



Academy of Medicine  
of Malaysia



College of  
Anaesthesiologists, AMM



College of  
Emergency Physicians, AMM



Malaysian Society  
of Anaesthesiologists



Ministry of Health  
Malaysia



**RECOMMENDATIONS OF  
MINIMUM STANDARDS FOR  
INTER-FACILITY  
TRANSPORT OF THE  
CRITICALLY ILL PATIENTS**

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MINIMUM STANDARDS FOR INTER-FACILITY  
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# CONTENTS

FOREWORD	ii
PREFACE	iv
WRITING COMMITTEE	v
REVIEW PANEL	vi
1. INTRODUCTION	1
2. ADMINISTRATIVE RESPONSIBILITIES	1
3. PROCEDURES AND PROTOCOLS	2 – 3
Decision Making	
Initiation and Response	
Coordination and Communication	
Responsibility	
Documentation	
4. STAFFING	4
5. TRAINING	4
6. MODE OF TRANSPORTATION FOR INTER-FACILITY TRANSPORT	5
Consideration on the Mode of Transportation	
Transport Vehicle Requirements	
7. EQUIPMENT	6
Equipment Selection	
Equipment Handling During Transfer	
8. PHARMACOLOGICAL AGENTS	7
9. MONITORING	8
10. PRE-DEPARTURE PROCEDURES	8
11. PATIENT PACKAGING AND LOADING	9
12. CARE DURING TRANSPORT	10
13. ARRIVAL PROCEDURES	10
14. SPECIAL SITUATIONS	10
REFERENCES	11
APPENDIX 1	12 – 13

## FOREWORD

I would like to take this opportunity to thank the College of Anaesthesiologists and the College of Emergency Physicians, Academy of Medicine of Malaysia, as well as the Malaysian Society of Anaesthesiologists and the Malaysian Society of Intensive Care, for inviting me to write a foreword for RECOMMENDATIONS OF MINIMUM STANDARDS FOR INTER-FACILITY TRANSPORT OF THE CRITICALLY ILL PATIENTS.

I would also like to congratulate everyone involved for their commendable efforts in coming up with these recommendations which are very relevant in our day-to-day clinical practice.

The Colleges of the Academy of Medicine of Malaysia, as well as the Malaysian Society of Anaesthesiologists and the Malaysian Society of Intensive Care, have taken many initiatives to improve and enhance the quality and delivery of medical services, especially in anaesthesia and intensive care services in the country. The Colleges are not only organising Conferences and continuous medical education Programmes, but are also very active in the preparation and dissemination of guidelines and protocols. These initiatives help the Ministry of Health Malaysia to meet its objectives.

The movement of patients within the hospital, as well as from one hospital to another, is not a feat that we have just started. With the advancement in medicine and regionalisation of sub-specialists care at major hospitals, we are seeing more and more sick patients being transported which, otherwise would not have been done so decades ago. We are also beginning to perform aeromedical transportation of patients with increasing regularity as well. As such, we need to ensure that the care during transport is not only optimal but of the highest standards as well. All relevant personnel who will be involved in this type of transport need to understand the nature of the transport requested and the complexities around it.

## FOREWORD

I hope that these recommendations will be appreciated by all medical personnel, in both the public and private hospitals. It is hoped that by adhering to these minimum recommendations, adverse outcomes following patient transportation can be minimised as far as possible.

From the standpoint of the Ministry of Health Malaysia, we will continue to support all medical personnel in any way we can, by providing the necessary framework, equipment, medications and other logistics required in rendering the practice of patient transport as safe as possible.

**Datuk Dr Noor Hisham Bin Abdullah**  
Director-General of Health  
Ministry of Health Malaysia

## PREFACE

It is timely that the College of Anaesthesiologists, the College of Emergency Physicians, the Malaysian Society of Intensive Care and the Malaysian Society of Anaesthesiologists, formed a Writing Committee to look into the various aspects of inter-facility transport of the critically ill patients.

