well as being informed by the medical research community. Advanced medical care and rehabilitation therapy may be extrapolated from other medical conditions or repurposed licences pharmaceutical, devices or medical interventions. An example may be the management of radiological casualty by specialists in oncology and haematology. Chemical burns may use the same healing techniques used for thermal burns.
- **Diagnostics / laboratory networks**. A CBRN incident may require a surge in niche diagnostic capabilities that due to the scarcity of the assay or number of samples may require civil-military cooperation or international networks. Access to clinical reference or military laboratories may be required due to the hazard nature of samples including clinical samples of highly infectious diseases. The military may also facilitate the movement of large numbers of clinical samples.
- **Medical transportation of CBRN casualties**. Any mass casualty incident will require secondary transfers to specialist medical units or other receiving hospitals as part of mutual aid. The military is most likely to provide the increase number of patient transfers or *en masse*. Ground or air military transport may be required due to the environment potentially remaining hostile either due to the incident or civil disturbance. Nations may also be required to evacuate civilians including patients from an overseas disaster involving a hazardous environment. This scenario may require military aircraft or *in extremis* a maritime non-combatant evacuation operation (NEO).

VII. Education, Training and Exercises

Education and Individual Training

Civilian and military training of healthcare personnel are based on the same scientific and clinical principles across all disciplines with greater commonality between civilian and military healthcare providers than between nations. Most trained healthcare personnel of the same discipline or specialisation will be accredited by the same external academic authority such as a medical or nursing college or board, or national regulatory body.

The framework for common training is already recognised both for the training of reservists and for the training of more common mechanisms for disease such as trauma. A common CBRN medical training framework is therefore commended to support wider health resilience and enable civil-military medical cooperation. Five training objectives are described as part of a CBRN medical competency framework for healthcare providers including first aid. The training objectives may be delivered at three levels: awareness, basic provider, and advanced (specialist). The five objectives are:

- Manage any casualty in a suspected or confirmed CBRN environment;
- Manage the medical aspects of a CBRN incident;
- Manage a chemical casualty;
- Manage a biological casualty, including sepsis;
- Manage a radiological casualty, including nuclear.

In addition to these guidelines, a common CBRN medical curriculum provides more detailed training requirements and reference to support CBRN medical education and training and standard.

Collective Training and Exercises

A CBRN medical response requires a multi-disciplinary response and may include liaison with non-medical personnel including first responders, law enforcement, local authorities, civil defence and military organisations. Any collective training opportunities will enable better understanding of capabilities and interoperability. The use of formative training and evaluation with an open non-judgemental lessons process may identify any potential conceptual or real-time differences that may have potential impact on the effectiveness of the response.

For an effective balance of investment for an exercise it should allow for the following:

a. Use of a credible threat or risk-based scenario;

b. Enable consolidation of individual training delivered before the exercise;

c. Enable the delivery of collective training objective;

d. Allow for the experimentation in new concepts, training, procedures and equipment; and

e. Enable formative or summative assessment of organisations.

IX. Summary

In 2009 NATO identified that Allied CBRN defence requires a comprehensive strategic approach. The Alliance, supported by the Defence Against Terrorism Programme of Work, identified the evolving threat from CBRN proliferation and use by terrorists. The recent use of CBRN substances as a method of assassination highlights the potential use of hybrid threats and complex attacks by state and non-state actors which may result in civilian or military CBRN and trauma mass casualties.

The increased likelihood and confluence of the CBRN threat against both the homeland and deployed operations means that there is a requirement for civil-military cooperation across the healthcare sectors in support of a number of scenarios:

- Military assistance to the civil response to a CBRN incident from small to high-impact with mass casualties as well as other health missions;
- Civilian CBRN medical support to deployed operations, including reach-back support, and the long term medical care of service personnel and veterans in civilian healthcare systems;
- Health resilience to a CBRN incident or public health emergency / health security across the Alliance, including cross-border, regional and global civil-military health cooperation;
- Close cooperation between the military medical service, CBRN defence forces, EOD, C-IED, military police, logistics, other military capabilities and civilian authorities and capabilities will be key to success.

These non-binding guidelines make a number of recommendations in order to support and enhance mass casualty management following a CBRN incident. The principal recommendation is that nations develop mechanisms for a comprehensive approach, including civil military cooperation, across the healthcare sectors to develop and support the planning, preparedness, training, capacity building and burden sharing, and medical response and recovery to a CBRN incident of any scale including mass casualties.

It is recommended that nations consider:

- Developing a regional CBRN mass casualty planning, preparedness, response and recovery framework to enable international burden sharing and Allied resilience;
- Establishing a national health resilience strategic stockpile including CBRN medical countermeasures (antidotes, antimicrobials, medical equipment and personnel protective equipment) for civilian and military use, as well as arrangements for access by international partners including interoperability and mutual regulatory recognition;
- Establishing a national CBRN medical incident management framework based on conventional mass casualty guidance but adapted to reflect the additional hazards and uncommon clinical presentations;
- Establishing a common national CBRN medical competency framework to support the training of civilian and military healthcare personnel from initial recognition through to advanced hospital medical management and enable interoperability and

mutual aid across national and international healthcare sectors;[13]

- Enabling access and participation of personnel from both civilian and military healthcare sectors on training exercises as well as sharing best practice and lessons from exercises and incidents;
- Developing a memorandum of understanding between civilian and military healthcare delivery and regulatory authorities to enable civil-military co-operation during a CBRN mass casualty incident.

X. References

AMedP-1.10 - Medical Aspects in the Management of a Major Incident / Mass Casualty Situation.

AJP-3.8 - Allied Joint Doctrine for Comprehensive CBRN Defence.

AJMedP-7 - Allied Joint Counter-CBRN Medical Support Doctrine.

AMedP-7.1 - The Medical Management of CBRN Casualties.

AMedP-7.2 - CBRN First Aid Handbook.

AMedP-7.3 - Training of Medical Personnel for CBRN Defensive Operations.

