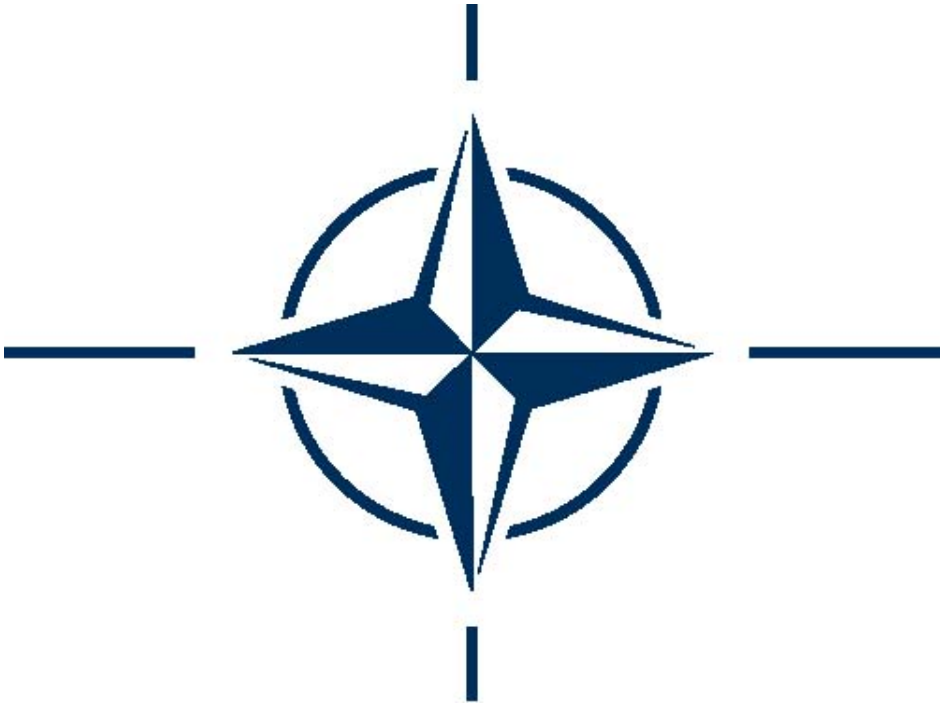
NATO STANDARD

AMedP-7.4

REGULATIONS FOR ESTABLISHMENT AND EMPLOYMENT OF MRIIT (MEDICAL RADIOLOGICAL INCIDENT INVESTIGATION TEAMS)

Edition A Version 1
NOVEMBER 2013



NORTH ATLANTIC TREATY ORGANIZATION

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NORTH ATLANTIC TREATY ORGANIZATION (NATO)

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NATO LETTER OF PROMULGATION

13 November 2013

1. The enclosed Allied Medical Publication AMedP-7.4 Edition A Version 1, REGULATIONS FOR ESTABLISHMENT AND EMPLOYMENT OF MRIIT (MEDICAL RADIOLOGICAL INCIDENT INVESTGATION TEAMS), has been approved by the nations in the MCMEDSB, is promulgated herewith. The agreement of nations to use this publication is recorded in STANAG 2551.

2. AMedP-7.4 Edition A Version 1 is effective upon receipt.

Dr. Cihangir Aksit, TUR Civ
Director NATO Standardization Agency

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RESERVED FOR NATIONAL LETTER OF PROMULGATION

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RECORD OF RESERVATIONS

CHAPTER	RECORD OF RESERVATION BY NATIONS
Note: The reservations listed on this page include only those that were recorded at time of promulgation and may not be complete. Refer to the NATO Standardization Database for the complete list of existing reservations.	

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RECORD OF SPECIFIC RESERVATIONS

