

Appendix 3

Airport Medical Services

GENERAL

1. Adequate medical services and supplies should be available at an airport. Provision of medical services will generally not present great difficulties at a large airport or airports near a large city, as the human resources and material will normally be available. It is necessary to develop the co-ordination with the emergency medical assistance system in the region. The medical co-ordinator appointed to the airport should be responsible for the provision and checking of medical supplies.

2. Provision of medical services may present some difficulties at small airports not located near populated areas. These airports, however, should have available emergency medical services to provide adequate medical care in the event of an aircraft accident, taking into account the largest aircraft using the airport.

3. A medical inventory of the airport community area should be part of the airport emergency plan. Consideration should be given to:

- a) human resources on and off the airport, i.e. doctors, teams qualified in first aid, stretcher bearers and nurses; and
- b) medical equipment and services on and off the airport, i.e. hospitals and ambulances.

4. At airports where the above resources are only available from areas beyond the immediate airport community, the airport emergency plan should be integrated with wider emergency plans to obtain the necessary response, possibly using helicopters to transport medical services and equipment to the crash site.

EMERGENCY MEDICAL SERVICES AT AIRPORTS

5. *Basis for recommendations.* Emergency medical services at airports are based on the concept that medical

personnel and a medical facility commensurate with the size of the airport have been established at the airport and that mutual aid emergency agreements have been developed. Sufficient medical supplies should be maintained at the airport facility to deal with routine medical emergencies which normally occur at the airport (on-the-job injuries, heart attacks, etc.) plus possible aircraft accidents.

6. Emergency medical training of airport personnel. All personnel assigned to rescue duties and "public-contact" airport employees should be given first aid and CPR (cardiopulmonary resuscitation) training.

7. Rescue and fire fighting personnel should have the ability to stabilize seriously injured casualties. At least two full-time members per shift of the airport rescue and fire fighting service or other on-airport personnel should be trained to an emergency medical treatment level as determined by the local medical authority. In addition, it is recommended that as many rescue and fire fighting personnel as is practicable receive training to meet minimum standards of medical proficiency and preferably to the level of personnel highly qualified in first aid or the equivalent. Accordingly, they should have sufficient medical equipment at their immediate disposal to initiate stabilization until full medical services are available at the site or until transportation of casualties to adequate medical facilities is provided.

8. As many airport rescue and fire fighting personnel as practicable also should be trained in CPR (cardiopulmonary resuscitation) as taught by the appropriate medical authority. Periodic exercises and drills in CPR techniques are mandatory to maintain proficiency.

9. The everyday medical problems at an airport can serve to promote and ensure an adequate level of medical proficiency of airport-based emergency personnel. It should be noted, however, that proficiency in emergency medical techniques can be maintained only through constant practical application. Unless operations include

providing advanced life-support systems on a day-to-day basis, proficiency will decline or disappear.

10. Airports may enlist volunteers from airport employees other than rescue and fire fighting personnel to provide an immediate response to assist casualties resulting from emergencies. Volunteers should be trained by accredited agencies in first aid and rescue response duties. In case of an emergency, they should initially be under the supervision of the first commander at the scene, i.e. the chief fire officer, until the arrival of the medical coordinator. Each appropriate authority must address the issues of compensation and liability.

Table 3-1. Estimated maximum number of casualties at an aircraft accident at an airport

| Aircraft occupants | Number of casualties | 20 per cent casualties Immediate care Priority I | 30 per cent casualties Delayed care Priority II | 50 per cent casualties Minor care Priority III |
|--------------------|----------------------|--|---|--|
| 500 | 375 | 75 | 113 | 187 |
| 450 | 338 | 68 | 101 | 169 |
| 400 | 300 | 60 | 90 | 150 |
| 350 | 263 | 53 | 79 | 131 |
| 300 | 225 | 45 | 68 | 112 |
| 250 | 188 | 38 | 56 | 94 |
| 200 | 150 | 30 | 45 | 75 |
| 150 | 113 | 23 | 34 | 56 |
| 100 | 75 | 15 | 23 | 37 |
| 50 | 38 | 8 | 11 | 19 |

These figures are based on the assumption that the maximum number of surviving casualties at an aircraft accident occurring on or in the vicinity of an airport is estimated to be about 75 per cent of the aircraft occupants.