Revised Budapest Guidelines: A Practical Guide to Public Information during a Crisis - A Practical Guide to Public Information during a Crisis (nato.int)

Guidelines for First Responder to a CBRN Incident - https://www.nato.int/nato_static_fl2014/assets/pdf/pdf_2016_08/20160802_140801-cep-first-responders-CBRN-eng.pdf

International CBRN Training Curriculum for Trainers of First Responders to CBRN Incidents - https://www.nato.int/nato_static_fl2014/assets/pdf/pdf_2016_08/20160826_160825-cbrn-curriculum-eng.pdf

Non-binding Guidelines for Enhanced Civil-Military Cooperation to Deal with the Consequences of Large-Scale CBRN Events Associated with Terrorist Attacks - 200414-guidelines-civmilcoop-cbrn.pdf (nato.int)

13 NATO Chemical, Biological, Radiological and Nuclear Medical Common Curriculum for Health Resilience.

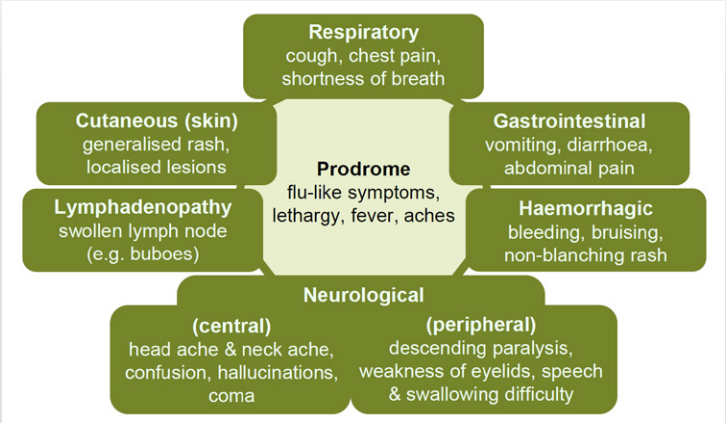
XI. Abbreviations

AJMedP	Allied Joint Medical Publication
AJP	Allied Joint Publication
AMC	Advanced Medical Care
AMedP	Allied Medical Publication
AP	Allied Publication
ATI	Air Transportable Isolator
<C>ABC	Catastrophic haemorrhage, Airway, Breathing and Circulation
Cat Haem	Catastrophic Haemorrhage
CBRN	Chemical, Biological, Radiological and Nuclear
CRESS	Consciousness, Respirations, Eyes, Secretions and Skin (Assessment)
DAT	Defence Against Terrorism
EMT	Emergency Medical Treatment (military medical)
EMT	Emergency Medical Teams (civil medical)
EU	European Union
HAZMAT	Hazardous Materials
ICRC	International Committee of the Red Cross
IED	Improvised Explosive Device
IHR	International Health Regulations
LSI	Life-Saving Intervention
MedCM	Medical Countermeasure
NGO	Non-Governmental Organisation
OPCW	Organisation for the Prohibition of Chemical Weapons
PAR	Population at Risk
PHEIC	Public Health Emergency of International Concern
PPE	Personal Protective Equipment
RoM	Restriction of Movement
TIM	Toxic Industrial Material
WHO	World Health Organization
WMD	Weapons of Mass Destruction

Annex A

This Annex provides supporting material based on lessons across NATO and between national civil-military medical consensus.[14]

Biological Agent Syndromic Approach



CBRN Abbreviated 'Cress' Assessment

CRESS		Nerve agent	Cyanide	Opiate (Morphine)	Atropine	Sepsis	Heat stroke
C	Consciousness	**Convulsions**	Unconscious / Convulsions	**Reduced → unconscious**	**Agitated / Confused**	Normal, **reduced or altered**	**Altered**
R	Respiration	Increased or reduced → stopped	Increased or stopped	**Reduced → stopped**	Increased	**Increased**	Increased
E	Eyes	**Pinpoint pupils***	Normal / Large pupils	**Pinpoint pupils**	**Large pupils / Blurred vision**	Normal	Normal / Large pupils
S	Secretions	**Increased***	Normal	Normal	**Dry mouth / Thirsty**	Normal / Sputum	Normal
S	Skin	Sweaty	Pink → blue	Normal / Blue	Flushed / Dry	Warm → pale Non-blanching rash	Varied
Other features		Vomiting Incontinence **Slow pulse**	**Sudden onset**		Fast pulse	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.
♦ 'Bio-syndromes' include: respiratory, cutaneous (skin), lymphadenopathy, haemorrhagic, gastrointestinal, and neurological (central & peripheral).

14 Courtesy of UK National Ambulance Resilience Unit and Joint CBRN Medical Faculty.

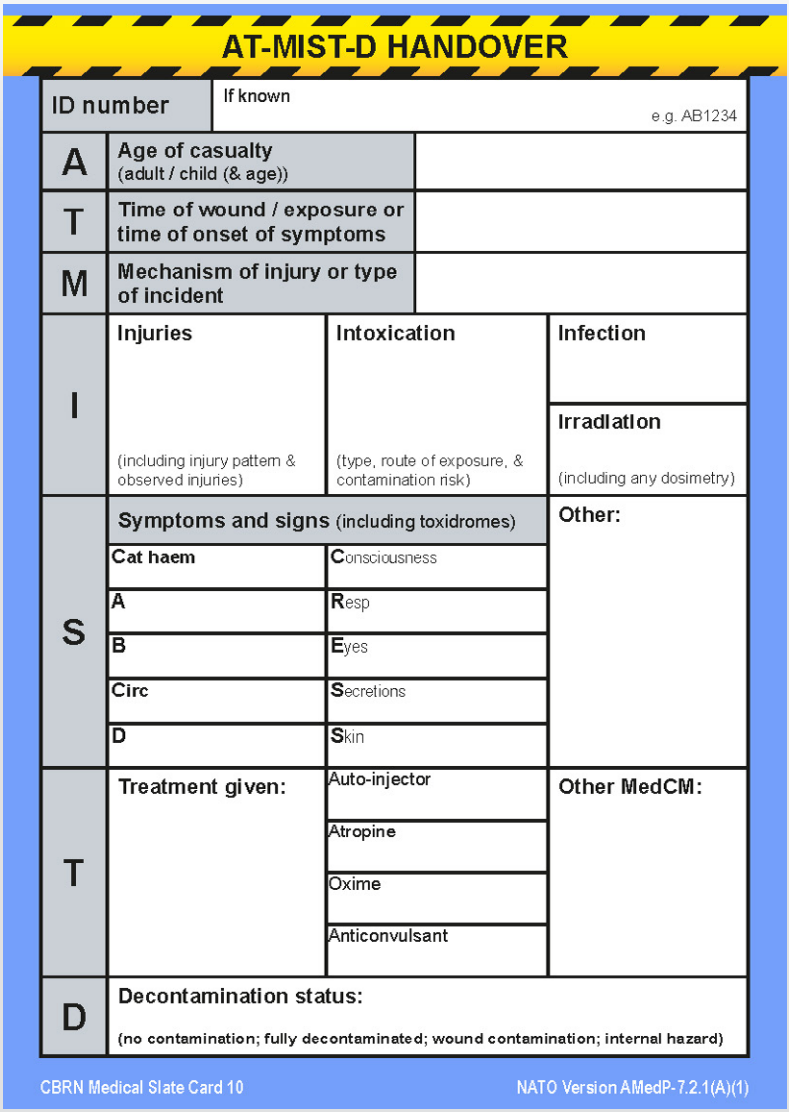
CBRN Extended 'Cress' Assessment and Initial Treatment

