



# **Recommended Minimum Facilities for Safe Anaesthetic Practice in Operating Suites**

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## **Table of Contents**

	Page
1. Introduction	3
2. Principles of Anaesthetic Care	3
3. Staffing	3
4. Equipment	3
5. Drugs	8
6. Checking, Cleaning and Servicing Equipment	9
7. Recovery Area	10
8. Reference	10



## **1. INTRODUCTION**

1.1 These recommendations state the minimum facilities required for the safe conduct of general and regional anaesthesia in operating theatre suites.

1.2 The document does not preclude the need for additional facilities relevant to special or local situations.

## **2. PRINCIPLES OF ANAESTHETIC CARE**

2.1 Anaesthesia should be administered only by registered medical practitioners<sup>1</sup> with appropriate training in anaesthesia.

2.2 Every patient presenting for anaesthesia should have a pre-anaesthetic assessment by an anaesthesiologist who should preferably be the one who will administer the anaesthetic.

2.3 Modern practice demands basic staffing, equipment and drugs, and protocols for the safe administration of anaesthesia.

2.4 Appropriate monitoring of physiological and other variables must occur during anaesthesia. Please refer to HKCA document [P1] *Guidelines on Monitoring in Anaesthesia*.

## **3. STAFFING**

3.1 In addition to the nursing staff required by the practitioner carrying out the procedure, there must be:

3.1.1 An assistant to the anaesthesiologist. Please refer to *Guidelines on Minimum Assistance Required for the Safe Conduct of Anaesthesia* [T7].

3.1.2 Adequate number of assistant with necessary experience or expertise for specialized procedures and monitoring.

3.1.3 Adequate assistance in handling the patient.

## **4. EQUIPMENTS**

4.1 Essential requirements are listed below. Where a range of equipment is



recommended, the facility is expected to provide the type most suitable for its needs.

#### 4.2 Each hospital must designate:

4.2.1 One or more specialist anaesthesiologists to advise on the choice and maintenance of anaesthetic equipment.

4.2.2 One or more of its staff to organize and supervise the cleaning, servicing and maintenance of anaesthetic equipment.

#### 4.3 Anaesthetic Delivery System

4.3.1 Each operating theatre must have an anaesthetic machine capable of delivering an accurately measured flow of oxygen, medical air and the commonly used inhalational anaesthetic agents.

4.3.2 Each anaesthetic machine must have the following safety features:

4.3.2.1 An indexed gas connection system.

4.3.2.2 A reserve cylinder supply of oxygen and, where appropriate, nitrous oxide.

4.3.2.3 An oxygen supply pressure warning device.

4.3.2.4 An oxygen analyzer/monitor with a low oxygen alarm.

4.3.2.5 An anti-hypoxic mechanism where nitrous oxide is used.

4.3.2.6 Oxygen would be the last gas to enter the common gas manifold in anaesthetic machines that incorporate a gas flow-meter bank.

4.3.2.7 For machines utilizing mechanical means to control the anaesthetic gas flow, each gas should be controlled only by one knob and the knob for Oxygen should allow a distinct tactile identification.

4.3.2.8 A vaporizer inter-lock system.

4.3.2.9 Standardized size in the fresh gas outlet (22 mm outer diameter and 15 mm inner diameter)

4.3.2.10 A high pressure relief valve or other means of automatically preventing dangerously high and/or prolonged pressure- this can be either an integral part of the anaesthetic machine or as part of the



breathing circuit.

4.3.2.11 A difference in size of the connection of the scavenging system to that of the patient breathing circuit.

4.3.3 Each anaesthetic machine should include:

4.3.3.1 Calibrated vaporizers for accurate delivery of inhalational anaesthetics.

4.3.3.2 Breathing systems suitable for paediatric anaesthesia when necessary.

4.3.3.3 Commonly required accessories.

4.3.4 A range of suitable breathing systems should be readily available to each anaesthetic machine.

4.3.5 An automatic mechanical ventilator, with a disconnection alarm, must be available for each anaesthetized patient.

4.3.6 Infusion devices designed for controlled delivery of intravenous anaesthetic agents must be available when required.