11. Emergency medical supplies and equipment. The airport authority should arrange to have sufficient medical supplies, available on or in the vicinity of the airport, to treat the passenger and crew capacity of the largest aircraft normally using the airport. Experience has shown, however, that more than one aircraft can be involved in an aircraft accident. Consequently, medical supplies to handle this possibility should be considered. The type and quantity of such supplies should be determined by the principal medical authority for the airport using the statistical information given in Table 3-1 of this Appendix.

12. Statistical data collected from aircraft accidents indicates that about 75 per cent of the aircraft occupants are expected to be surviving casualties. It can be expected that requirements for care of these will be distributed as follows:

- 20 per cent — Immediate care (Red — Priority I)
- 30 per cent — Delayed care (Yellow — Priority II)
- 50 per cent — Minor care (Green — Priority III)

A table of the estimated maximum number of casualties resulting from an aircraft accident occurring at an airport is given in Table 3-1 of this Appendix.

13. The airport should have available stretchers, blankets, backboards and/or immobilizing mattresses, preferably stored on a suitable vehicle (e.g. trailer) which can be transported to the accident site. Blankets are needed to alleviate casualties' exposure to shock and possible adverse weather conditions. Since trauma victims in an aircraft accident sometimes sustain severe spinal injuries, backboards and cervical collars should be used when removing such casualties from the aircraft in order to minimize the possibility of further spinal injury. The backboards should be of a type designed to fit through access ways and aisles of commercial and business aircraft. They should have restraining straps available so that the patient can be secured to the board. A cleat should be attached to the underside of the backboard to facilitate lifting by carrying personnel (See Figures A3-1A and A3-1B).

14. Sufficient emergency oxygen and respiratory equipment should be available to treat smoke inhalation victims.

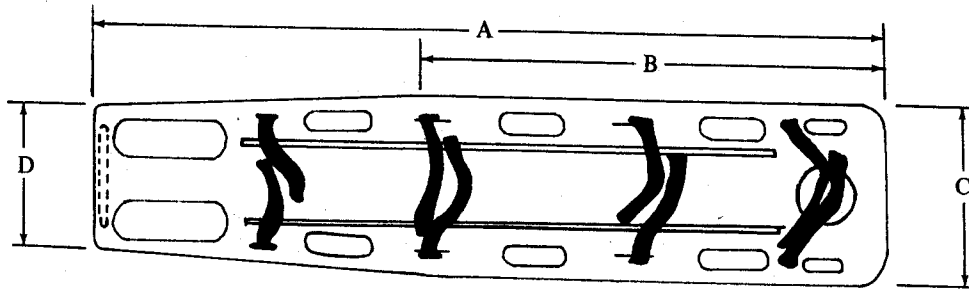
15. Since the majority of non-accident related medical emergencies at airports involve coronary difficulties, advanced life support systems should be readily available.

16. Mobile emergency hospitals or inflatable tents (See Figure A3-2) or shelters can be used for on-site treatment of immediate care (Priority I — Red) and delayed care (Priority II — Yellow) casualties. These units should be readily available for rapid response. The casualties can be treated at the scene, stabilized and be available for transportation to the appropriate hospital.

17. A resuscitation type ambulance can be used as an ideal shelter for an immediate care (Priority I — Red) casualty.

18. Inflatable tents should have adequate heating and lighting when possible. A large tent can normally accommodate about ten (10) serious cases and can be carried on a large all-purpose vehicle along with other necessary medical equipment.