Extended CRESS	Nerve agent	Vesicants (blistering agents)	Pulmonary agents	Cyanide / Hydrogen sulphide	Met-Hb	Opioids	Atropine	Sepsis	Botulinum toxin	Heat stroke
	THIS LIST IS NOT EXHAUSTIVE AND NOT ALL FEATURES MAY BE PRESENT									
Consciousness	Convulsions	Normal	Normal / Agitated	Unconscious / Convulsions	Agitated	Reduced → Unconscious	Agitated / Confused	Normal, reduced or altered	Normal	Altered
Respiration	Increased or reduced → stopped	Normal / Increased	Increased	Increased or stopped	Normal / Increased	Reduced → stopped	Increased	Increased	Reduced	Increased
Eyes	Pinpoint pupils*	Normal / Inflamed	Normal / Inflamed	Normal / Dilated pupils	Normal	Pinpoint pupils	Dilated pupils / Blurred vision	Normal	Dilated pupils / Blurred vision	Normal / Dilated pupils
Secretions	Increased*	Normal / Increased	Increased / Pink tinged sputum	Normal	Normal	Normal	Dry mouth / Thirsty	Normal / Sputum	Dry mouth / Thirsty	Normal
Skin	Sweaty	Red / Blistered	Cyanosed	Pink → cyanosed	Cyanosed	Normal / Cyanosed	Flushed / Dry	Warm → pale Non-blanching rash	Flushed / Dry	Varied
Other features	Altered vision Headache Vomiting Incontinence Slow pulse	**Rapid**: Caustic agent, Lewisite **Delayed (6-24h)**: Sulphur mustard		Sudden onset Arterialised venous blood Raised lactate	Chocolate coloured blood No improved cyanosis or O_2 saturations with oxygen	Chest wall rigidity / myoclonus associated with fentanyls	Tachycardia	Fast pulse Fever (>38.3°C) Bio-syndrome♦ Hypotension (< 100mmHg) / No radial pulse	Descending paralysis incl. ptosis and dysphagia	High temperature (>38°C)
Initial treatment	Atropine Oxime Benzodiazepine	**Lewisite**: Chelating agents **HF**: Calcium	Supportive	See local guidance	Methylene blue	Naloxone	Supportive (physostigmine)	Sepsis Six	Botulinum antitoxin	Urgent cooling Supportive

* Pinpoint pupils (and/or increased secretions) may be delayed if skin absorption or eye protection worn.
♦ 'Bio-syndromes' include: respiratory, cutaneous (skin), lymphadenopathy, haemorrhagic, gastrointestinal, and neurological (central & peripheral).
2016 Criteria for Sepsis: 2 of 3 – altered conscious level; respiratory rate ≥ 22; or systolic blood pressure < 100mmHg ± non-blanching rash (additional NATO criterion) [see AmedP-7.1 Part 4].
Consider SEPTIC SHOCK if blood pressure < 90mmHg or no radial pulse.

Annex B

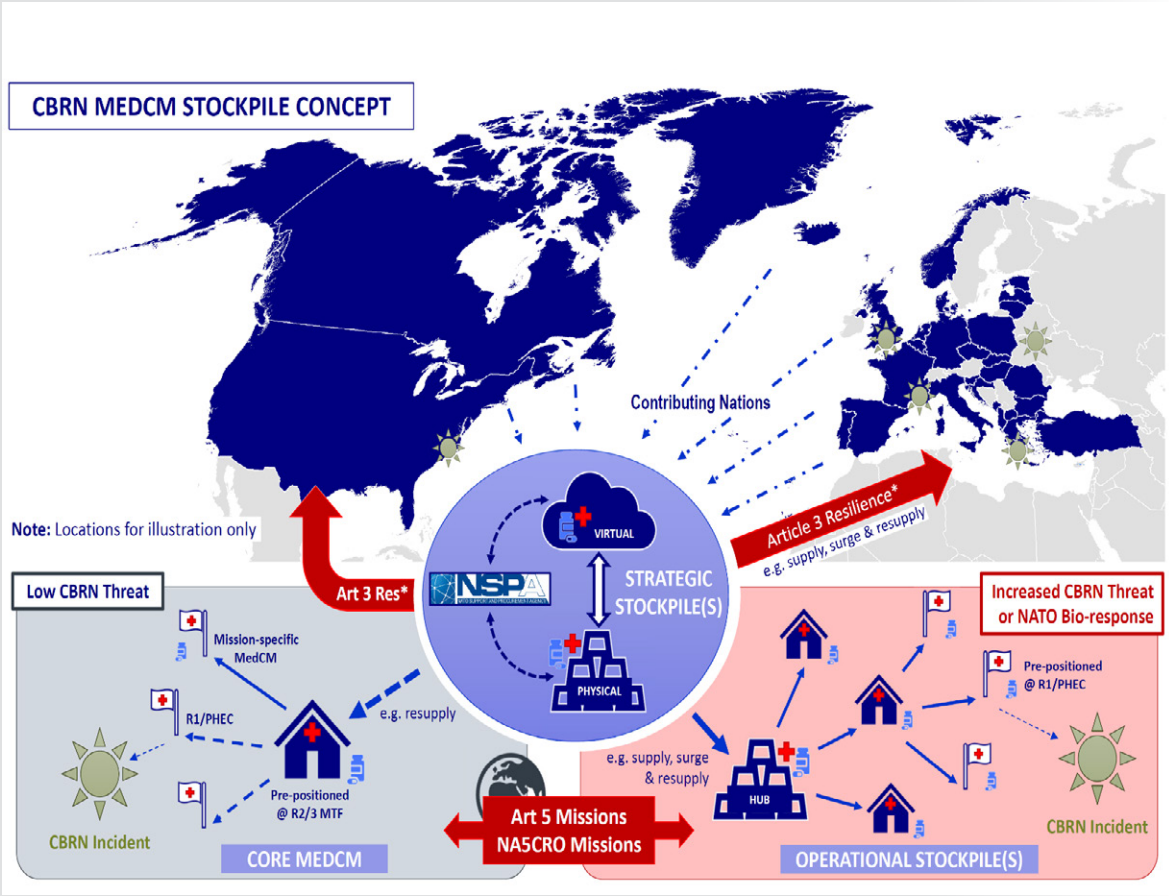
AT-MIST-D Handover



AT-MIST-D HANDOVER

ID number	If known e.g. AB1234		
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 (including injury pattern & observed injuries)	Intoxication (type, route of exposure, & contamination risk)	Infection Irradiation (including any dosimetry)
S	Symptoms and signs (including toxidromes)		Other:
	Cat haem	Consciousness	
	A	Resp	
	B	Eyes	
	Circ	Secretions	
	D	Skin	
T	Treatment given:	Auto-injector	Other MedCM:
		Atropine	
		Oxime	
		Anticonvulsant	
D	Decontamination status: (no contamination; fully decontaminated; wound contamination; internal hazard)		

