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**AEROMEDICAL EVACUATION**

**Edition B Version 1**

**JULY 2020**



**NORTH ATLANTIC TREATY ORGANIZATION**

**ALLIED AEROMEDICAL PUBLICATION**

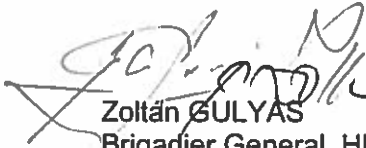
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**NORTH ATLANTIC TREATY ORGANIZATION (NATO)**  
**NATO STANDARDIZATION OFFICE (NSO)**  
**NATO LETTER OF PROMULGATION**

6 July 2020

1. The enclosed Allied Aeromedical Publication AAMedP-1.1, Edition B, Version 1, AEROMEDICAL EVACUATION, which has been approved by the nations in the Military Committee Air Standardization Board (MCASB) and is promulgated herewith. The agreement of nations to use this publication is recorded in STANAG 3204.
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Zoltán GULYÁS  
Brigadier General, HUNAF  
Director, NATO Standardization Office

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## RECORD OF SPECIFIC RESERVATIONS

[nation]	[detail of reservation]
FRA	<p>Many definitions in AAMedP-1.1 are not NATO agreed definitions. France will use NATO agreed definitions.</p> <p>France usually has an officer who is qualified in aviation medicine or aeromedical evacuation or a flight nurse acting as AEOO (<i>aeromedical evacuation operations officer</i>) or AEOO adviser.</p> <p>The aeromedical crew in France does not systematically involve the presence of a flight surgeon and a flight nurse. France would rather use the following terminology: “<i>médecin du personnel navigant ou infirmier navigant</i>” (“flight surgeon or flight nurse”).</p> <p>For France, the presence of a member of the aeromedical crew is not systematic when the number of D4/C3x patients exceeds 5. It depends on the operational context and on the number of stops during the flight.</p> <p>Paragraph 3.a.(1), Chapter 4: the physician may either be an intensive care physician or specialized in aviation medicine.</p> <p>The <i>Service de santé des armées</i> (Armed Forces Medical Services) does not deploy technicians on its evacuation flights, because repairs, which can be done by a technician, require too many materials and, above all, technical interventions that are not compatible with flight conditions (containment, O2 presence, limited power, etc.). The technician’s role is assumed by the flight nurse.</p> <p>Regarding Medium Dependency 2 patients, France deploys at least one nurse and one physician who is trained in intensive care or one flight nurse.</p> <p>It is strictly prohibited to all person to smoke inside an aircraft.</p> <p>Annex A, A.6: France now has Bluetooth wireless equipment.</p>
NLD	<p>para 4.1 Composition of Aeromedical crews:</p> <ul style="list-style-type: none"> <li>- physician and nurse trained in intensive care medicine are not formally trained in aviation medicine. They are added as augmentation to an aeromedical crew and therefore not seen as an aircrew member.</li> <li>- maintaining aeromedical life support equipment is done by a flight nurse</li> </ul> <p>para 5.8 Signal procedure</p>

	- no clinical information is added to a flight plan. Clinical information will be processed separately as described in national regulations.
NOR	4.1 3a(4): "A technician (or CCAE nurse) competent to maintain aeromedical life support equipment". NOR position: "Super-users" among flight nurses and strict equipment maintenance procedures are in our experience enough to avoid down-time of equipment which might affect the operation

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 Document Database for the complete list of existing reservations.

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<b>CHAPTER 1 - INTRODUCTION</b>
---------------------------------

**1.1. AIM**

The aim of this publication is to standardize the terminology, procedures, training and equipment used in the aeromedical evacuation of ill or injured personnel, in order to facilitate safe and timely transport of patients of one NATO nation by aeromedical services of any other NATO nation.

**1.2 TERMS AND DEFINITIONS**

The following terms relating to aeromedical evacuation are defined as follows:

- a. **Aeromedical Crew Member** - A medical officer, nurse, nursing attendant or other ancillary medical person who forms part of a constituted aeromedical in-flight team.
- b. **Aeromedical Evacuation (AE)** - Aeromedical evacuation is the movement of patients under medical supervision by air transport to and between medical treatment facilities as an integral part of the treatment continuum.
- c. **Aeromedical Evacuation Control Centre (AECC)** - The facility established by the commander of an air transport division, air force, or air command that operates in conjunction with the command movement control centre and coordinates overall medical requirements with airlift capability, assigns medical missions to the appropriate aeromedical evacuation elements in the system and monitors patient movement activities.
- d. **Aeromedical Evacuation Coordinating Officer (AECO)** - An officer of an originating, in transit or destination medical treatment facility which is qualified in aerospace medicine or aeromedical evacuation and who coordinates aeromedical evacuation activities of the facility.
- e. **Aeromedical Evacuation Operations Officer (AEEO)** - An individual of the airlift force or command who is responsible for activities relating to planning and directing aeromedical evacuation operations, maintaining liaison with medical airlift activities concerned, operating an Aeromedical Evacuation Control Centre, and otherwise coordinating aircraft and patient movements.