The Writing Committee, comprising Anaesthesiologists, Emergency Physicians and Intensivists, met and went through a number of existing guidelines from America, United Kingdom, Australia, New Zealand and Hong Kong, and decided on a number of issues relevant to our local setting.

The Writing Committee also decided that the details of the inter-facility transport of the critically ill patient will be presented in the form of a manual, the task of which will be taken up by the College of Emergency Physicians.

I wish to thank all members of the Writing Committee for their enthusiasm and hard work. I also wish to thank the reviewers for reviewing the draft document.

I sincerely hope that you will find these Recommendations useful.

**Dr Tan Cheng Cheng**  
Chairperson  
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## **1. INTRODUCTION**

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Critically ill patients are transported to alternate healthcare facilities to obtain additional care that is not available at the existing facility.

This document outlines the minimum standards required for the safe inter-facility transport of the critically ill patients.

A critically ill patient is defined as a patient who has a critical illness or injury that acutely impairs one or more vital organ systems. Adverse physiological changes during transport of the critically ill patients are common and can be life-threatening.

The decision to transport a critically ill patient is made when potential benefits of transport outweigh the potential risks. Risks incurred during transport can be minimised by careful planning and the use of competently trained personnel and monitoring equipment.

## **2. ADMINISTRATIVE RESPONSIBILITIES**

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Administrative responsibilities are expected to cover all aspects of the transport of the critically ill which include:

- Referral procedures
- Transport protocols
- Costing
- Training of personnel
- Procurement of equipment including personal protective equipment
- Staff safety, protection and insurance, where applicable

### **3. PROCEDURES AND PROTOCOLS**

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#### **3.1. DECISION MAKING**

- 3.1.1. Decision to transfer must be made by a senior doctor preferably specialist or consultant in charge of the patient after weighing risks and benefits.
- 3.1.2. Decision must be communicated to the next-of-kin where applicable. However, this communication should not supersede or compromise the clinical management of the patient.

#### **3.2. INITIATION AND RESPONSE**

- 3.2.1. Each facility must have its own mechanism of patient transport system.
- 3.2.2. The initiation of the patient transport system should be simple, with clear guidelines.
- 3.2.3. The response of the transport system should be rapid.

#### **3.3. COORDINATION AND COMMUNICATION**

- 3.3.1. Communications must be reliable and available at all times.
- 3.3.2. Communication loop must be established among the referring facility, the transport team and receiving facility.
- 3.3.3. First contact communication between referring facility and receiving facility should include the following:
  - a) Patient's current condition and management
  - b) Steps needed to be taken in planning and preparation for the transport

### 3.4. RESPONSIBILITY

- 3.4.1. The chain of responsibility must be clear throughout the transport. The most qualified medical practitioner should be responsible for the transfer process.
- 3.4.2. Pre-transport resuscitation and stabilisation is a joint responsibility of both referring and receiving facilities. Agreement between referring and receiving facilities must be achieved on the emergency care and level of stability prior to commencement of transport.
- 3.4.3. Care of patient and safety during transport is the responsibility of the referring facility.
- 3.4.4. Upon arrival, the continuity of care is the responsibility of the receiving facility after completion of handover.
- 3.4.5. Handover should be done between medical personnel of the same or higher level.

### 3.5. DOCUMENTATION

- 3.5.1. The clinical record should have the following documentation:
  - a) Patient's clinical status before, during and after transport
  - b) Relevant medical conditions
  - c) Therapy given
  - d) Any other pertinent events or conditions
- 3.5.2. A copy of this record should be provided to the receiving facility.

## 4. STAFFING

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- 4.1. The transport team should be selected based on the clinical requirements of the patient. This includes the capability to monitor and provide emergency or pharmacological intervention for the patient.
- 4.2. There should be a minimum of two transport team members at the patient compartment of the transport vehicle for the purpose of monitoring and intervention.
- 4.3. There should be at least one member of the transport team who is trained to initiate the emergency intervention. Depending on the clinical requirements of the patient, a doctor who is trained in the management of a critically ill patient may be required to be a member of the transport team.
- 4.4. If such a person is not available, then an on-line medical directive approach is needed. On-line medical directions are directives given for particular patient care by a physician who is not physically present at patient's side.