CBRN Medical Slate Card 10 NATO Version AMedP-7.2.1(A)(1)


CBRN MEDCM STOCKPILE CONCEPT
Contributing Nations
Note: Locations for illustration only
Article 3 Resilience*
e.g. supply, surge & resupply
Art 3 Res*
VIRTUAL
STRATEGIC STOCKPILE(S)
PHYSICAL
Low CBRN Threat
Mission-specific MedCM
R1/PHEC
e.g. resupply
Pre-positioned @ R2/3 MTF
CBRN Incident
CORE MEDCM
Art 5 Missions
NA5CRO Missions
Increased CBRN Threat or NATO Bio-response
Pre-positioned @ R1/PHEC
e.g. supply, surge & resupply
HUB
CBRN Incident
OPERATIONAL STOCKPILE(S)

NATO Non-Binding Guidelines For Civil-Military Cooperation

Chemical, Biological, Radiological and Nuclear Medical Common Curriculum for Health Resilience

"Manage casualties in a suspected or confirmed CBRN environment and beyond underpinned by the 'all-hazards approach along a continuum of care' from point of exposure through to rehabilitation."

Aim

The aim of this curriculum is to describe the training requirements and standards to support the management of CBRN casualties[15] as part of a comprehensive approach to CBRN Defence and Defence Against Terrorism.

Introduction

In 2019, Non-Binding Guidelines for Enhanced Civil-Military Cooperation to Deal with the Consequences of Large-scale CBRN events associated with Terrorists Attacks provides a framework for national strategic, operational and tactical planning including civil-military cooperation and preparedness and sharing best practice including medical preparedness and training.

This appendix is in support of the Non-binding Guidelines for Civil-Military Medical Cooperation in Response to CBRN Mass Casualty Incidents. In the event of a CBRN mass casualty incident this cooperation is highly likely to require an allied, regional and wider international cooperation across all health sectors and supporting disciplines.

The '*Guidelines for First Responders to a CBRN Incident*' identified the saving of life as the first priority for all responding agencies. The saving and protecting of life including the implementation of decontamination as appropriate (emergency, mass, clinical), and the implementation of medical triage and treatment. The '*International CBRN Training Curriculum for Trainers of First Responders to CBRN Incidents*' also identified as the fifth learning outcome: "*Comprehend first aid requirements in relation to CBRN response*".

AMedP-7.3 - *Training of Medical Personnel for CBRN Defensive Operations* provides a medical competency framework for military medical personnel. AMedP-7.2 – *CBRN First Aid Handbook* provides a training framework for non-medical first responders providing life-saving interventions in the CBRN environment. Both training requirements are based on the five training objectives which can be applied for wider civil-military use in support of national resilience.

The scope of this document is to provide a competency framework for medical responders including first aid to support the recognition and management of CBRN casualties and any casualty in CBRN environment as well as continuing patient management in national healthcare systems. This document intends to expand on both for non-medical responders (see Section III) and medical responders (see Section IV).

15 The term *casualty* refers to any exposed person who has been declared dead, wounded, injured or diseased. Casualties that enter the medical care system may also be referred to as *patients*.

I. CBRN Medical and First Aid Training Objectives

The five CBRN medical training objectives, delivered at awareness, basic or advanced level, are based on the following tasks for healthcare providers including first aid:

- TO1: Manage any casualty in a CBRN environment including trauma.
- TO2: Manage the medical aspects of a CBRN incident.
- TO3: Manage a chemical casualty.
- TO4: Manage a biological casualty including sepsis.
- TO5: Manage a radiological casualty including nuclear.

II. Levels of CBRN Medical Training

The five tasks, as training objectives, may be taught to one of the three competency levels depending on the deployed medical role and scope of clinical practice:

- **Awareness level**. This competency level introduces concepts and mandatory knowledge. Medical personnel should be able to describe the CBRN threat, recognise a CBRN incident and carry out immediate actions beyond those taught at generalist (non-medical) level. A recommended outline of CBRN medical awareness training is given in Annex A.
- **Basic (provider) level**. This level of competency includes knowledge and skills that provide a minimum standard of casualty care within an individual's scope of practice
- e.g. first aider, 'medic'[16], nurse, doctor or other allied health professional. This level covers the initial stages of the CBRN medical response focusing on the preservation of life (enhanced first aid and emergency medical treatment). For forward deployed medical responders, this will include the knowledge and skills to manage any type of casualty, including trauma, in a CBRN environment from point of exposure through to initial hospital resuscitation as part of the 'all-hazards' approach.
- **Advanced (specialist) level**. This level of competency will support the medical response up to and including advanced medical care such as delivered at a hospital. Advanced level includes medical care to continue to treat life-threatening conditions and limit long-term health effects, incident management and command, and initial outbreak investigation, as appropriate to the medical role.

III. CBRN First Responders and First Aid Provision

First responders at risk from trauma or exposure in a CBRN environment should be able to recognise and initially manage both CBRN and traumatic life-threating 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 before the arrival of medical personnel.

Due to the immediate effects or short latency period, the management of trauma and chemical exposures are the main focus for first aid training. However, training should also include the

16 The definition and role of a medic (and paramedic) may vary between nations.

recognition of biological and radiological effects, and the reporting of significant symptoms and signs. First aid should be focused on the most severe (T1) casualties requiring life-saving interventions (LSI), but may also be provided to other casualties to prevent deterioration. Some personnel may also be managed with simple interventions and be returned to duty.

The management of trauma in a CBRN-threat environment remains a priority. Chemical casualty management will also follow this general approach, although some chemical agents will also have more agent-specific guidance and require antidote immediate therapy. These chemical agents include:

- Nerve agents;
- Blistering (vesicants) agents;
- Pulmonary (choking) agents;
- Cyanides (blood) agents;
- Incapacitating agents, including pharmaceutical based agents.