- f. **Casualty Staging Unit (CSU)** - A medical unit caring for in-transit patients under medical personnel supervision.
- g. **Forward Aeromedical Evacuation** - The movement of casualties in an air platform with medical personnel from point of injury and/or illness to the first medical treatment facility.<sup>1</sup>
- h. **In-Transit Evacuation Facility (IEF)** - A medical facility, similar to an CSU, placed at interim staging points which may be required for AE missions staged over a number of flight legs
- i. **Medical Officer** - An officer, of a nation's medical service or branch, who possesses a nationally recognised qualification in medicine. A medical officer may also be specially trained in aerospace medicine and may then be referred to as a 'Flight Medical Officer' or 'Flight Surgeon'.
- j. **Notice to Move** – A warning order that specifies the time given to a unit or headquarters to be ready to deploy.
- k. **Nurse** - A member of a nation's medical service or branch, who possesses a nationally recognised general nursing qualification. A nurse may also be specially trained for aeromedical duties and then be referred to as a 'Flight Nurse'.
- l. **Nursing Attendant/Physician Assistant/Medical Technician** - An enlisted member in the ranks of a nation's medical service or branch who, although not possessing a nationally recognised general nursing qualification, has been trained in military aeromedical duties. Following this training they will be entitled to the designation, 'Flight Nursing Attendant' or similar title.
- m. **Originating Medical Facility** - A medical facility that initially transfers a patient to another medical facility.
- n. **Receiving Medical Facility** – A medical facility that receives a patient from another medical facility.

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<sup>1</sup> At the time of drafting some definitions were in process to be approved through NTO, AJP-2, and replace the previously approved definitions; for the most updated definition please visit NATOTerm at <https://nso.nato.int/natoterm/Web.mvc>

- o. **Strategic Aeromedical Evacuation** - The intertheatre movement of patients in an air platform under the supervision of medical personnel from the area of operations to medical treatment facilities outside the area of operations or between medical treatment facilities outside the area of operations.
- p. **Stretcher/Litter** - Throughout this document the word 'stretcher' is synonymous with 'litter'.
- q. **Stretcher Patient** - A patient requiring stretcher accommodation while in transit.
- r. **Tactical Aeromedical Evacuation** - The intratheatre movement of patients in an air platform with medical personnel between medical treatment facilities.
- s. **Walking Patient** - A patient not requiring a stretcher while in transit.

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## CHAPTER 2 - SELECTION OF PATIENTS FOR AEROMEDICAL EVACUATION

### 2.1. FITNESS FOR AIR TRAVEL

Patients selected for transportation by air must be cleared for the proposed flight by an aeromedically trained medical officer either at the originating facility, a casualty staging unit, or an in-transit evacuation facility, or, in his absence, by another competent medical authority. The medical officer must balance casualty fitness considerations against the availability of suitable in-flight medical attention; the capacity for treatment in the reception area; the operational situation; and the operational capabilities of the available airlift aircraft.

### 2.2. FORWARD AEROMEDICAL EVACUATION

1. In forward aeromedical evacuation, the paramount need is to transport the patient to the initial point of treatment as quickly as possible. Helicopters and V/STOL aircraft may be used for airlift.
2. The principle for the conduct of aeromedical evacuation in forward areas, including priority of movement, scheduling, decisions as to whom should be evacuated and the provision of medical escorts, is outlined in STANAG 2087/AAMedP-1.5 Forward Aeromedical Evacuation.

### 2.3. TACTICAL AND STRATEGIC AEROMEDICAL EVACUATION

1. In these types of operations, the benefit to the patient of transfer to an area where appropriate medical facilities are available must be balanced against the ability of the patient to withstand the anticipated environment conditions of the flight. Account must be taken of the effects on the prospective passenger of significant changes in atmospheric pressure and cabin temperature, turbulence, the work load on a hard-pressed in-flight medical team with restricted facilities and due regard paid to the aircraft type, flight plan and mode of flight.
2. When aeromedical evacuation is carried out with helicopters, vibration (causing resonance of damaged body structures), turbulence (causing motion sickness), noise (making communication difficult), poor temperature control and a cramped and ill-lit interior (making in-flight care less available) are all problematic. In unpressurised fixed-wing aircraft, hypoxia and expansion of gas in bodily cavities may worsen the condition of a casualty; these problems are lessened in pressurised aircraft but not totally eliminated.

## 2.4. CLINICAL SELECTION CRITERIA

1. There are no absolute contra-indications to aeromedical evacuation. Each case must be judged on its merits, weighing the advantage to the patient of transfer against the possible harmful effects of the flight. Sometimes a calculated risk must be taken. Patients with critical medical or surgical conditions (e.g. penetrating wounds or injuries of the chest or abdomen) should be stabilised wherever possible before evacuation. Unstable, or recently stabilised patients, must be provided with the highest level of care available and wherever possible should be accompanied by a physician trained in critical care medicine. As a guide it would be wise to accept the following types of patients only when there is no other acceptable means of transport:

- a. Patients in the infective stage of serious communicable diseases are generally not acceptable for AE. If any are carried, appropriate precautions must be taken for the protection of other occupants (ref. Chapter 7).
- b. Ill or injured whose general condition is such that they may not survive the flight.
- c. Patients whose upper and lower jaws are immobilised. Such patients require constant supervision by persons who are competent and equipped to remove the tie materials immediately should the patient become airsick or vomit. Fixation by intermaxillary elastics is preferable to wire because of ease of cutting.
- d. Pregnant patients who are beyond the 250<sup>th</sup> day of pregnancy are not routinely acceptable for aeromedical evacuation, but may be moved if determined necessary to the patient's mental and/or physical health by competent medical authority.