19. To cope with an emergency involving a large aircraft, it is recommended that the general emergency medical supplies and equipment described in List 3-1 be available at the airport or be available from outside sources. List 3-1 has been prepared to cope with the largest type of aircraft at present being used for commercial air

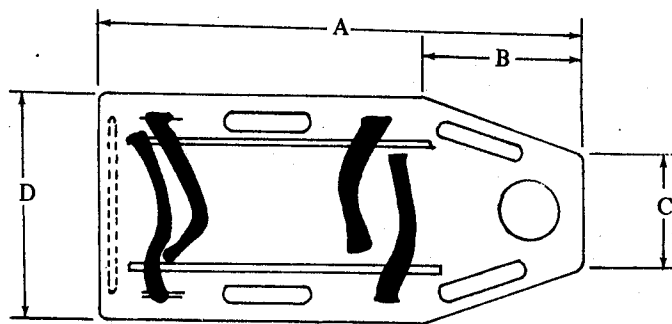


- A — 1.90 m
- B — 1.10 m
- C — 0.46 m
- D — 0.25 m

Thickness: 19 mm plywood
 Head hole: 14 cm diameter
 Hand holes: 25 cm × 5 cm
 Foot holes: 25 cm × 7.5 cm

Note.— 2.5 cm cleats should be placed longitudinally on the under side of the backboard to facilitate lifting.

Figure A3-1A. Long backboard



- A — 0.91 m
- B — 0.30 m
- C — 0.20 m
- D — 0.41 m

Thickness: 16 mm plywood
 Head hole: 11.4 cm diameter
 Hand holes: 15 cm × 3.8 cm

Note.— 2.5 cm cleats should be placed longitudinally on the under side of the backboard to facilitate lifting.

Figure A3-1B. Short backboard

transport operations, i.e. B747, DC-10, Airbus. If only operations by smaller aircraft are planned for the foreseeable future, the specified medical supplies and equipment should be adjusted to comply with reasonable requirements for the largest aircraft expected to operate at the airport.

20. The following material describes some of the items included in List 3-1:

Immobilizing mattresses (also called vacuum mattresses): This apparatus consists of a plastic bag designed like a mattress and filled with very small balls. An aspirator (mechanical or other) is used to take out the air so that the mattress is crushed by atmospheric pressure and becomes as rigid as plaster. A human body, partly enveloped before compressing the mattress, is completely wrapped. Head, limbs and backbone thus become immobilized, allowing any type of transportation through the use of lateral rope loops. The apparatus is permeable to x-rays. Although the dimensions are variable, its length varies generally between 1.80 and 1.90 m and its width between 0.80 and 0.90 m.

Backboards. These are classified as long and short backboards. The approximate dimensions for a long backboard are shown in Figure A3-1A. Although a backboard of 1.90 m is shown, some backboards of 1.83 m length should be available to manoeuvre through the smallest aircraft emergency exits of 51 cm wide and 91.5 cm high. A 7.5 cm wide velcro retaining strap is normally required for legs, hips, upper torso and head.

The appropriate dimensions for a short backboard are shown in Figure A3-1B. A 7.5 cm wide velcro retaining strap is normally required for lower and upper torso.

List 3-1.— General emergency supplies and equipment

| Quantity | Description |
|----------|--|
| 500 | triage labels |
| 100 | stretchers, adaptable to the most commonly used ambulances |
| 10 | immobilizing mattresses for backbone fractures |
| 10 | backboards for backbone fractures |
| 50 | splints, either conventional or inflatable, for the various types of fractures |

| | |
|---------|---|
| 50 | first-aid kits, each containing a set of 10 tags, haemostatic pads, tourniquets, respiratory tubes, scissors, dressings, sterile burn packs |
| 20 | resuscitation chests containing material for on-site intubation, infusion and oxygenation for about 20 casualties (See Figure A3-2) |
| 2 or 3 | electrocardiographic or electrocardioscopic apparatuses |
| 2 or 3 | manual or mechanical respirators |
| 10 | intravenous infusion packs (normal saline or haemacell) with giving sets |
| 2 or 3 | suction devices |
| 2 | entonox analgesic cylinders |
| 300-500 | plastic bags or coffins for the deceased |

21. *Emergency medical communication system.* Communications is a primary requisite of an airport emergency medical plan. The airport medical service communication system should ensure adequate communication during emergencies to disseminate warning information and obtain support operations. Without communications the hospital cannot know the number and type of casualties it will be receiving, ambulances cannot be directed to the facilities most capable of rendering the needed care, supplies available from outside sources cannot be called for, and medical personnel cannot be directed to the point where they are needed most.