[nation]	[detail of reservation]
BGR	The Bulgarian Military Medical Service has only stationary but not field equipment to detect and identify radiological contamination in case of radiological incidents, as set out in paragraph 2.5 (Support). We can participate in joint teams with experts - physicists, biochemists and radiobiologists.
DNK	- Denmark cannot act as the lead nation of a Medical Radiological Incident Investigation Team (MRIIT). - The Danish Armed Forces cannot provide a sufficiently skilled scientific or medical specialist within the field of radiation biology and nuclear chemistry. - The Danish Armed Forces does not possess any lab analysis capabilities, neither stationary nor deployable.
FRA	France will not implement the following parts of AMedP-7.4: a) Presumptive treatment of internal contamination: In France, in case of internal contamination, treatment with antidotes is administered on the basis of a mere presumption, without waiting for the diagnosis. Therefore, France does not agree with the following sentences: - “The primary aim of medical radiological diagnostics is to confirm or rule out the incorporation of one or more radionuclides. This information is a prerequisite to decide on the initial and subsequent therapies.” (Extract from Annex A, paragraph 4.5). - “Decorporation therapy is used to eliminate or reduce a confirmed internal contamination in a contaminated individual. A physician may choose to presumptively implement decorporation therapy once a radionuclide release has been confirmed and the nuclide has been identified.” (Extract from Annex A, paragraph 4.6). b) Bronchoalveolar lavage (mentioned in Annex A, paragraphs 4.5 and 4.7): France has given up bronchoalveolar lavage in case of internal contamination by inhalation given the subsequent risks to the patient. c) Use of EDTA (mentioned in paragraphs 1.4 and 2.3.3.f.): EDTA (Ethylenediamine-N,N,N’,N’-tetraacetic acid) is not used

	anymore in France and will not be used in the future as this product has not been validated as an antidote by the competent authorities.
USA	The USA has established CBRN emergency response teams with the capability of global response to CBRN hazard situations and does not plan to establish any additional medical radiological investigation team.
Note: The reservations listed on this page include only those that were recorded at time of promulgation and may not be complete. Refer to the NATO Standardization Database for the complete list of existing reservations.	

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CHAPTER 1 INTRODUCTION

1.1 AIM

The aim of this agreement is to lay down the necessary framework for NATO policy to create Medical Radiological Incident Investigation Teams (MRIITs) for medical evaluation and initial response following radiological incidents, e.g. such as an attack in which a Radiation Dispersal Device (RDD) may have been used.

1.2 GENERAL

1. Nations agree that delays in the evaluation of the situation, including the identification of the radionuclide involved as well as confirmation of possible exposure, may amplify a critical situation and most likely would weaken NATO's ability to successfully continue operations eventually resulting in mission failure.
2. Nations agree that in case of an incident involving radiological material and NATO troops or taking place within NATO Areas of Responsibility a planned, coordinated and effective response is vital to:
   - protect the health of NATO personnel,
   - mitigate the operational, political, social and psychological impact of such incidents,
   - successfully continue operations despite the presence of radiological material.
3. Nations recognize the importance of on-site medical expertise for supporting operational decision-making.
4. Nations accept that a MRIIT is necessary for the investigation and advice on the medical management of incidents in which radionuclides may have been released into the area of operation and might affect military personnel.
5. Nations agree that MRIITs require approval of the chain of command to engage in such activities. When civilians are affected, it is presumed that these activities will be coordinated between military and civilian authorities.
6. MRIITs should be able to operate under international tactical/operational control, when needed.
7. The principle and the policies set out in this document apply in peace, crisis and conflict, including Article 5 operations as well as non-Article 5 operations.

1.3 TERMS AND DEFINITIONS

The listed terms are referred to in the framework of this agreement under the following definitions:

a. Radiation Dispersal Device (RDD): An improvised means or weapon, designed to disperse radionuclides.

b. Dirty Bomb: Special RDD type, which uses conventional explosives to accomplish the task of dispersing radionuclides.

c. Radiation / radio nuclear incident: an event related to the intentional use or accidental release of radioactive materials leading to the radioactive contamination of the environment and potential exposure (of personnel) to ionizing radiation.

d. Decorporation therapy: used to eliminate or reduce a confirmed internal contamination in a contaminated individual.

1.4 ABBREVIATIONS

The listed abbreviations are referred to in the framework of this agreement as follows:

AEROMEDEVAC	Aeromedical Evacuation
CBRN	Chemical, Biological, Radiological and Nuclear
DTPA	Diethylenetriaminepentaacetic acid
EDTA	Ethylenediamine-N,N,N',N'-tetraacetic acid (Edetic Acid)
MRIIT	Medical Radiological Incident Investigation Team
MTF	Medical Treatment Facility
RDD	Radiation Dispersal Device
SIRA	Sampling and Identification of Radiological Agents
SOP	Standard Operation Procedure
STARC	Simple, Timely, Accurate, Reliable and Credible

CHAPTER 2 DETAILS OF THE AGREEMENT

2.1 COMPOSITION

MRIITs are national or international teams, constituted on a single-nation or multi-nation basis.

In order to meet deployment timelines, members of the MRIIT must be pre-identified.