2. Patients with any of the following conditions require special consideration in selection for aeromedical evacuation, particularly in unpressurised aircraft:

- a. Respiratory compromise. Patients whose unaided vital capacity is less than 900 ml should not normally be moved by air without a mechanical ventilator.
- b. Cardiac failure or early post-myocardial infarction.
- c. Anaemia - Patients should not normally travel by air with a Hb level of less than 10 g/dL. Patients with a Hb of greater than 8 g/dl may

travel without problems in the absence of coexisting cardiovascular or respiratory disease. Patients who have developed an acute anaemia are more likely to experience side effects in an environment with a reduced oxygen partial pressure and therefore should have a Hb level of at least 10g/dl pre-flight. Not only will the patient not have had time to adapt, but there will also be limited reserves to cope with any further haemorrhage during flight. Individuals with chronic anaemia will usually tolerate a lower Hb level than if the anaemia is of acute onset. Hb estimation should be undertaken as near as possible to the proposed flight and certainly not more than 72 hours pre-flight. Monitoring of oxygen saturation will be required, with supplemental oxygen if necessary.

- d. Trapped gas within any of the body cavities, e.g. pneumothorax, bowel obstruction or acute sinusitis. Patients with gas introduction into the skull by trauma or other means. Post-laparotomy or thoracotomy patients should not normally be moved within 10 days of operations except in pressurised aircraft.
- e. Patients with neurological or psychiatric conditions require special consideration before being allowed to emplane which may include any condition that might prove suddenly incapacitating or acutely progressive, or that may involve dangerous or disruptive behavioural manifestations. Past psychiatric disease, excessive nervousness, flight phobias etc. must all be borne in mind. Prior to flight these patients should have been kept under observation for a period dependent on their condition to assess their suitability for nursing care during flight.
- f. Patients diagnosed with Decompression Illness shall be transported at sea level cabin altitude or as near sea level as possible.

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## CHAPTER 3 - CATEGORIZATION OF PATIENTS FOR AEROMEDICAL EVACUATION

### 3.1. CATEGORISATION OF PATIENTS

The system of categorising patients that is used for aeromedical evacuation provides the medical and movements staff responsible for coordinating the movement of patients with a simple means of assessing the urgency, medical support needs and space requirement of each casualty without a need to refer to detailed clinical information which may not be readily available. Indeed such medical information should be treated in strict confidence and a classification system can aid in this. Codes are allocated to patients for Priority, Dependency and Classification.

### 3.2. PRIORITY

Patients for aeromedical evacuation will be given appropriate degrees of priority so that, if aircraft space is limited, the more urgent patients may be evacuated before those whose conditions are less serious. Patients in the forward evacuation phase are prioritized using the T classification or the 9-liner report for AE. In the tactical and strategic evacuation phase they are prioritized using the P classification. The degrees of priority are:

- a. **Priority 1/URGENT.** Patients require immediate transfer for life, limb or function saving treatment or to prevent complication of serious illness or to avoid serious permanent disability. These patients require evacuation to a higher level of care as soon as possible (the recommended notice to move (NTM) for Priority 1/URGENT strategic aeromedical evacuation is < 12h).
- b. **Priority 2/PRIORITY.** Patients require transfer for further treatment but their injuries are not currently life threatening. These patients require specialized treatment not available locally and are liable to suffer unnecessary pain or disability unless evacuated with the least possible delay. The recommended NTM for Priority 2/Priority strategic aeromedical evacuation is < 24h.
- c. **Priority 3/ROUTINE.** Patients will require further medical care, but are able to accept greater delay than urgent or priority patients. Routine patients immediate treatment may be available locally but their prognosis would definitely benefit by evacuation on routine scheduled missions or their expected convalescence period exceeds the Theatre holding policy. MEDEVAC is generally required within 72 hours.

### 3.3. DEPENDENCY

The assessment of dependency recognises the need to move patients who have been stabilised but whose condition remains unstable, possibly requiring intensive support in flight. The degrees of dependency are:

- a. **Dependency 1 – High Dependency.** Patients who require intensive support during flight. For example, patients requiring ventilation, ICP-monitoring, ECMO, IABP, chest tubes, etc. They may be unconscious or under continuous analgo-sedation.
- b. **Dependency 2 – Medium Dependency.** Patients who, although not requiring intensive support, require regular, frequent monitoring and whose condition may deteriorate in flight. For example, patients who have a combination of oxygen administration, one or more intravenous infusions and multiple drains or catheters.
- c. **Dependency 3 – Low Dependency.** Patients whose condition is not expected to deteriorate during flight but who require nursing care of, for example, simple oxygen therapy, an intravenous infusion or a urinary catheter.
- d. **Dependency 4 - Minimal Dependency.** Patients who do not require nursing attention in flight but who might need assistance with mobility or bodily functions.

### 3.4. CLASSIFICATION

The classification defines the patient's requirement for space in the aircraft and for physical assistance. In addition it describes any requirement for the physical restraint or supervision of psychiatric patients.

- a. **Class 1 – Neuropsychiatric Patients:**
  - (1) **Class 1A – Severe Psychiatric Patients.** Patients who are frankly disturbed and inaccessible and require restraint, sedation and close supervision. A stretcher fit may be required for each Class 1A patient.
  - (2) **Class 1B – Psychiatric Patients of Intermediate Severity.** Patients who do not require restraint and are not, at the moment, mentally disturbed, but may react badly to air travel, or commit acts likely to endanger themselves or the safety of the aircraft and its occupants. These patients need close supervision in flight and may need sedation.