## 5. TRAINING

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Each facility is expected to conduct training with regards to the following key areas:

- Usage of equipment
- Effective medical communications
- Emergency care for critically ill patient
- Safety of transport

## **6. MODE OF TRANSPORTATION FOR INTER-FACILITY TRANSPORT**

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### **6.1. CONSIDERATION ON THE MODE OF TRANSPORTATION**

- 6.1.1. Consideration on the mode of transportation to be used will depend on the following factors:
- a) Nature of illness
  - b) Possible clinical impact of the transport environment
  - c) Urgency of intervention
  - d) Location of patient
  - e) Distances involved
  - f) Number of accompanying personnel and equipment
  - g) Road transport time and road conditions
  - h) Range and speed of vehicle
- 6.1.2. With all modes of transport, stabilisation of vital signs, provision of a secure airway and IV access, securing of all catheters and provisions of appropriate monitoring before departure is fundamental to safe transport.
- 6.1.3. The vehicle must be equipped with the minimum equipment required as outlined in Appendix 1.

### **6.2. TRANSPORT VEHICLE REQUIREMENTS**

- 6.2.1. Vehicles should be well-maintained and regularly serviced.
- 6.2.2. The vehicle must support the use of equipment such as adequate power supply.

## **7. EQUIPMENT**

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### **7.1. EQUIPMENT SELECTION**

- 7.1.1. Equipment should be appropriate for use according to the following factors:
  - a) Patient's condition
  - b) Level of monitoring needed during transport and in ambulance environment
  - c) Level of therapeutic intervention required
- 7.1.2. Attention must be given to size, weight, battery life, oxygen consumption and durability, as well as to suitability for operation under conditions of transport.
- 7.1.3. Electrical and gas supply fittings of all equipment must be compatible with those of the transport vehicle.
- 7.1.4. All equipment needs to be properly calibrated, maintained and regularly checked.
- 7.1.5. All equipment should incorporate audible and visual alarms.

### **7.2. EQUIPMENT HANDLING DURING TRANSPORT**

- 7.2.1. All equipment should be adequately restrained, and readily available to the operator.
- 7.2.2. Monitoring and infusion devices should be kept in areas visible to the accompanying staff.
- 7.2.3. Patient stretchers should be adequately secured within the transport vehicle.

## 8. PHARMACOLOGICAL AGENTS

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Pharmacological agents necessary to manage patient's specific clinical condition and anticipated deterioration and acute life-threatening medical emergencies will need to be brought along. These conditions include:

- Cardiac arrest
- Hypotension
- Hypertension
- Cardiac dysrhythmia
- Pulmonary oedema
- Anaphylaxis
- Bronchospasm
- Hypoglycaemia
- Hyperglycaemia
- Raised ICP
- Uterine atony
- Adrenal dysfunction
- Narcotic depression
- Convulsions
- Agitation
- Pain
- Emesis
- Electrolyte abnormalities
- Provision of sedation and neuromuscular paralysis

## 9. MONITORING

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- 9.1. Constant direct observation of patient by medical personnel is essential during transport.
- 9.2. Direct observation should be supplemented by vital sign monitoring that include the following:
  - 9.2.1. Continuous cardiac rhythm monitoring
  - 9.2.2. Non-invasive blood pressure
  - 9.2.3. Heart rate
  - 9.2.4. Respiratory rate
  - 9.2.5. Oxygen saturation (SpO<sub>2</sub>)
  - 9.2.6. End-tidal CO<sub>2</sub> (recommended especially for transporting intubated patients with head injuries or raised intracranial pressure (ICP))
- 9.3. Documentation of monitoring is recommended at 15-minute interval, or shorter when clinically appropriate

## 10. PRE-DEPARTURE PROCEDURES

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- 10.1. The transport team must be free from other duties upon activation.
- 10.2. The receiving person or staff at the destination must be notified, and the arrival time must be clearly understood.
- 10.3. All pieces of equipment must be checked, and notes and imaging films gathered using a check-list method. Individual responsible for checking equipment must be identified.
- 10.4. A best route should be planned. Lifts should be secured or reserved beforehand.