Additional first aid considerations include:

- The recognition and initial management of atropine overdose;
- The recognition of heat illness and the initial management of heat stroke;
- The recognition of a severe biological casualty (sepsis);
- The recognition of acute radiation syndrome and local radiation injury including the reporting of any radiation exposures or dosimetry;
- The recognition and initial management of psychological casualties.

Annex B provides a summary of the training requirements for the provision of CBRN first aid whilst AMedP-7.2 provides more detailed training content for this requirement.

IV. CBRN Medical Providers

CBRN Emergency Medical Treatment is the provision of care in a CBRN environment by medical personnel usually in the pre-hospital environment before, during and after decontamination, if required. Emergency Medical Treatment is normally reserved to patients requiring life-saving interventions and therefore an element of triage is required also. Annex C provides a summary of the training requirements for the provision of CBRN Emergency Medical Treatment.

Specialist clinical personnel including doctors and specialist nurses may require additional medical training. Clinical specialties may vary between nations, but key specialties include:

- Emergency medicine;
- Intensive care medicine;
- Anaesthesia;
- Acute and internal medicine; this may include infectious disease medicine;
- Pre-hospital emergency care (PHEC);
- Preventive (occupational) medicine; this may include submarine and nuclear medicine;
- Public health;
- Infection prevention and control (IPC);
- Primary health care (PHC);
- Ophthalmology and plastic surgery (with an interest in eye injuries and CBRN-related burns respectively).

Annex D provides the full CBRN medical competency framework across the five training objectives.

V. References

Guidelines for First Responder to a CBRN Incident

https://www.nato.int/nato_static_fl2014/assets/pdf/pdf_2016_08/20160802_140801-cep-first-responders-CBRN-eng.pdf

International CBRN Training Curriculum for Trainers of First Responders to CBRN Incidents https://www.nato.int/nato_static_fl2014/assets/pdf/pdf_2016_08/20160826_160825-cbrn-curriculum-eng.pdf

Non-binding Guidelines for Enhanced Civil-Military Cooperation to Deal with the Consequences of Large-Scale CBRN Events Associated with Terrorist Attacks 200414-guidelines-civmilcoop-cbrn.pdf (nato.int)

AMedP-7.1 - Medical Management of CBRN Casualties.

AMedP-7.2 - CBRN First Aid Manual.

AMedP-7.3 - Training of Medical Personnel for CBRN Defensive Operations.

Annex A

CBRN Medical Awareness Training

This Annex provides an outline for CBRN medical awareness training introducing the concept of CBRN medical support. Training should include nation-specific CBRN threats, medical implications of a CBRN incident, principles of CBRN casualty care and CBRN recognition. Training delivery could be provided by short introductory lectures, DVD or advanced distributed learning (e-learning). The enabling objectives (EO) and key learning points (KLP) for CBRN medical awareness training are:

A.1	**Raise awareness of the CBRN threat:**	
	KLP A.1.1	List historical CBRN incidents.
	KLP A.1.2	Describe the medical implications of a CBRN incident.
	KLP A.1.3	List significant CBRN agents and TIM.
A.2	**Describe C-CBRN medical support:**	
	KLP A.2.1	Describe the types of CBRN MedCM available.
	KLP A.2.2	Describe the principles of CBRN casualty management.
	KLP A.2.3	Describe the priorities for CBRN casualty management.
A.3	**Recognise a CBRN incident:**	
	KLP A.3.1	Describe the casualty indicators of a CBRN incident.
	KLP A.3.2	Describe the on-scene indicators of a CBRN incident.
A.4	**Respond to a CBRN incident:**	
	KLP A.4.1	List initial personal actions on recognising a CBRN incident.
	KLP A.4.2	Describe the organisational CBRN incident response.

Annex B

CBRN First Aid

The table below lists all the training objectives (TO), enabling objectives (EO) and key learning points (KLP) to enable first aid provision in a CBRN environment by non-medical first responders. The development of courses may extract the KLPs from this table for use within the provider's scope of practice. AMedP-7.2 provides more detailed training content for this requirement.

B.1	**Manage any casualty in a CBRN environment (basic level)**	
	B.1.1	Recognise a CBRN casualty or incident
	B.1.2	Carry out personal safety procedures
	B.1.3	Assess a casualty in a CBRN environment
	B.1.4	Treat life-threatening CBRN and traumatic conditions
	B.1.5	Perform initial casualty hazard management
	B.1.6	Provide psychological first aid, as required
B.2	**Manage the medical aspects of a CBRN incident (basic level)**	
	B.2.1	Identify any on-scene CBRN hazards
	B.2.2	Mitigate any on-scene CBRN hazards
	B.2.3	Triage casualties in a CBRN environment
	B.2.4	Handover casualty to medical personnel using AT-MIST-D format.
B.3	**Manage a chemical casualty (basic level)**	
	B.3.1	Assess a casualty for life-threatening chemical intoxication
	B.3.2	Treat a casualty with life-threatening chemical intoxication
B.4	**Manage a biological casualty including sepsis (awareness level)**	
	B.4.1	Recognise signs of life-threatening or significant biological exposure
B.5	**Manage a radiological casualty including nuclear (awareness level)**	
	B.5.1	Recognise signs of acute radiation exposure
	B.5.2	Treat a combined radiological casualty for life-threatening trauma

Annex C

CBRN Emergency Medical Treatment

The table below lists all the training objectives (TO), enabling objectives (EO) and key learning points (KLP) applicable to medical personnel responding in a CBRN environment including pre-hospital emergency care. The development of courses delivering training for patient care in a CBRN environment may extract the KLPs from this table for use within the student's scope of practice.

C.1	**Manage any casualty in a CBRN -threat environment (basic level)**		
	C.1.1	Recognise a CBRN casualty or incident	
	C.1.2	Carry out personal safety procedures	
	C.1.3	Assess a casualty in a CBRN environment	
	C.1.4	Treat life-threatening CBRN and traumatic conditions	
	C.1.5	Perform casualty hazard management	
		C.1.5.1	Perform decontamination on a walking casualty
		C.1.5.2	Perform decontamination on a stretcher casualty
		C.1.5.3	Perform appropriate wound decontamination
		C.1.5.4	Manage the hazards of a contagious casualty
C.2	**Manage the medical aspects of a CBRN incident (basic level)**		
	C.2.1	Identify any on-scene CBRN hazards	
	C.2.2	Mitigate any on-scene CBRN hazards	
	C.2.3	Triage casualties in a CBRN environment	
	C.2.4	Communicate and handover of CBRN casualties along the medical evacuation chain including AT-MIST-D format	
C.3	**Manage a chemical casualty (basic level)**		
	C.3.1	Assess a casualty for life-threatening chemical intoxication	
	C.3.2	Treat a casualty with life-threatening chemical intoxication	