- (3) **Class 1C – Mild Psychiatric Patients.** Patients who are cooperative and have proved reliable under pre-flight observation.
- b. **Class 2 – Stretcher Patients (other than Psychiatric):**
  - (1) **Class 2A – Immobile Stretcher Patients.** Patients unable to move about of their own volition under any circumstances.
  - (2) **Class 2B – Mobile Stretcher Patients.** Patients able to move about of their own volition in an emergency.
- c. **Class 3 – Sitting Patients (other than Psychiatric):**
  - (1) **Class 3A –** Sitting patients, including handicapped persons, who in an emergency would require assistance to escape/egress.
  - (2) **Class 3B –** Sitting patients who would be able to escape/egress unassisted in an emergency.
- d. **Class 4 – Walking Patients.** Walking patients, other than psychiatric, who are physically able to travel unattended.

### **3.5. DOCUMENTATION**

1. Each patient will be tagged with a medical record in accordance with STANAG 2132/AMedP-8.1 – Documentation Relative To Initial Medical Treatment and Evacuation.
2. All appropriate medical documents pertaining to the patient will be placed in an envelope and accompany the patient to the medical facility at the final destination. The envelope will be marked with the patient's name, rank, serial number, nationality, organisation, date of departure and destination.
3. Manifests of patients carried on each aircraft engaged in tactical or strategic aeromedical evacuation will be prepared in accordance with STANAG 7213/ATP-3.3.4.1 – Tactics, Techniques and Procedures for NATO Air Movements; copies will be prepared for base operation, the originating aeromedical evacuation facility, each intermediate stop, the destination terminal and the medical facility at the final destination.

4. Whenever the operational situation permits, clinical information shall be forwarded to the AECC as far in advance of the evacuation as is practicable.



<b>CHAPTER 4 - AEROMEDICAL AIRCREW PROCEDURES</b>
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**4.1. COMPOSITION OF AEROMEDICAL CREWS**

1. Aeromedical crews will consist of flight surgeons, flight nurses and/or nursing attendants specially trained in aeromedical evacuation duties, supplemented where necessary by medical officers and other ancillary medical personnel. Aeromedical Crew Members are, whenever possible, to fly as constituted crews and are to be trained on all medically relevant aspects of the aircraft type on which they are to operate.

2. The recommended minimum scale for staffing aeromedical crews for Dependency 4 patients and excluding Class 4 patients who require no escorts is:

- a. 1-10 patients – 1 aeromedical crew member.
- b. 11-20 patients – 2 aeromedical crew members (if possible one should be a nurse).
- c. 21-40 patients – 3 aeromedical crew members (if possible at least one should be a nurse).
- d. 41-60 patients – 4 aeromedical crew members (if possible at least two should be nurses).

3. Additional requirements are as follows:

- a. For Dependency 1 patients, the aeromedical crew shall include:
  - (1) For 1 or 2 patients: a physician trained in intensive care medicine and aviation medicine.
  - (2) For 3 or 4 patients: a physician trained in intensive care medicine and an additional physician, at least one of whom has received training in aviation medicine.
  - (3) For each patient: a nurse trained in intensive care nursing.
  - (4) A technician (or CCAE nurse) competent to maintain aeromedical life support equipment.

- b. For Dependency 2 patients, the aeromedical crew shall include:
    - (1) A physician trained in aviation medicine.
    - (2) For up to 10 patients and for each additional 10 patients: a flight nurse and a nursing attendant.
  - c. For Dependency 3 patients the aeromedical crew shall include a flight nurse.
4. Additional trained medical personnel may be assigned when, in the opinion of the dispatching medical officer, the condition of any of the patients warrants this.

#### **4.2. AEROMEDICAL CREW TRAINING**

Ground instructions required on the special problems associated with in-flight clinical care and treatment; loading and unloading of patients; emergency procedures; and methods of documentation, etc. In addition, practical experience in the air is essential (see Chapter 6).

#### **4.3. AEROMEDICAL CREW EQUIPMENT**

Appropriate medical and general equipment and supplies adequate for the care of the number and types of patients transported will be available. In planning aeromedical equipment needs, provision should be made for the unexpected, e.g. delays, diversion or in-flight emergencies.

#### **4.4. BRIEFING OF PATIENTS**

A member of the aeromedical crew or an aircrew member must brief all patients, paying special attention to the following points:

- a. A number of walking patients will be detailed to assist with the evacuation of stretcher patients in any emergency.
- b. Safety belts and stretcher harnesses are to be properly fastened in accordance with orders in any emergency.
- c. Safety belts and harnesses are also to be correctly re-fastened immediately in any emergency.
- d. Smoking is to be restricted to the places and times authorised by the aircraft captain.

- e. The direct or indirect orders of the aircraft captain and the medical team are to be obeyed immediately at all times.

#### **4.5. EMERGENCY PROCEDURES IN FLIGHT**

All aeromedical crew members involved in the AE of patients will be thoroughly trained and experienced in the measures necessary for evacuating the aircraft in an emergency. These measures will include the following procedures appropriate to each type of aircraft:

- a. Consideration should be given to moving stretcher patients into passenger seats if the circumstances permit. All other stretcher patients should be properly secured and remain on their stretcher until after the aircraft comes to a complete halt.
- b. Instruct the patients on the proper position to assume in preparing for an emergency. Flight crews/aeromedical teams will ensure that seat safety harnesses have been tightened.
- c. After the aircraft has come to a complete halt, walking patients, with the exception of those designated to assist stretcher patients, will be the first to leave the aircraft.
- d. Free immobile stretcher patients from stretcher and assist them to leave the aircraft. Stretchers will not normally be removed from their fastenings in view of the limited time available to evacuate the aircraft.