## 11. PATIENT PACKAGING AND LOADING

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- 11.1. The patient must be reassessed at all steps of movement such as after transfer to stretcher, and loading into ambulance before transport begins.
- 11.2. An example of a brief check on the patient is listed in Table I.

Table I: Brief patient assessment process prior to transport

AREAS	ASSESSMENT
Airway	Ensure secured and patent
Ventilation	Adequate; respiratory variables appropriate; PEEP/CPAP (if set); and FiO <sub>2</sub> levels correct
Circulation	Haemodynamically stable; vital signs displayed on transport monitors and clearly visible to transport team members
Venous access	Adequate, secured and patent
IV drips and infusion pumps	Functioning properly
All drains (urinary, wound, or underwater seal)	Functioning and secured; underwater seal drain is not clamped
All equipment alarms	Switched on
Patient	Safely secured on trolley

- 11.3. Upon satisfactory evaluation, only then should the actual journey begin.

## **12. CARE DURING TRANSPORT**

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- 12.1. The status of the patient must be checked at regular intervals.
- 12.2. Any change in the patient's condition, unexpected event, or critical incident, must be acted upon immediately.

## **13. ARRIVAL PROCEDURES**

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- 13.1. On arrival at the destination, the patient will need to be received at a designated area where handover of clinical care can be done.
- 13.2. The transport staff must remain with the patient until an appropriate handover has been done.

## **14. SPECIAL SITUATIONS**

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While the recommendations provide minimum standards of care that should be followed by all healthcare providers during inter-facility transport of the critically ill patient, it is recognised that there will be situations where these standards cannot be followed due to special circumstances such as during disaster.

- 14.1. Transportation of patients on circulatory supportive devices (IABP/ECMO) and other specialised devices (Incubator/ Temperature Regulation Devices)
  - 14.1.1. All circulatory supportive devices should have adequate battery power, in appropriate setting (including alarm limits, if any) and are operational before and during transport.
  - 14.1.2. There should be trained personnel who are able to provide the specialised care of critically ill patient on the circulatory supportive devices.

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# APPENDIX 1

## EQUIPMENT LIST

EQUIPMENT CATEGORY	LIST
<b>Respiratory Support</b>	Basic airway devices such as oropharyngeal airway Advanced airway devices including supraglottic airway devices such as laryngeal mask airway Oxygen delivery devices including nebuliser Self-inflating bag ventilation device Suction equipment Portable ventilator with disconnect alarms and high and low pressure alarms Intubation set with appropriate size blades and endotracheal tubes Oxygen supply in excess of that estimated for the maximum transport time
<b>Patient Monitoring</b>	Patient vital sign monitor device (lead II ECG, NIBP, HR, RR, SpO <sub>2</sub> )
<b>Pharmacology /Intervention</b>	Vascular cannulae (peripheral and central) IV fluids Infusion pumps Syringes and needles

## APPENDIX 1

<b>Infection Control</b>	<p>Personal protective equipment such as gloves, mask</p> <p>Standard Precaution Equipment such hand rub and disinfectant wipes, sharps disposal container and bag for biological refuse</p>
<b>Cardiac Intervention Device</b>	Defibrillator (automated or manual)
<b>Communication Devices</b>	Handphones or two-way communication devices such as radio
<b>Others</b>	<p>Nasogastric tube and bag</p> <p>Urinary catheter and bag</p> <p>Dressings, bandages, slings, splints and tapes</p> <p>Cutting shears and portable torch</p> <p>When clinically indicated, equipment to measure other physiological variables such as temperature, point of care blood analysis and glucometer, should be made available.</p>