C.4	**Manage a biological casualty including sepsis (basic level)**		
	C.4.1	Assess a casualty for life-threatening or significant biological exposure	
		C.4.1.1	Assess a casualty for signs of infection and sepsis
		C.4.1.2	Assess a casualty for signs of biological toxin exposure
		C.4.1.3	Assess a casualty for risk of a contagious disease
	C.4.2	Treat a casualty with life-threatening or significant biological exposure	
		C.4.2.1	Treat a casualty with sepsis
		C.4.2.2	Treat a casualty with a significant infection
		C.4.2.3	Treat a casualty with biological toxin exposure
C.5	**Manage a radiological casualty including nuclear (basic level)**		
	C.5.1	Assess a casualty for signs of acute radiation exposure	
	C.5.2	Treat a casualty with prodromal symptoms of acute radiation syndrome	
	C.5.3	Treat a combined radiological casualty	

Annex D

CBRN Medical Competency Framework

D.1. The table below lists all the training objectives (TO), enabling objectives (EO) and key learning points (KLP) applicable to the delivery of awareness, basic and advanced CBRN medical training up to and including advanced medical care. Each EO is supported with KLPs, references to support the development of training standards and additional supporting notes. The development of courses delivering training for the medical management of CBRN casualties may extract the KLPs from this table for use within the student's scope of practice.

TO / EO number	Training Objective (Performance)	Reference	Notes
TO 1	**Manage any casualty in a CBRN environment**		
	Awareness – Able to list CBRN threats, impact and risks, and describe the principles of casualty care in a CBRN environment including recognition **Basic (provider) level** – Able to operate safely in a CBRN environment and manage any immediate life-threatening conditions and casualty hazards iaw AMedP-7.1 and national guidance **Advanced level** – Not applicable		
EO 1.1	Describe the CBRN-related threats, hazards and risks 1. Describe the all-hazards approach 2. List historical CBRN incidents and types of events 3. Describe the medical implications of a CBRN incident 4. List the significant CBRN groups and specific agents 5. Compare CBRN threat, hazard and risk	AMedP-7.1 Chap 2 National guidance	CBRN casualty care paradigm: 'All-hazards (CBRNE3T) approach along a continuum of care'.
EO 1.2	Describe the hazards associated with CBRN agents 1. Describe the general properties of CBRN agents 2. List the routes of exposure 3. Describe the CBRN zones (exclusion, hot, warm, clean) 4. Describe the hazards from a CBRN casualty 5. List the types of CBRN casualties	AMedP-7.1 Chap 2 National guidance	Chemical, microbiological and radiological properties are covered in specific sections below and AMedP-7.1 Parts 3-5 respectively

TO / EO number	Training Objective (Performance)	Reference	Notes
EO 1.3	Recognise a CBRN casualty or incident 1. Describe the on-scene indicators of a CBRN incident including detection, identification and monitoring (DIM) equipment 2. Describe the casualty indicators of a CBRN incident	AMedP-7.1 Chap 5 National guidance	DIM equipment may include in-service civil response and military equipment as well as medical diagnostics. Group and agent-specific recognition is covered by other EOs.
EO 1.4	Carry out personal safety procedures 1. Describe CBRN immediate actions 2. Demonstrate CBRN immediate actions 3. Describe the main components of personal protective equipment (PPE)	AMedP-7.1 Chap 9 National guidance	This EO is cross-referenced with the Safety EO supporting TO2. Personal protective equipment in the military is sometimes referred to as Individual Protective Equipment (IPE).
EO 1.5	Assess a casualty in a CBRN environment 1. Describe the assessment of a casualty in a CBRN environment 2. List life-threatening conditions that require treatment in a CBRN environment 3. Demonstrate the assessment of a casualty in a CBRN environment 4. Identify life-threatening conditions in a CBRN environment	AMedP-7.1 Chap 4 AMedP-7.1 Chap 5 National guidance	CRESS – 'Consciousness, Respiration, Eyes, Secretion, Skin' 'Abbreviated' CRESS includes nerve agent, cyanide, opiates, atropine. sepsis and heat stroke.

TO / EO number	Training Objective (Performance)	Reference	Notes
EO 1.6	Treat life-threatening CBRN and traumatic conditions 1. Describe the life-saving interventions that may be required in a CBRN environment 2. Demonstrate the life-saving interventions that may be required in a CBRN environment	AMedP-7.1 Chap 4 AMedP-7.1 Chap 7 AMedP-7.2 National guidance	Priority for treatment is: - Management of catastrophic haemorrhage - Basic airway management - Antidote administration, where available - Breathing support and oxygen - Circulatory support (warm zone only) - Decontamination (warm zone only) - Evacuation to next level of care
EO 1.7	Perform casualty hazard management 1. Describe casualty hazard management 2. Describe the methods of casualty decontamination 3. Define isolation and quarantine 4. Describe the stretcher decontamination of a T1 casualty 5. Demonstrate the stretcher decontamination of a T1 casualty 6. Describe the stretcher decontamination of a T2 casualty 7. Describe the walking decontamination of a T3 casualty 8. List the levels of isolation of a contagious patient 9. Describe the types of personal protective equipment required to manage safely a contagious patient 10. Describe restriction of movement (RoM)	AMedP-7.1 Chap 6 AMedP-7.1 Chap 26 National guidance	Reference to military, civilian, NATO and WHO best practice (highlighting commonalities). Casualty hazard management includes: - Contain - Decontamination (external, internal, wound) - Isolation - Quarantine - Restriction of Movement (RoM) - Fatality management

TO / EO number	Training Objective (Performance)	Reference	Notes
EO 1.8	Describe CBRN Medical Countermeasures (MedCM) 1. List the five concepts of use for CBRN MedCM 2. List the types of CBRN MedCM pharmaceuticals 3. Describe the regulation of CBRN MedCM 4. Describe the deployment, use and recording requirements of CBRN MedCM	AMedP-7.1 Chap 3 National guidance	CBRN MedCM includes: - Pre-exposure prophylaxis (PrEP) - Pre-treatment - Post-exposure prophylaxis (PEP) - Immediate therapy - Medical therapy
EO 1.9	Manage safely a patient presenting with unusual symptoms and signs (the 'unusual patient') 1. Describe the initial assessment of an unusual patient 2. Describe the safety considerations managing an unusual patient 3. Describe the initial clinical investigation of an unusual patient	AMedP-7.1 Chap 7 National guidance	
EO 1.10	Manage a life-threatening CBRN exposure in a paediatric patient 1. Describe the paediatric considerations following a CBRN exposure 2. Describe the paediatric considerations to managing a paediatric patient following a CBRN exposure	AMedP-7.1 Chap 7 National guidance	