#### **4.6. IN-FLIGHT FEEDING OF PATIENTS**

Provision will be made for supplying both normal and modified diets to patients during flight. The medical facility delivering the patient to the aircraft is to ensure that adequate food (including special diets where necessary) is available for all aeromedical flights to meet the needs of patients and which can be prepared within the cooking capabilities on board the aircraft.

#### **4.7. PERSONAL PROPERTY AND VALUABLES**

Personal property and valuables will be safeguarded as far as possible. Patients will not generally be permitted to transport firearms, ammunition, weapons, or any other article (e.g. aerosol containers or portable electronic equipment containing batteries) that could become a hazard during flight. These should be controlled in accordance with national procedures.

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<b>CHAPTER 5 - EQUIPMENT AND GENERAL PROCEDURES USED IN AEROMEDICAL EVACUATION</b>
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**5.1. AIRCRAFT EQUIPMENT**

1. Aeromedical aircraft stretchers and stretcher support systems shall meet the following requirements:
  - a. Suitable stretcher supports will be provided, for example rigid posts or webbing straps, that are light in weight and which may be easily stowed in the aircraft when the aircraft is used for other purposes.
  - b. The dimensions of stretchers and stretcher supports will be as detailed in STANAG 2040/AMedP-2.1 – Stretchers, Bearing Brackets and Attachment Supports, except that stretchers in aeromedical use may be supported other than by their feet.
  - c. A satisfactory safety belt or stretcher safety harness should be provided that will protect each stretcher patient against the accelerations likely to be encountered in flight; and those induced by turbulence, heavy landing or ditching.
  - d. The stretcher installation shall provide sufficient space to allow aeromedical personnel to care for each patient. Stretcher supports shall allow sufficient vertical tracking distance between stretchers to prevent injury to patients by overhead structures. Stretchers shall be as nearly horizontal as possible in flight.
  - e. The stretcher itself, the stretcher support and the stretcher harness system should be capable, while loaded with a 114kg human dummy, of supporting and restraining the dummy when exposed to short duration accelerations of up to +9Gz, -6Gz, -9Gx and ±6Gy.
2. The aircraft shall be provided with:
  - a. Adequate passenger compartment lighting and power outlets for the operation of electrical medical equipment.
  - b. A supply of oxygen of sufficient quantity to satisfy therapeutic and emergency requirements, either through the aircraft oxygen system or by suitable portable oxygen supplies.

## **5.2. AEROMEDICAL ELECTRICAL EQUIPMENT**

All electro-medical equipment used in aeromedical evacuation shall be tested for electromagnetic compatibility and is to be cleared by the relevant national authority for the aircraft on which it is to be used. Recommended minimum specifications of such equipment are at Annex A.

## **5.3. PRE-FLIGHT INSPECTION OF AEROMEDICAL EQUIPMENT**

For aircraft operating in the aeromedical evacuation role, the following equipment checks appropriate to the aircraft type will be carried out:

- a. Stretcher suspension straps, stanchions and clamps will be checked to ensure serviceability and proper security.
- b. All aeromedical evacuation equipment will be checked in order to ensure proper functioning. The equipment should be properly secured to withstand turbulent air conditions.
- c. The loading of patients, survival equipment, etc. will be carried out in accordance with safety precautions and existing instructions for the particular aircraft.
- d. Stretcher patients will be secured by means of safety harnesses.
- e. All other medical equipment in the aircraft will be checked and made secure.
- f. Immediately prior to take-off, the proper functioning of the cabin telephone and other communication devices will be checked.
- g. Oxygen outlets will be checked including their adaptability to therapeutic oxygen kits. The adequacy of oxygen supply will also be checked.

## **5.4. DISINFECTION OF AIRCRAFT AND MEDICAL EQUIPMENT**

The interior of the aircraft and such articles as cutlery, crockery, stretchers, blankets, sheets, medical equipment etc. will require disinfection after the carriage of patients with infectious conditions, including open pulmonary tuberculosis. Appropriate procedures are:

- a. General Aircraft Disinfection. When considered necessary by the competent medical authority in order to prevent dangerous exposure to other persons, aircraft interiors should be sprayed with an approved disinfectant, closed for at least an hour and then well ventilated.
- b. Cutlery and Crockery Disinfection. This should be done by immersing the articles in a suitable dilute disinfectant for 20 minutes prior to washing in the normal manner.
- c. Disinfection of Medical Equipment. Medical equipment shall be cleaned and disinfected, according to manufacturer guidelines, but if appropriate, sterilised. The consumable equipment is one time use only (disposable).
- d. Disinfection of Stretchers and Bedding. This should be done by normal washing and, where appropriate, by steam or hot air disinfection.

***NOTE:*** Other nationally approved disinfecting procedures may be used to supplement or replace any of the above procedures.

## **5.5. DISINSECTION OF AIRCRAFT**

Attention is drawn to the fact that disinsection of aircraft may also be a requirement under certain conditions. Guidance on disinsection is provided in AGARD-AG-340. In addition WHO International Health Regulations describe the methods and procedures recommended by the WHO.