4.4 A separate means of inflating the lungs with oxygen must be provided in each anaesthetizing location.

4.4.1 The size of the device and its attachments must be appropriate for patients being anaesthetized at that location.

4.4.2 Its oxygen supply must be independent of the anaesthesia delivery system.

4.5 Suction apparatus

4.5.1 Suction apparatus must be available for the exclusive use of the anaesthesiologist at all time together with appropriate hand pieces (e.g. Yankauer) and range of endotracheal suction catheters. This apparatus should comply with the current relevant international standards.

4.5.2 Provision must be made for an alternative suction system in the case of primary suction machine failure.

4.6 Each operating theatre must have monitoring equipment according to the HKCA document [P1] *Guidelines on Monitoring in Anaesthesia* .



4.7 Each operating theatre must also have:

4.7.1 Appropriate protection for the anaesthesia team against biological contaminants. This must include gowns, disposable gloves, masks and eye shields.

4.7.2 A stethoscope.

4.7.3 Non-invasive blood pressure measuring devices with appropriate sized cuffs.

4.7.4 A range of appropriate face masks.

4.7.5 A range of appropriate oropharyngeal, nasopharyngeal, laryngeal mask and other artificial airways.

4.7.6 Two laryngoscopes and a range of interchangeable blades.

4.7.7 A range of appropriate endotracheal tubes and connectors.

4.7.8 A range of endotracheal tube introducers and bougies.

4.7.9 Endotracheal cuff inflating syringe and clamps.

4.7.10 Endotracheal catheter mounts.

4.7.11 Magill's forceps and throat packs.

4.7.12 A suitable range of adhesive and other tapes appropriate for the securing of apparatus.

4.7.13 Scissors.

4.7.14 Sterile lubricant suitable for use with airway devices.

4.7.15 Support for corrugated tubing.

4.7.16 Arm supports.

4.7.17 Tourniquets for use during intravenous insertion.

4.7.18 Intravenous infusion equipment with a range of cannulae, catheters and solutions.

4.7.19 Facilities for safe disposal of sharp objects, waste glass and items contaminated with biological fluids.

4.7.20 Access to hand washing facilities.



4.7.21 Equipment for scavenging of anaesthetic gases and vapours where these are in use with interface equipment which prevents over-pressurization of the anaesthesia breathing circuit.

4.8 Each operating suite complex must have:

4.8.1 Equipment for difficult intubations. A specialist anaesthesiologist should be responsible for organizing the equipment, preferably in a trolley designated for such purpose. This trolley should be easily accessible and its position well known by all theatre staff.