TO / EO number	Training Objective (Performance)	Reference	Notes
EO 1.11	Manage a psychological casualty following a CBRN incident 1. Describe the types of psychological patients following a CBRN incident 2. Describe the initial management of a psychological patient following a CBRN incident 3. Describe the potential long-term psychological effects following a CBRN incident	AMedP-7.1 Chap 7 National guidance	Links to risk communication
EO 1.12	Mitigate long term health effects and consider rehabilitation following a CBRN incident 1. Describe CBRN rehabilitation 2. List potential long-term physical health effects following a CBRN incident and mitigation 3. List potential long-term mental health effects following a CBRN incident and mitigation 4. List potential long-term social health effects following a CBRN incident and mitigation 5. Describe health surveillance and health registries	National guidance	Links to statutory reporting requirements including ionising radiation. Links to reporting of exposures and public health registries.

TO / EO number	Training Objective (Performance)	Reference	Notes
TO 2	**Manage the medical aspect of a CBRN incident**		
	Awareness – Able to describe the initial CBRN response and triage **Basic (provider) level** – Able to operate safely at a CBRN scene, triage casualties and communicate incident and casualty details iaw AMedP-7.1 (Part 2) and national guidance **Advanced level** – Able to operate safely and manage a CBRN scene or outbreak (operational epidemiology) iaw AMedP-7.1 (Part 2) and national guidance		
EO 2.1	Describe the principles of CBRN medical incident response 1. Describe the special considerations for a medical response to a CBRN incident 2. List the elements of the SC3AT3ER paradigm	AMedP-7.1 Chap 8 National guidance	
EO 2.2	Identify on scene CBRN hazards 1. Describe on scene hazards in a CBRN environment 2. Demonstrate the identification of on scene hazards in a CBRN environment	AMedP-7.1 Chap 13 National guidance	
EO 2.3	Mitigate on scene CBRN hazards 1. List the types of CBRN functional zones / areas 2. Describe the mitigation for specific CBRN hazards	AMedP-7.1 Chap 9-11 National guidance	

TO / EO number	Training Objective (Performance)	Reference	Notes
EO 2.4	Report a CBRN incident or casualty 1. List major incident and CBRN report formats 2. Describe the casualty handover procedure to medical personnel in a CBRN environment 3. Demonstrate the casualty handover procedure to medical personnel in a CBRN environment	AMedP-7.1 Chap 12 National guidance	Includes modified METHANE, AT-MIST-D and CBRN1 (ATP-45) formats.
EO 2.5	Triage CBRN casualties 1. List the five triage categories 2. List the criteria and considerations for each CBRN triage category 3. Demonstrate CBRN triage	AMedP-7.1 Chap 14 National guidance	Five categories are T1, T2, T3, T4 (expectant), and Dead. Exposed but asymptomatic may also be considered separately or as T3.
EO 2.6	Transport CBRN and other casualties in a CBRN or conventional environment 1. Describe the OPCP in a CBRN environment 2. Describe the challenges of moving contaminated or contagious patients 3. Illustrate medical evacuation from point of exposure through to the specialist hospital care 4. List equipment and capabilities that support casualty and sample handling, and medical evacuation	AMedP-7.1 Chap 15 National guidance	OPCP = operational patient care pathway.

TO / EO number	Training Objective (Performance)	Reference	Notes
EO 2.7	Perform initial outbreak and/or incident investigation 1. Describe initial outbreak investigation 2. List the elements of operational epidemiology 3. List personnel, teams and organisations that support outbreak investigation 4. List outbreak interventions including MedCM and public health 5. List the medical deployable outbreak and incident investigation teams (MED-DOIITs) and roles 6. Describe the International Health Regulations (IHR)	AMedP-7.1 Chap 17 AMedP-7.4 IHR 2015 National guidance	
EO 2.8	Implement the recovery phase following a CBRN incident 1. List the medical priorities for the CBRN recovery phase 2. Describe the requirements for fatality management 3. Describe the requirements for the incident investigation including forensics	AMedP-7.1 Chap 16 National guidance	

TO / EO number	Training Objective (Performance)	Reference	Notes
TO 3	**Manage a chemical casualty**		
	Awareness – Able to list chemical threats, effects and available MedCM **Basic (provider) level** – Able to manage chemical casualties with any immediate life-threatening chemical exposures iaw AMedP-7.1 (Part 3) and national guidance **Advanced (specialist) level** – Able to manage chemical casualties and reduce long-term effects iaw AMedP-7.1 (Part 3) and national guidance		
EO 3.1	Assess a casualty for life-threatening or significant chemical exposure 1. List the main classifications or groups of chemical agents 2. Describe the main characteristics of a chemical agent 3. List the main classifications or groups of biological agents 4. Demonstrate the assessment of a chemical casualty including initial safety precautions	AMedP-7.1 Chap 18 National guidance	'Extended' CRESS includes nerve agent, cyanide, opiates, pulmonary agents, blistering agents, atropine, botulinum toxin, sepsis and heat stroke.
EO 3.2	Manage a nerve agent casualty 1. List the historical uses of nerve agents and current threats 2. Describe the mechanism of nerve agent toxicity 3. Describe the clinical features of nerve agent poisoning 4. Describe the treatment of nerve agent casualties including any casualty hazard management 5. List deployable antidotes and other MedCM 6. Demonstrate the management of a nerve agent casualty	Recognition, first aid, PHEC and hospital management iaw: AMedP-7.1 Chap 19 National guidance	Nerve agents includes: G-agents (GA, GB, GD, GF) V-agents (VX and variants) A-agents ('Novichoks')* Organophosphate pesticides * Unclassified overview

TO / EO number	Training Objective (Performance)	Reference	Notes
EO 3.3	Manage a blistering agent casualty 1. List the historical uses of blistering agents and current threats 2. Describe the mechanism of blistering agent toxicity 3. Describe the clinical features of blistering agent poisoning 4. Describe the treatment of blistering agent casualties including any casualty hazard management 5. List deployable antidotes and other MedCM 6. Demonstrate the management of a blistering agent casualty	Recognition, first aid, PHEC and hospital management iaw: AMedP-7.1 Chap 20 & 25 National guidance	Blistering agents include: Sulphur mustard Lewisite Phosgene oxime Caustic agents including HF Phosphorous burns
EO 3.4	Manage a pulmonary agent casualty 1. List the historical uses of pulmonary agents and current threats 2. Describe the mechanism of pulmonary agent toxicity 3. Describe the clinical features of pulmonary agent poisoning 4. Describe the treatment of blistering agent casualties including any casualty hazard management 5. List deployable antidotes and other MedCM 6. Demonstrate the management of a pulmonary agent casualty	Recognition, first aid, PHEC and hospital management iaw: AMedP-7.1 Chap 21 National guidance	Pulmonary agents include: Chlorine Phosgene Diphosgene Ammonia Other toxic industrial chemicals