22. The participating hospitals should have the capability of communicating with one another by means of a two-way communication network. Ideally, each hospital should have the capability of either calling other individual hospitals or, if the occasion arises, calling all other hospitals simultaneously. This capability is invaluable for hospitals experiencing an emergency such as a requirement for a certain blood type or an item of equipment in short supply. It is also recommended that the medical coordinator be able to communicate with participating hospitals directly.

23. *Emergency medical transportation facilities.* The dispatch of casualties to hospitals from the accident site should take into consideration the hospital(s) medical personnel on staff, medical specialties and beds readily available. Ideally, each airport should have available at

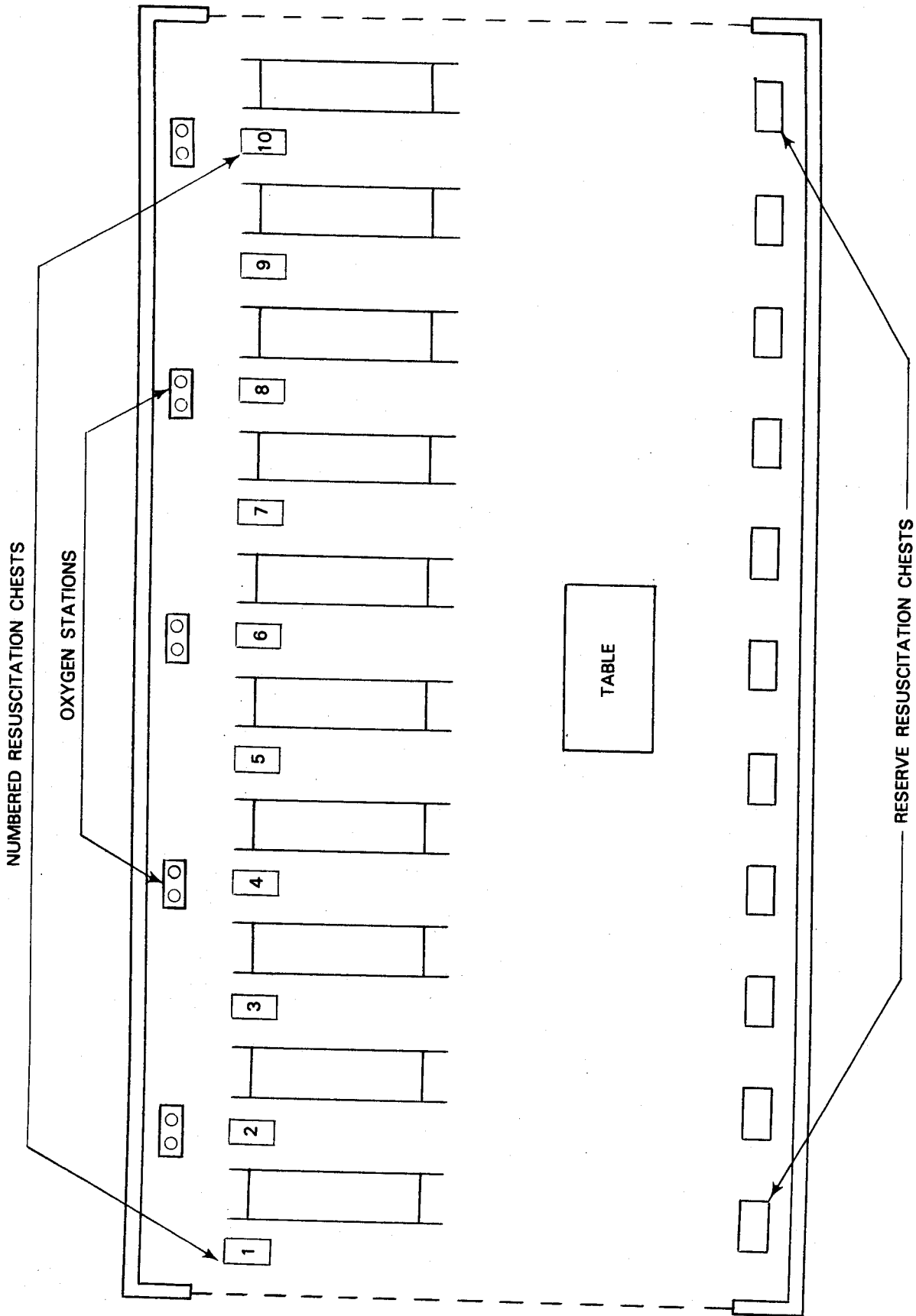


Figure A3-2. Schema of an inflatable tent

least one on-call ambulance for routine medical emergencies. Written agreements with off-airport based ambulances should be prepared to provide for emergency transportation services.

24. Airborne transportation equipment, i.e. helicopters and fixed wing aircraft, should be considered for emergency evacuation or for transport of medical services and equipment from hospitals to the accident site.

25. Since it may be necessary to transport many casualties to appropriate off-airport medical facilities, ambulances arriving at the scene should report to the rendezvous point or staging area and then to the designated transportation officer. This officer will be responsible for ascertaining the number of casualties who will need transportation, the number and type of ambulance units necessary, and the availability and capacity of each medical facility receiving casualties. In the event of a multi-casualty accident, the transportation officer (or members of the team) will also supervise the actual loading, recording of names and injuries of casualties, and routing of the individual vehicles and casualties to hospitals.

26. In major emergency situations, other means of transportation may be substituted for ambulances. Vans, buses, automobiles, station wagons or other suitable airport vehicles may be used. Immediate transportation for moving of the uninjured or apparently uninjured to a designated holding area should be available.