4.8.2 A 12-lead electrocardiograph.

4.8.3 Equipment for invasive monitoring of arterial blood pressure.

4.8.4 A cardiac defibrillator with capacity for synchronized cardioversion.

4.8.5 A manual, self-inflating resuscitator bag capable of delivering up to 100% oxygen (e.g. Laerdal, Ambu bags).

4.8.6 Central venous pressure sets.

4.8.7 Means of infusing intravenous fluids rapidly under pressure.

4.8.8 Blood warming apparatus.

4.8.9 Means of insulating the patient against heat loss.

4.8.10 Equipment to cool patients in case of inappropriate increases in body temperature.

4.8.11 Means of providing or conserving airway humidification.

4.8.12 Interpleural drainage sets including appropriate underwater seal drainage equipment or one way valves.

4.8.13 Trays suitable for spinal, epidural and regional nerve blocks, wherever these procedures are used.

4.8.14 Patient trolleys capable of rapid tilting.

4.8.15 Commonly used spare parts and sundries.

4.8.16 Refrigerator for the storage of drugs required to be stored in the cold.

4.8.17 Means to ensure safe positioning for patients during procedures.



4.8.18 Adequate equipment for radiation protection of staff

4.9 Other essential requirements for safe anaesthesia are:

4.9.1 Warning devices in medical gas pipeline systems, to alarm when bulk gas supplies are low.

4.9.2 Electrical supply and equipment designed to eliminate risk of microshock.

4.9.3 Appropriate lighting for the clinical observation of patients.

4.9.4 Emergency lighting and power supply.

4.9.5 Means of controlling the room temperature within the range of 18 - 28°C.

4.9.6 A wall clock with a sweep second hand.

4.9.7 Means of communicating with persons outside the theatre.

4.9.8 Ready access within the hospital to separate refrigerators for the correct storage of blood and biological products.

4.9.9 Patient transfer trolleys as specified in HKCA document [P3] *Guidelines on Postanaesthetic Recovery Care*.

4.9.10 Devices such as rollers or patient slides to assist with transfer of patients in a manner safe for patients and staff.

4.9.11 A minimum of three people to assist with transfer of the patient when required, with the anaesthesiologist having prime responsibility for the patient's airway, head and neck.

## **5. DRUGS**

5.1 In addition to the drugs commonly used in anaesthesia, drugs and agents necessary for the management of the following conditions which may complicate or co-exist with anaesthesia, must also be available:

- Adrenal dysfunction
- Anaphylaxis
- Bronchospasm



- Cardiac arrest
- Cardiac arrhythmias
- Coagulopathy
- Hyperglycaemia
- Hypoglycemia
- Hypertension
- Hypotension
- Malignant hyperpyrexia
- Opioid and benzodiazepine overdose
- Pulmonary oedema
- Raised intracranial pressure
- Status epilepticus
- Uterine atony (where relevant)

5.2 The hospital or institution should seek the advice of specialist anaesthesiologists working in the institution in the selection of drugs for the above purposes.

5.3 An appropriate protocol should exist for the regular replacement of all drugs.

5.4 An initial supply of dantrolene sufficient for commencing the treatment of a suspected case of malignant hyperpyrexia should be readily accessible to all anaesthetizing locations within the institution. Additional doses must be readily available on request.

## **6. CHECKING, CLEANING AND SERVICING EQUIPMENT**

6.1 Regular sterilizing, cleaning and maintenance routines for anaesthetic equipment must be established.

6.2 Each anaesthetic machine must be clearly identified by a serial number to facilitate maintenance and servicing. Readily removable components, such as canisters and vaporizers must also be clearly identified.



6.3 Each anaesthetic machine must be serviced by an appropriate organization on a regular basis, and at least twice a year. A record of service or test procedures for each machine, provided by the service organization to the appropriate hospital personnel must be available.

6.4 Each anaesthetic machine, if new or after having been in storage for a considerable time, should undergo gas analysis checks of its outlets, to verify the supply of correct gases. In addition, the accuracy of flowmeters on such a machine should be tested by flow measurement techniques.

6.5 All wall gas outlets must undergo gas analysis checks, following a major structural alteration of the operating suite. A signed record must be provided by the service organization after the gas analyses.

6.6 A copy of the HKCA document [T1] *Recommendations on Checking Anaesthesia Delivery Systems* or similar document should be available with each anaesthetic machine.

## **7. RECOVERY AREA**

7.1 Recovery from anaesthesia should take place under appropriate supervision in an area designated for the purpose and conforming to HKCA document [P3] *Guidelines for Postanaesthetic Recovery Care*.

7.2 Contingency plans should exist for the safe emergency evacuation of patients from the operating theatre and/or recovery areas under adequate medical supervision.

## **8. REFERENCE**

- Recommendations on Minimum Facilities for Safe Administration of Anaesthesia in Operating Suites and Other Anaesthetising Locations. Australian and New Zealand College of Anaesthetists. T1 (2008)

<sup>1</sup> Medical Registration Ordinance (Cap 161): “registered medical practitioner” means a person who is registered, or is deemed to be so registered under the provisions of section 29.