## **5.6. GROUND EQUIPMENT**

1. **Unloading and Loading Apparatus.** Ramps or mechanised lifting platforms will be required to permit loading and unloading of patients from aircraft where a high clearance exists between the ground and the aircraft fuselage door and there is no built-in aircraft loading lift. Ramps should be covered as a weather protection for patients where loading or unloading cannot be done under cover (e.g. in a hangar).
2. **Cooling Apparatus.** Whenever possible, in areas where high shade temperatures are commonly encountered, cooling apparatus should be provided for controlling temperatures within the aircraft during the period when patients are inside and during loading and unloading.

3. **Heating Apparatus.** Whenever possible, in areas where very low temperatures are commonly encountered, heating apparatus should be provided for warming the interior of the aircraft during the period when patients are inside with the aircraft engines cut off and during loading and unloading.

#### **5.7. PROPERTY EXCHANGE**

Property exchange will be carried out where possible in accordance with STANAG 2128/A MedP-1.12 – Medical and Dental Supply Procedures. Equipment expended in the care and treatment of patients will be replenished using normal resupply procedure.

#### **5.8. SIGNALS PROCEDURE**

In an operational scenario routine signals procedures will be heavily used and may become overloaded. It is impossible to dictate the use of a specific system, but alternative methods of message transfer for aeromedical evacuation information must be considered. Whatever system is chosen, it may only be possible to send limited information; however, the minimum information required will be:

- a. Flight plans for aircraft will indicate:
  - (1) that the aircraft is on an aeromedical evacuation mission, or is carrying evacuation patients and the total number of patients;
  - (2) the highest medical priority of any patient aboard.
- b. The following additional information is essential and should be included in the flight plan and/or transmitted by the aeromedical evacuation facility at the point of departure to the AECC and the receiving medical facility when the military situation permits:
  - (1) Number of patients in the various classes (see Chapter 3).
  - (2) Number of female patients.
  - (3) Essential clinical information on seriously and very seriously ill patients.
  - (4) Essential clinical information on patients requiring treatment at special centres, e.g. burns, maxillofacial or thoracic injuries.



<b>CHAPTER 6 - AEROMEDICAL EVACUATION TRAINING</b>
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**6.1. CONTENT**

The following sequence of lectures, audio-visual presentations and demonstrations is given as a guide for the aeromedical evacuation training of nursing and medical personnel as required:

- a. Lecture on history of aeromedical evacuation, the scope of current air routes, aeromedical staging units and the advantages and disadvantages of aeromedical evacuation.
- b. Lecture on the effects of flight on health and diseases (to include stresses of flight, clinical criteria and decisions on fitness to fly).
- c. Lecture on Priorities, Dependencies and Classification.
- d. Demonstration of oxygen equipment and ancillary equipment.
- e. Lecture on the organisation of aeromedical evacuation in peace and in war.
- f. Demonstration of types of aircraft currently used for aeromedical evacuation – to include aircraft configuration, methods of loading and unloading, oxygen points, harnesses and emergency equipment.
- g. Lecture on the documentation in current use e.g. medical, movements, customs and health control.
- h. Lecture on the duties of the various aeromedical crew members and the air load master.
- i. Lecture on aviation physiology to include a practical demonstration of hypoxia where possible, using a hyperbaric chamber or reduced oxygen breathing devices.
- j. Audio-visual presentation on aeromedical evacuation.
- k. Demonstration of types of stretcher, stanchions, airworthy medical equipment, documentation and tags, (including dangerous air cargo procedures and restraining apparatus etc.).

- l. Demonstration of and participation in drills for ditching, crash landing and survival (to include wet dinghy drills).
- m. Lecture on medical as well as aircraft emergency procedures in flight, including briefing of patients (as detailed in Chapter 4).
- n. Lecture by aeromedical crew member, including demonstration of in-flight medical documentation.
- o. Lecture on aeromedical evacuation of patients requiring specialist medical input such as those with infectious disease, spinal injury etc.
- p. Patient interview and assessment.
- q. Flight familiarisation.
- r. Demonstration of loading, unloading and reception of patients.
- s. Further training, to include practical experience and trainee assessment on aeromedical evacuation flights, under the supervision of an experienced aeromedical evacuation crew.
- t. Medical and Nursing Officers should be trained in Immediate life support and advanced life support skills. Due to the mixed Population-at-Risk profile all providers should have some basic paediatric emergency medical knowledge, but paediatric life support training should be undertaken by those responsible for aeromedical evacuation of children.
- u. Lecture on safety procedures: safety on the flight line and during flight, crew resource management and in-flight procedures, and aircrew restrictions (crew duty times, alcohol, medication etc).

<b>CHAPTER 7 - MANAGEMENT OF CHEMICALLY CONTAMINATED OR HIGHLY INFECTIOUS CASUALTIES</b>
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**7.1. CHEMICALLY CONTAMINATED CASUALTIES**

1. Patients will normally not be evacuated by air in a chemically contaminated state. Decontamination is accomplished at the first point of care and not expected as part of aeromedical evacuation crew duties.
2. If contamination status cannot be fully ascertained or there is a fear of the patient 'off gassing' in flight, a risk assessment should be undertaken to determine the necessity of evacuating the patient by air; potential hazards to other passengers or patients, to aircrew and to medical personnel and the impact of potentially removing an airframe from service to be decontaminated, should all be taken into account.
3. Once the risks have been assessed and a decision has been made to evacuate a potentially contaminated casualty by air, the risk must then be mitigated to the greatest extent possible. Such protective measures could include individual protective equipment and casualty barrier devices (bags or wraps).