2.2 MISSION

1. In order to support the Commander these teams in theatre will have the capability to undertake interventions including:
   a. performing sampling, both for immediate and specialized downstream diagnostics. Sampling will include any relevant material, (e.g. clinical and post mortem, both human and animal, food and drinking water, etc.),
   b. performing diagnosis after exposure and radiation dose estimation as fast as possible (experts are supposed to carry the appropriate equipment and supplies in order to achieve this),
   c. providing advice on the use of personal protective garments and decontamination equipment and supplies when appropriate,
   d. providing advice to medical authorities in order to improve situational awareness
   e. identifying, reviewing and advising of medical personnel on therapeutic interventions and contamination control measures. These may include but are not limited to appropriate medical treatment, healthcare worker safety, AEROMEDEVAC, appropriate protective apparel, and appropriate waste disposal,
   f. acting as liaison between on-scene commander and supporting medical treatment facility(ies).
2. Before deployment, MRIITs will liaise with other CBRN assets already deployed to provide advice to medical assets already in theatre.
3. MRIITs are not primarily intended for forensic purposes but can be tasked to initiate chain of custody procedures, e.g. by requesting other units like SIRA[1] teams to do so, for sample collection and handling if an event is believed to result from a radiological attack.

[1] q.v. STANAG 4590 and AEP-49

2.3 CAPABILITIES

2.3.1 General

1. The lead nation supplying the MRIIT is responsible for the composition, the planning and preparation of the team.
2. The contributing nations must provide an appropriate level of training, experience and force health protection of its members.
3. The MRIITs will be able to move and will be provided with appropriate physical security by theatre assets, even if Restriction of Movement (ROM) has been established, if cleared by the Task Force Commander and in close consultation with highest NATO Medical Advisor and local health authorities.
4. The MRIITs footprint should be maintained as small as possible. This can be achieved by identifying the mission-specific requirements on the MRIIT before deployment and sending teams tailored to the mission, only including the needed capabilities.
5. While having the competence for investigation of any radiological event, MRIITs must be reserved as a priority for incidents involving NATO forces and radioactive materials.

2.3.2 Personnel

1. Team leader:
2. In the preparatory phase, one of the team members will be designated as team leader. The team leader's task is to command the planning and execution of the MRIIT mission, and to represent the team to military and civilian authorities. The team leader function requires a scientific or medical background.
3. Technical expertise:
   a. A high level of expertise is required (e.g. senior scientists), in order to provide commanders with valuable and timely advice.
   b. Health and radiological expertise, besides general knowledge of clinical / medical care, in the team should include the following competencies:
      (1) radiation biology
      (2) nuclear chemistry
      (3) clinical sampling, including handling and packaging of potentially infectious or radiologically contaminated material
      (4) technical assistance (for sample analysis)

(5) radiation protection/health physics and field radionuclide detection/ identification

c. Optional competencies could include:

(1) physical security/chain of custody procedures

(2) security of nuclear, chemical and pyrotechnical material

(3) veterinary medicine

d. The team could also include staff for sample courier services and for field deployment of the team facility, if needed.

e. To cover these competencies, a "core" team should at least be composed of a medical doctor, with sufficient education in radiation medicine or health physics, a CBRN defense officer or an analyst capable of performing radionuclide analysis, a nurse or a clinical lab technician with expertise in nuclear or radiation medicine. This core team can be augmented by additional personnel if the situation requires, e.g. a health physicist.

4. If MRIIT or other units are required to initiate chain of custody procedure, presence of law enforcement officers could be necessary, according to national regulations.

2.3.3 Technical

1. MRIITs teams will be self-contained and able to undertake interventions in theatre including:

a. Evaluate the hazards, following the release of radionuclides,

b. Perform sampling of any relevant material (e.g. from humans, animals, drinking water, food), both for immediate specialized and delayed diagnosis. Sampling will include live invasive sampling when needed as well as samples from human remains. This encompasses capabilities to maintain samples at appropriate storage conditions (including refrigerating or freezing of samples),

c. Escort samples as fast as possible to a reference laboratory in safe conditions, according to international regulations for the transportation of biological samples (International Air Transport Association, IATA, and World Health Organization, WHO). The courier role is a priority.

d. Conduct analysis of the above-mentioned samples to confirm or rule out exposure to radionuclides and identify the nuclide (if not already done by CBRN Defense),

e. Provide expert advice on the diagnosis of radiation injuries,

f. Provide advice regarding clinical triage and treatment with therapeutic and prophylactic radioprotective pharmaceuticals (e.g., stable iodine, Prussian blue, DTPA, EDTA, etc.),

g. Provide advice to commanders and medical authorities in order to make available immediate information to improve situational awareness,

h. Provide information to assist command and medical decision makers for the clinical management,

i. Provide recommendations to protect forces from further radiation exposure, and communicating radiation risks to operating forces,

j. Use personal protective garments and decontamination equipments and supplies when appropriate.