TO / EO number	Training Objective (Performance)	Reference	Notes
EO 3.5	Manage a cyanide or other chemical asphyxiant casualty 1. List the historical uses of cyanide or other chemical asphyxiants and current threats 2. Describe the mechanism of cyanide or other chemical asphyxiants toxicity 3. Describe the clinical features of cyanide or other chemical asphyxiants poisoning 4. Describe the treatment of cyanide or other chemical asphyxiant casualties including any casualty hazard management 5. List deployable antidotes and other MedCM 6. Demonstrate the management of a cyanide (chemical asphyxiant) casualty	Recognition, first aid, PHEC and hospital management iaw: AMedP-7.1 Chap 22 National guidance	Chemical asphyxiants include: Cyanides (HCN, cyanide salts) Cyanogens Hydrogen sulphide Rodenticides Also haemoglobin poisons (CO, MetHb-formers)
EO 3.6	Manage an incapacitated casualty including riot control agents 1. List the historical uses of incapacitants and riot control agents 2. Describe the mechanism of incapacitant toxicity 3. Describe the clinical features of incapacitants 4. Describe the treatment of incapacitants casualties including any casualty hazard management 5. List deployable antidotes and other MedCM 6. Demonstrate the management of an incapacitated casualty	Recognition, first aid, PHEC and hospital management iaw: AMedP-7.1 Chap 23 & 24 National guidance	Examples of agents causing physical and mental incapacitation include: BZ LSD Adamsite (DM) ‘Pharmaceutical based agents’ incl. fentanyls ‘Riot control agents’

TO / EO number	Training Objective (Performance)	Reference	Notes
TO 4	**Manage a biological casualty including sepsis**		
	Awareness – Able to list biological threats, effects and available MedCM **Basic (provider) level** – Able to manage biological casualties with any immediate life-threatening biological exposures iaw AMedP-7.1 (Part 4) and national guidance **Advanced (specialist) level** – Able to investigate and manage biological casualties, including under isolation conditions, and reduce long-term effects iaw AMedP-7.1 (Part 4) and national guidance		
EO 4.1	Mitigate the hazards from a contagious casualty, outbreak or incident 1. List the main types of biological agents 2. Describe the main characteristics of a biological agent 3. Describe the types of hazards from a contagious patient 4. List the levels of infection control precautions 5. Describe the levels and types of infection control personnel protective equipment 6. List the main classifications or groups of biological agents 7. List other control measures and MedCM	Recognition, first aid, PHEC and hospital management iaw: AMedP-7.1 Chap 26 National guidance	* 4.1.4 & 5 is linked to 1.7.6 & 1.7.7 Classification / groupings include CDC (A, B and C) and NATO (biological agents of operational and strategic significance)

TO / EO number	Training Objective (Performance)	Reference	Notes
EO 4.2	Assess a casualty for life-threatening or significant biological exposure 1. List the syndromes associated with biological agent exposure 2. List the criteria for life-threatening (sepsis) or significant biological agent exposure 3. Demonstrate the assessment of a biological casualty including initial safety precautions*	Recognition, first aid, PHEC and hospital management iaw: AMedP-7.1 Chap 27 National guidance	
EO 4.3	Treat a casualty with life-threatening or significant biological exposure 1. Describe the treatment of a patient with sepsis ('sepsis 6') 2. Describe the treatment of a patient with a significant infection 3. Describe the treatment of a patient with biological toxin exposure 4. List the deployable biological MedCM 5. Demonstrate the management of a biological casualty	Recognition, first aid, PHEC and hospital management iaw: AMedP-7.1 Chap 28 National guidance	Sepsis as defined by 2012 and 2016 / NATO-modified criteria Toxin management highlighted by use of envenomation and use of antivenom

TO / EO number	Training Objective (Performance)	Reference	Notes
TO 5	**Manage a radiological casualty including nuclear**		
	Awareness – Able to list radiological and nuclear threats, effects and available MedCM **Basic (provider) level** – Able to initially assess radiological, including combined, casualties with acute radiation exposure and treat any immediate life-threatening conditions iaw AMedP-7.1 (Part 5) and national guidance **Advanced (specialist) level** – Able to manage radiological, including combined, casualties up to Role 3 level of medical care iaw AMedP-7.1 (Part 5) and national guidance		
EO 5.1	Mitigate the hazards from a radiologically contaminated casualty or incident 1. List the types of ionising radiation and characteristics 2. Define contamination and irradiation 3. Describe the principles of radiation protection 4. Describe the types of hazards from a radiological patient 5. Describe the levels and types of radiological personnel protective equipment 6. List other control measures and MedCM	Recognition, first aid, PHEC and hospital management iaw: AMedP-7.1 Chap 30 & 31 National guidance	Radiation protection including: - Time distance & shielding - Control measures incl. dose limits

TO / EO number	Training Objective (Performance)	Reference	Notes
EO 5.2	Assess a casualty for signs of acute radiation exposure or local radiation injury 1. Describe the acute and chronic effects of ionising radiation* 2. List the features of acute radiation syndrome 3. List the features of local / cutaneous radiation syndrome 4. List the long-term consequences of exposure to ionising radiation 5. Describe the features of a nuclear detonation	Recognition, first aid, PHEC and hospital management iaw: AMedP-7.1 Chap 32, 33 & 34 National guidance	* Acute and chronic effects overlap with more traditional descriptions of deterministic and stochastic effects as well as whole body and localised. Based on REAC/TS management guidance
EO 5.3	Treat a radiological casualty including combined* 1. Describe the initial investigation of a radiological casualty 2. Describe the markers of significant irradiation and risk of acute radiation syndrome 3. Describe the management of external radiological contamination 4. Describe the management of internal radiological contamination (decorporation) 5. Describe the management of a significantly irradiated casualty (i.e. > 2Gy) 6. List the priorities for the management of a combined radiation casualty 7. List deployable radiological MedCM	Recognition, first aid, PHEC and hospital management iaw: AMedP-7.1 Chap 35 National guidance	* radiological casualty includes irradiated, and/or external or internal contamination. * combined radiological casualty describes a radiological casualty with concurrent trauma including burns and blast Based on REAC/TS management guidance

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