27. A grid map (with date of latest revision) of the airport and surrounding area should be provided for all rescue vehicles. All medical facilities should be depicted prominently on the grid map (See Chapter 7 — Grid Map).

AIRPORT MEDICAL CARE FACILITIES (MEDICAL CLINIC AND/OR FIRST-AID ROOM)

28. General factors influencing need. There are many general factors which influence the need for an airport first-aid room or an airport medical clinic. Factors to be taken into consideration include:

- a) the number of passengers served annually and the number of employees based on the airport;
- b) the industrial activity on the airport property and in the surrounding community;
- c) the distance from adequate medical facilities; and
- d) mutual aid medical services agreements.

29. Generally, it may be recommended that an airport medical clinic be available when the airport employees number 1 000 or more and that a first-aid room be available at every airport. The airport medical care or first-aid room personnel and facilities should be integrated with the airport emergency plan.

30. The airport medical clinic, in addition to providing emergency medical care to the airport population, may extend emergency care to communities surrounding the airport, if these communities have no emergency facilities of their own.

31. The airport medical clinic may be included in the community emergency services organization and planning. In the event of a large-scale non-airport local emergency, the airport medical clinic may function as the co-ordination site for direction of incoming medical assistance.

32. *Location of airport medical care facilities.* The facilities should be readily accessible to the airport terminal building, to the general public and to emergency transportation equipment (i.e. ambulances, helicopters, etc.). Site selection should avoid the problem of having to move injured persons through congested areas of the airport terminal building, while providing access to the facility by emergency vehicles by a route that as far as is feasible can bypass normal public access roadways to and from the airport. This suggests that the medical care facility be located so that access can be gained from the air side of the airport terminal building as this provides control over unauthorized vehicles interfering with emergency equipment.