Nations are responsible for identifying and providing the minimal requirements and validated procedures.

2.4 PROCEDURES

2.4.1 Triggering mechanism

1. The deployment of a MRIIT will be initiated upon request by the Theatre Commander or higher level authority through the chain of command, following medical advice.
2. Triggering events for MRIIT deployment could be very diverse in nature, and cannot be listed in an exhaustive manner. The following examples should be considered as possible triggers:

   a. Data from the medical treatment facilities, such as identification of prodromal symptoms which indicate a significant radiation exposure among military or civilians, e.g. nausea, vomiting, disorientation, rapid development of erythema, hair loss, etc.

   b. Data from disease surveillance systems and related case definitions, when available.

3. The team members of the MRIIT should be alerted through the chain of command whenever an incident involving radionuclides is suspected.
4. MRIITs will provide expert advice to the medical officers in theatre immediately after being notified of the incident, initially via telecom.

2.4.2 Deployment

MRIITs should be deployable within 48 hours from time of notification and should have a three-day mission specific sustainability[2]. However, when an elevated threat for incidents/attacks involving radioactive material is perceived, it is recommended having the team on stand-by to deploy within 24 hours.

2.4.3 Command and Control

Once deployed into a theatre of operations, the MRIIT will be under Operational Control (OPCON) of the Theatre Commander. The Theatre Commander will thus be responsible for base operational support, for logistic support (ground and air transport, supply, means of communication), chemical biological radiological, nuclear protection and security of the MRIIT once deployed. The Theatre Command Surgeon will direct and guide the MRIIT activities through the theatre chain of command in order to ensure its safe and effective reception, staging, onward movement and integration within the multi national Joint Operations Area (JOA).

2.4.4 Reach-back laboratory(ies)

MRIIT will only perform rapid preliminary and orientating surveys, with basic field capabilities. It is possible that the identification of the radionuclide in the field as well as the initial dose assessment will have to be confirmed by tests performed in a reference laboratory[3]. Designation of reach-back laboratory(ies) able to receive and process the samples is a prerequisite to MRIIT deployment and should be agreed by the participating nations. In the absence of such a designation, the MRIIT's national laboratories should be used, unless the nation declines this role.

2.5 SUPPORT

1. Continuous technical support/re-supply (e.g. sampling and diagnostic equipment) and laboratory assistance is required from the home-base or nation and from adequately equipped on-site facilities (medical command and support).
2. In order to perform their early identification task as fast as possible, the MRIIT should be authorized to request assistance from the analytical facilities already deployed (field laboratories, medical treatment facilities, etc.)

[2] q.v. paragraph 2.4.3.
[3] f.e. unambiguous identification according to AEP-49

3. Appropriate, state of the art means of navigation, positioning, communication, IT support and audio-visual documentation should be made available to the deployed MRIITs by the Theatre Commander.
4. Teams must have access to interpreters and to air and ground transport means for sample transportation to the designated analysis laboratories.

2.6 INTERRELATIONS

1. The MRIIT should be prepared to cooperate with other theatre CBRN assets, security forces, local laboratories (clinical/microbiological, public health and environmental) and authorities; local medical personnel, to include public health officials, on-site commanders and NGOs when appropriate. The MRIIT will interact, as decided by the local commander, with all the above mentioned parties and may exchange information and samples with other teams and laboratories, as appropriate. Teams must be provided with information from all relevant medical intelligence systems.
2. Data collected and/or generated will be reported to the relevant authorities through the chain of command.
3. Generic results of MRIIT investigations must be available to all participating nations concerned (i.e. the contributor(s) of the MRIIT, nations which had citizens affected by the incident, the lead nation in theatre) and available to satisfy international reporting requirements. In case of risk to public health, information is to be shared with potentially impacted civilian agencies with the exception of information protected by operational security and medical confidentiality.

ANNEX A IN DEPTH BACKGROUND INFORMATION ABOUT THE TASK OF MRIIT

A.1. THE THREAT

Radionuclides have been and continue to be used for a large variety of industrial, medical, scientific etc. purposes in many countries of the world, including areas of instability and conflict. In those areas radiation sources are often poorly guarded and may be easily accessible to criminals and terrorists. Radionuclides may also be smuggled and cause a threat far away from the area where they have first been illegally acquired.