**7.2. PATIENTS WITH HIGHLY COMMUNICABLE INFECTIOUS DISEASES**

1. Every patient being considered for evacuation by air should be assessed for infectious potential and handled in accordance with standard infectious disease precautions (such as: body waste cleanup, containment and disposal; hand-washing; barriers and protective clothing). However, depending on the threat situation, there are special circumstances that require more extraordinary measures to ensure not only patient and medical crew welfare and protection, but also force protection and population health.
2. To assist those responsible for aeromedical evacuation of casualties in the assessment of highly communicable infectious diseases that may present special considerations for aeromedical evacuation, Annexes B and C may be helpful in determining the level of containment required when evacuating highly infectious patients.
3. When, by whatever method, suspicion is high that the patient(s) being considered for aeromedical evacuation might have a highly communicable infectious disease, there are extraordinary issues to be considered and, if evacuated by air, special measures to be taken. If it is determined that aeromedical evacuation is desirable to provide care for the patient, other issues to be considered are as follows:

- a. Risk to other patients, aircrew and medical crew (consider immune status and suitability of chemoprophylaxis for the tasked crew).
  - b. Capability to properly isolate and safely provide care.
  - c. Risk to population at destination, along planned flight legs and possible emergency diversions (disease suspected vs. population immunity; will require infectious disease and preventive medicine consultation).
  - d. International health regulations.
  - e. Impact on mission (dedication of significant resources which detract from other medical mission considerations).
  - f. Command/control and reporting procedures.
  - g. Attendance or accompaniment by infectious disease experts.
  - h. Notification and suitability of the receiving facility to treat highly communicable infectious diseases.
  - i. Numbers of patients suspected of being infected.
  - j. Contact tracing should a highly communicable disease emerge after evacuation.
4. Decision to evacuate patient(s) suspicious for or confirmed to have a highly communicable infectious disease may be made on other than medical reasons. The issues mentioned here allow the responsible medical team to provide more complete advice to commanders.
5. The use of a special air transportable isolator for highly infectious disease patients could be considered for nations possessing such equipment. However, the use of such equipment requires a large number of personnel and this form of aeromedical evacuation can only be used infrequently and for the occasional patient. It cannot be seen as a routine means of aeromedical evacuation.

<p style="text-align: center;"><b>CHAPTER 8 - AEROMEDICAL EVACUATION USING CIVILIAN OR MIXED (CIVILIAN/MILITARY) ASSETS IN MILITARY MASS CASUALTY SCENARIOS</b></p>
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### **8.1. AIM**

The aim of this Chapter is to explain and describe how a military-civilian AE system may be used within an ongoing NATO operation to handle military mass casualty situations.

### **8.2. CONSIDERATIONS**

1. Aeromedical evacuation is crucial during many types of NATO operations. Strategic AE function is a national responsibility for each troop-contributing nation (TCN), therefore, each TCN has to secure capacity and capability of AE, civilian or military, for mass casualty incidents. TCNs may cooperate to establish this function on a bi- or multi-lateral level.
2. Civil assets may be used to augment military AE capability in five ways:
  - a. Civil aircraft assets with military medical crew.
  - b. Civil aircraft assets with civilian medical crew.
  - c. Civil aircraft assets with mixed civilian-military medical crew.
  - d. Military aircraft assets with civilian medical crew.
  - e. Military aircraft assets with mixed civilian-military medical crew.
3. Chapter 3 describes the various levels of dependency for patients being aeromedically evacuated. While some civil capability may exist for all patient categories, in an effort to decompress military medical capability on the ground, and to facilitate patient regulation, the following should be considered:
  - a. Patients categorized as Dependency 1 or 2 require assets with intensive care capability. This is best met using dedicated and established AE systems, preferably military.
  - b. Patients assessed as Dependency 3 or 4 may be aeromedically evacuated using civil assets with medical crew and equipment complying with the requirements described in Chapters 4 and 5 and as determined by the needs of the patients.

4. When contracting civil assets for aeromedical evacuation, the following operational and medical issues must be considered:

- a. The contract must ensure that contracted capabilities meet the requirements of this publication. Specifically, electro-medical equipment used in AE must be cleared by the relevant national authority for the aircraft on which it is used.
- b. National legal/medico-legal responsibilities and liabilities must be established. Specifically, the contractor must be able to verify the quality and level of training of medical crews.
- c. Responsibility for providing the medical crews and aeromedical equipment.
- d. Standard Operating Procedures for initiating, planning and executing the AE operations.
- e. Location of the APOE(s) and APOD(s).
- f. Estimated number of AE patients based on population at risk and available capabilities.
- g. Procedures for raising printed documentation in accordance with STANAG 2132/AMedP-8.1 - Documentation Relative to Initial Medical Treatment and Evacuation.
- h. Routines for briefing medical crew on patient history and status.
- i. Responsibilities of military and civil authorities at points of embarkation and disembarkation.

5. During an AE operation, the treatment of patients should be secured at the appropriate level depending on patient history and status. It is the responsibility of the physicians at the sending medical facility in coordination with the validating flight surgeon at the Aeromedical Evacuation Coordination Centre to identify the required level of medical care during transfer. The medical care during the AE operation is provided by the AE crew – it is, therefore, crucial that patients' medical needs are clearly stated and considered when deciding what type of AE assets are to be used.