33. *Airport medical care facility personnel.* The number of trained personnel and degree of expertise needed by each individual will depend on the particular airport's requirements. The staff of the airport medical clinic should form the nucleus for the medical services planning for the airport emergency plan (and be responsible for implementation of the medical portion of the plan). It is recommended that the airport first-aid room be staffed with at least highly qualified first-aid personnel.

34. In general it is recommended that during the principal hours of airport activity at least one person trained to deal with the following be on duty:

- a) cardiopulmonary resuscitation (CPR);
- b) bleeding from a traumatic source;
- c) Heimlich manoeuvre (choking);

- d) fractures and splinting;
- e) burns;
- f) shock;
- g) emergency childbirth and immediate care of newborn, including prematures;
- h) common medical conditions which may influence the outcome of injury (allergies, high blood pressure, diabetes, pace-maker, etc.);
- i) basic measures for treatment and protection subsequent to spills or leaks of radioactive materials, toxic, or poisonous substances;
- j) treatment of emotionally disturbed persons;
- k) recognition and first aid for poisons, bites, and anaphylactic shock; and
- l) transportation techniques for injured persons.

This person should have authority to order hospitalization if necessary and to arrange any needed transportation.

35. The airport authority should obtain the advice and direction of a consulting emergency medical care physician as to the allotment and design of equipment for the first-aid room commensurate with the anticipated needs of the particular airport.

36. The airport medical clinic equipment and the medical supplies have to be determined by the physician or the group of physicians in charge of the clinic. It should be remembered that responding to an aircraft emergency may be the main problem.

37. The airport medical care facility should be adequately equipped to handle cardiac arrest and other types of injuries and illnesses associated with industrial medicine. If drugs are maintained, provision should be made to ensure full security.

38. Sufficient emergency oxygen and respiratory equipment should be available to treat smoke inhalation victims.

39. Since the majority of non-accident related medical emergencies at airports involve coronary problems, advance life support systems including oxygen, oxygen regulators, and other elements for cardiopulmonary care should be readily available. In addition, first-aid kits

(containing drugs, a wide selection of bandages and splints, blood transfusion equipment, and burn and maternity kits), chains, ropes, crow-bars, and metal cutters should be available.

AIRPORTS WITHOUT A MEDICAL CARE FACILITY

40. At airports without a medical care facility (medical clinic or first-aid room), the airport authority should make arrangements to have available sufficient personnel trained in advanced first aid to cover all active hours of airport operation. Equipment for first aid work at these airports should consist, at minimum, of an emergency medical care bag. This bag should be readily available to be carried on a designated airport emergency vehicle and should contain at least:

- one plastic sheet (1.80 m x 1.80 m) with four spikes;
- seven haemostats (one package of three, one package of four);
- two field dressings (one 45 cm x 56 cm, one 56 cm x 91 cm);
- ten abdominal pads (five packages of two);
- forty 10 cm x 10 cm gauze pads (four packages of ten);
- two tourniquets;
- one artificial airway;
- three disposable airways (one each No. 2, No. 4, No 5);
- one bulb syringe with two catheters (No. 12, No. 14 FR);
- two large bandage scissors;
- twenty disposable syringes with No. 25 GA 1.6 cm needle;
- twelve ace bandages (two 15 cm, four 7.5 cm, six 5 cm);
- twelve alcohol sponge packages;
- four rolls of gauze bandage (two 7.5 cm, two 5 cm);
- two rolls of adhesive tape;
- four vaseline gauze dressings (15 cm x 91 cm);
- box of 100 band-aids;
- one blood pressure cuff and gauge;
- two clipboards (22 cm x 28 cm);
- six pencils;
- sufficient supply of casualty identification tags (see Appendix 8);
- one set of inflatable splints;
- one resuscitube;
- one short spine board;
- one flashlight;
- two cervical collars;
- one bite-stick wedge;
- one disposable obstetric kit; and
- one immobilizing mattress.