Terrorist groups may use conventional explosives to disperse radionuclides contaminating the incident site and potentially producing contaminated casualties and cause conventional injuries.

A.2. RADIONUCLIDES OF HIGHEST CONCERN

To conduct attacks involving radiological material, e.g. RDD attack, terrorists are most likely to use purified radionuclides or other materials containing mixtures of radionuclides, e.g. radioactive or nuclear waste material, that are widely available and easy to disperse. With other radionuclides, which are not as readily available, but have a potential use in such attacks, reason for strong concern remains.

A.3. CHARACTERISTICS OF A RDD ATTACK

- Explosion with or without advance warning,
- conventional injuries from blast and/or shrapnel likely,
- combined injuries, i.e. shrapnel injuries or conventional injuries contaminated by radionuclides possible,
- delayed detection of radionuclide release possible, depending on intelligence indicators and standard operating procedures of initial responders,
- massive psychological impact likely, once the use of a RDD is suspected or has been disseminated,
- possible incorporation of radionuclides.

Incorporation of radionuclides may occur by

- contamination of open wounds in the case of combined injuries,
- inhalation and/or ingestion.

A.4. GUIDELINES FOR RESPONSE

4.1 Immediate Life-Saving Medical Interventions

Immediate medical interventions necessary to save life, limb, eyesight, etc. and normally performed by first responders take priority over decontamination and decorporation procedures. Casualty rescue from the hazard area, triage and treatment, takes precedence over surveying the area for radioactive contamination.

4.2 Detection and Identification of Radionuclide release

If an explosion has occurred due to hostile activity or for an unknown reason, the incident site has to be monitored for potential release of radionuclides as soon as possible by CBRN Defense personnel. Detected radionuclides have to be identified.

4.3 Protective Measures for First Responders

Medical personnel and other first responders entering the contaminated area must be equipped with adequate Individual Protective Equipment (IPE) and dosimeters.

First responders must be provided adequate protection from secondary hazards, f.e. secondary IEDs or RDDs.

4.4 Personnel and Casualty Decontamination

Prior to entering a medical facility, a thorough personnel or casualty decontamination must be conducted. Contaminated casualties with serious/multiple injuries should be decontaminated by adequately trained medical personnel at a casualty decontamination facility.

In the case of casualties with life threatening injuries however life-saving measures have absolute priority over decontamination measures.

Personnel without apparent injuries or health disorders will be decontaminated by CBRN Defense personnel. However, even with no apparent injuries, all potentially exposed personnel, either during or after attack, must be closely monitored for possible radiation exposure or radionuclide incorporation. Therefore, these potentially exposed personnel must be registered promptly and clinical samples for diagnostics taken. These tasks will be carried out by medical personnel already in theatre as guided by the experts of the MRIIT.

In order to provide casualty decontamination as quickly as possible, adequate decon facilities should be held available in theatres whenever the threat of an attack involving radioactive material, e.g. with an RDD, is perceived.

The decontamination task should be performed according to the internationally accepted standards defined in STANAG 2461 and STANAG 2873.

4.5 Medical radiological diagnostics

The primary aim of medical radiological diagnostics is to confirm or rule out the incorporation of one or more radionuclides. This information is a prerequisite to decide on the initial and subsequent therapies.

Identification of the radionuclide can be conducted by:

- on-site gamma-spectrometry or analyzing environmental samples (task of CBRN Defense forces)
- analyzing clinical samples (task of the medical service). Samples may include but are not limited to:
    - swipe samples from wounds, mouth or nose,
    - blood, urine or feces,
    - samples from gastric or bronchoalveolar lavage,
    - tissues from biopsy or wound debridement,
    - shrapnel fragments.

Standard Operating Procedures (SOPs) must be developed and validated by experts of medical radiological defense regarding:

- sampling (kind and amount of samples required, time for sampling, including repeated sampling, if required, labeling, documentation, tracking)
- storage and shipment,
- analysis (validation of methods, processing and measurement),
- evaluation, reporting and documentation of results (including the chain of custody)

Sampling is carried out at the closest appropriate facility for later analysis in the clinical laboratory available in theatre. MRIIT members steer the procedures, the actual sampling and analysis should be conducted by the personnel of the deployed medical facility.

Adequate analytical equipment most likely may not be available in theatre to facilitate timely analysis and diagnosis. Thus, the MRIIT should possess the analytical equipment necessary to identify radionuclides.