<p style="text-align: center;"><b>ANNEX A RECOMMENDED SPECIFICATIONS FOR ELECTROMEDICAL EQUIPMENT</b></p>
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**A.1. Alarms**

- a. **Audio.** All audio equipment should be capable of generating a variable sound level up to 110dB.
- b. **Visual.** All indications of normal function should be displayed in GREEN; all abnormal functions and alarms in RED.
- c. **Commonality.** When equipment modules are grouped together, all resultant audio signals should be ultimately generated from a common outlet to limit confusion and noise levels.

**A.2. Visual Displays.** All visual displays should be visible both in bright sunlight and total darkness.

**A.3. Power Supply**

- a. **Mains.** All equipment should be able to work on 220/240 or 110/115 volt AC and 12/28 volt DC supplies. Current Converters should be cleared for use on the aircraft carrying the equipment.
- b. **Battery.** All equipment should have internal batteries which are either small enough to be readily transported and exchanged when necessary, or large enough to provide power for full-specification function for at least 8 hours.
- c. **Failure.** All equipment should have automatic battery-powered function in the events of mains failure. Switch over should be signaled.

**A.4. Temperature.** All equipment should be capable of operating in temperatures ranging – 10°C to +50°C.

**A.5. Humidity.** All equipment should be capable of operating in conditions of 0-100% humidity.

**A.6. RS232/USB Interface.** All equipment should have an RS232 or USB interface for ultimate automatic data collection.

**A.7. Vibration and Shock.** All equipment should pass vibration and shock tests to a standard laid down by appropriate authorities.

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**ANNEX B CLINICAL SIGNS SUGGESTIVE OF A HIGHLY  
COMMUNICABLE INFECTIOUS DISEASE**

[Note: High-Level Containment Care is addressed in Annex C and would likely be warranted in only a small minority of cases of a highly-communicable disease.]

B.1. Highly-communicable infectious disease may be suspected in patients with pyrexia (an oral temperature greater than 38.5°C) and at least one of the following:

- a. Acute Respiratory Syndrome – rapid progression of symptoms over a period of less than three days plus two or more of the following:
  - (1) Cough
  - (2) Odynophagia/pharyngodynia
  - (3) Dyspnea/tachypnea
  - (4) Green or rust-coloured sputum
  - (5) Haemoptysis
  - (6) Chest pain
  - (7) Pneumonic infiltrates or mediastinal widening
  
- b. Hemorrhagic Syndrome:
  - (1) Bleeding from gingiva or other mucous membranes
  - (2) Palatal petechiae
  - (3) Purpura
  - (4) Conjunctival haemorrhage
  - (5) Melena, haematemesis, haemoptysis, epistaxis
  
- c. Lymphadenopathy Syndrome:
  - (1) Tender or painful lymph nodes
  - (2) Unusually coloured or draining lymph nodes

- d. Dermatologic Syndrome:
  - (1) Centrifugal Rash (petechial, purpurial, vesicular)
  - (2) Necrotic Skin Lesions
  
- e. Neurologic Syndrome - malaise plus at least one of the following:
  - (1) Confusion
  - (2) Disorientation
  - (3) Delirium
  - (4) CSF leukocytosis
  - (5) Meningoencephalitic signs or symptoms
  
- f. Jaundice
  
- g. Sepsis Syndrome:
  - (1) Hypotension
  - (2) Organ failure

B.2. Other factors which might lend support to a diagnosis of a highly-communicable infectious disease include the following:

- a. History of contact with an individual known to have a highly-communicable infectious disease
  
- b. History of insect bites
  
- c. History of exposure to animals, sewage, or body fluids
  
- d. Other contextual factors such as country visited and the time of the year.
  
- e. In a CBRN environment, contaminated patients and those infected with contagious biological agents.

<b>ANNEX C HIGH-LEVEL CONTAINMENT CARE</b>
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C.1 Confirmed or suspected communicable diseases for which high-level containment may be warranted include:

- a. Apparently-contagious diseases of unknown etiology with a potential for high morbidity and mortality.
- b. Those highly-contagious diseases which WHO has determined constitute a “Public Health Emergency of International Concern<sup>2</sup>”:
  - (1) Smallpox
  - (2) Wild-type Polio
  - (3) Human Influenza caused by a novel serotype
  - (4) SARS
- c. Those contagious diseases whose etiologic agents require handling under BSL-4 conditions in the laboratory<sup>3</sup>. In addition to Smallpox, these include:
  - (1) Lassa
  - (2) New World arenaviral VHFs (Guanarito, Junin, Machupo, Sabia)
  - (3) Filoviral VHFs (Ebola, Marburg)
  - (4) Certain flaviviral diseases with a haemorrhagic diathesis
  - (5) Omsk VHF
  - (6) Kyasanur Forest Disease
  - (7) Congo-Crimean Haemorrhagic Fever

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<sup>2</sup> World Health Organization. International Health Regulations, 2005. Annex 2.

<sup>3</sup> U.S. Department of Health and Human Services. Biosafety in Microbiological and Biomedical Laboratories, 5<sup>th</sup> Edition, 2009.

C.2. It is acknowledged that extraordinary measures may occasionally need to be employed for political reasons rather than for strictly medical considerations. In this regard, some nations may choose to utilize high-level containment transport for the movement of patients with other conditions that typically would not require high-level containment constituting a WHO public health crisis of international concern (PHEIC), specifically:

- a. Cholera
- b. Pneumonic Plague
- c. Yellow Fever
- d. Dengue
- e. West Nile Fever
- f. Rift Valley Fever
- g. Meningococcal disease
- h. Others (e.g. XDR-TB)

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**AAMedP-1.1(B)(1)**