Prior to deployment, medical laboratory personnel have to be trained to carry out the analytical procedures by the experts who eventually will form the MRIIT; furthermore, procedures have to comply with the standards set forth in AEP-49 (SIRA-Handbook).

When samples have to be shipped to a home nation laboratory, the international air safety regulations have to be followed.

4.6 Therapy

Decorporation therapy is used to eliminate or reduce a confirmed internal contamination in a contaminated individual. A physician may choose to presumptively implement decorporation therapy once a radionuclide release has been confirmed and the nuclide has been identified. Some pharmaceuticals may be used when incorporation is suspected. The medical officer responsible for the patients will decide on further medical interventions based on the physical status of the patient and the clinical assessment of type, quantity and internal distribution of radionuclides, and current international consensus recommendation for treatment. To improve the prognosis of a patient who has incorporated radionuclides, the decorporation therapy should be initiated as soon as possible, ideally within the first hours after the incorporation incident.

In the rare event of a high radiation exposure (greater than 125 cGy) among radiological casualties, resulting in altered blood cell counts, surgical interventions and/or additional treatment will have to be considered immediately and possibly be completed within 36 to 48 hours.

4.7 Advice on Strategic Aeromedical Evacuation (StratAEROMEDEVAC)

National standards for AEROMEDEVAC coordination do apply. Casualties suffering from radionuclide incorporation will usually be transferred to a ROLE-4 medical facility, where a department of radiation or nuclear medicine is available.

In case of a high priority request for StratAEROMEDEVAC in general a flight surgeon and/or intensive care specialist will decide, whether the medical condition of the patient does allow this form of transport. For patients with mainly conventional injuries, these decisions will be taken based upon the usual criteria established in traumatology.

The following prodromal symptoms indicate a significant radiation exposure and the need for swift transport to an appropriate level medical treatment facility and possibly the need for repatriation:

- nausea within a couple of hours after the radiation exposure,
- vomiting within a couple of hours after the radiation exposure,

- disorientation,
- development of erythema
- irritation of mucous membranes (enanthema).
- rapid decreases in the lymphocyte count and changes in white blood cell and platelet count/profile particularly (indication of impairment of hematopoiesis due to radiation exposure)
- hair loss (after reception of extremely high doses)

If, because of massive inhalation, a bronchoalveolar lavage is required, the patient should be transferred to the nearest available ROLE 3 or 4 hospital equipped with a nuclear or radiation medicine department.

4.8 Documentation

All personnel having been in the vicinity of the incident or having entered the area afterwards during the rescue effort will have to be monitored both for external contamination as well as for incorporation of radionuclides. The documented results and information have to be in accordance with STANAG 2474 and with STANAG 2461 (AMedP-6). In addition with documentation summarizing the general incident itself, specific individuals' information should be documented to address future medical issues and queries. Documented information should be submitted through command and/or country specified medical channels for medical review and archiving.

Acquisition of this information normally is initiated at the decon facility, as on principle no casualty will be allowed into a MTF without thorough decontamination, and continued throughout the process of medical care, including medical facilities both in theatre and in the home nation.

Medical data of uninjured personnel undergoing decontamination by CBRN Defense Forces should be collected by medical personnel at the personnel decon site. Medical data of casualties will be collected at the patient decon site or facility.

4.9 Psychological Care

Actual or suspected ("worried well") exposure to radiation and/or radionuclides constitutes a severe psychological burden for the patient. For this reason, counseling by psychologists, peers or other trained intervention teams must be provided in a timely manner. Furthermore, MRIIT personnel may be able to help in identifying those needing assistance and treatment strategies.

4.10 Long term care and surveillance

The task of timely detection and medical intervention in case of possible late effects due to radiation exposure (i.e. various forms of cancer) and the monitoring of long term incorporation of radionuclides require prolonged periods of time of surveillance for the patients. Monitoring, including Diagnostic clinical exams and/or reviews should be conducted at regular intervals determined by the physician in charge and based upon the individual patient's medical history.

4.11 Risk Communication

Information to the deployed force and the general public is to be provided in accordance with national standards. MRIIT expertise should be used to review the scientific and medical details of a bulletin prior to its release. Effective risk communication is able to counter, at least partially, the psychological impact of an incident involving radioactive material, e.g. a RDD attack. Messages should follow the STARC principle:

Simple, **T**imely, **A**ccurate, **R**eliable and **C**redible.

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