

## GUIDE TO INFRASTRUCTURE AND SUPPLIES AT VARIOUS LEVELS OF HEALTH CARE FACILITIES

### Emergency and Essential Surgical Care (EESC)

Compiled from the WHO Manual *Surgical Care at the District Hospital 2003*

Level 1 Small Hospital / Health Centre	Level 2 District / Provincial Hospital	Level 3 Referral Hospital
<ul style="list-style-type: none"> <li>• Rural hospital or health centre with a small number of beds and a sparsely equipped operating room (OR) for minor procedures</li> <li>• Provides emergency measures in the treatment of 90–95% of trauma and obstetrics cases (excluding Cesarean section)</li> <li>• Referral of other patients (e.g., obstructed labour, bowel obstruction) for further management at a higher level</li> </ul>	<ul style="list-style-type: none"> <li>• District or provincial hospital with 100–300 beds and adequately equipped major and minor operating theatres</li> <li>• Short term treatment of 95–99% of the major life-threatening conditions</li> </ul>	<ul style="list-style-type: none"> <li>• A referral hospital of 300–1000 or more beds with basic intensive care facilities</li> <li>• Treatment aims are the same as for Level 2, with the addition of: <ul style="list-style-type: none"> <li>• Ventilation in OR and ICU</li> <li>• Prolonged endotracheal intubation</li> <li>• Thoracic trauma care</li> <li>• Hemodynamic and inotropic treatment</li> </ul> </li> <li>• Basic ICU patient management and monitoring for up to 1 week : all types of cases, but with limited or no provision for: <ul style="list-style-type: none"> <li>○ Multi-organ system failure</li> <li>○ Hemodialysis</li> <li>○ Complex neurological and cardiac surgery</li> <li>○ Prolonged respiratory failure</li> <li>○ Metabolic care or monitoring</li> </ul> </li> </ul>

PROCEDURES	PROCEDURES	PROCEDURES
<ul style="list-style-type: none"> <li>• Normal delivery</li> <li>• Uterine evacuation</li> <li>• Circumcision</li> <li>• Hydrocele reduction, incision and drainage</li> <li>• Wound suturing</li> <li>• Control of hemorrhage with pressure dressings</li> <li>• Debridement and dressing of wounds</li> <li>• Temporary reduction of fractures</li> <li>• Cleaning or stabilization of open and closed fractures</li> <li>• Chest drainage (possibly)</li> </ul>	<p>Same as Level 1 with the following additions:</p> <ul style="list-style-type: none"> <li>• Cesarean section</li> <li>• Laparotomy (usually not for bowel obstruction)</li> <li>• Amputation</li> <li>• Hernia repair</li> <li>• Tubal ligation</li> <li>• Closed fracture treatment and application of plaster of Paris</li> <li>• Eye operations, including cataract extraction</li> <li>• Removal of foreign bodies, e.g. in the airway</li> <li>• Emergency ventilation and airway management for referred patients such as those with chest and head injuries</li> </ul>	<p>Same as Level 2 with the following additions:</p> <ul style="list-style-type: none"> <li>• Facial and intracranial surgery</li> <li>• Bowel surgery</li> <li>• Pediatric and neonatal surgery</li> <li>• Thoracic surgery</li> <li>• Major eye surgery</li> <li>• Major gynecological surgery, e.g. vesico-vaginal repair</li> </ul>
PERSONNEL	PERSONNEL	PERSONNEL
<ul style="list-style-type: none"> <li>• Paramedical staff without formal anesthesia training</li> <li>• Nurse-midwife</li> </ul>	<ul style="list-style-type: none"> <li>• One [two] trained anesthetists</li> <li>• District medical officers, senior clinical officers, nurses, midwives</li> <li>• Visiting specialists or resident surgeon and/or obstetrician/ gynecologist</li> </ul>	<ul style="list-style-type: none"> <li>• Clinical officers and specialists in anesthesia and surgery</li> </ul>
DRUGS	DRUGS	DRUGS
<ul style="list-style-type: none"> <li>• Ketamine 50 mg/mL injection, 10 mL</li> <li>• Lidocaine 1% or 2%</li> <li>• Diazepam 5 mg/mL injection, 2 mL injection</li> <li>• [Epinephrine (adrenaline)] 1 mg</li> <li>• [Atropine 0.6 mg/mL]</li> </ul>	<p>Same as Level 1, but also:</p> <ul style="list-style-type: none"> <li>• Thiopental 500 mg/1gm powder</li> <li>• Suxamethonium bromide 500 mg powder</li> <li>• Atropine 0.5 mg injection</li> <li>• Epinephrine (adrenaline) 1 mg injection</li> <li>• Diazepam 10 mg injection</li> </ul>	<p>Same as Level 2 with the following additions:</p> <ul style="list-style-type: none"> <li>• Vecuronium 10 mg powder</li> <li>• Pancuronium 4 mg injection</li> <li>• Neostigmine 2.5 mg injection</li> <li>• Trichloroethylene, 500 mL inhalation</li> <li>• Calcium chloride 10% ,10 mL injection</li> </ul>

	<ul style="list-style-type: none"> <li>• Halothane, 250 mL inhalation</li> <li>• Lidocaine 5% heavy spinal solution, 2 mL</li> <li>• Bupivacaine 0.5% heavy or plain, 4 mL</li> <li>• Hydralazine 20 mg injection</li> <li>• Furosemide 20 mg injection</li> <li>• Dextrose 50%, 20 mL injection</li> <li>• Aminophylline 250 mg injection</li> <li>• Ephedrine 30/50 mg ampoules</li> </ul>	<ul style="list-style-type: none"> <li>• Potassium chloride 20%, 10 mL injection for infusion</li> </ul>
<b>EQUIPMENT: CAPITAL OUTLAY</b>	<b>EQUIPMENT: CAPITAL OUTLAY</b>	<b>EQUIPMENT: CAPITAL OUTLAY</b>
<ul style="list-style-type: none"> <li>• Adult and pediatric resuscitators</li> <li>• Foot sucker</li> <li>• Oxygen concentrator</li> </ul>	<ul style="list-style-type: none"> <li>• Complete anesthesia, resuscitation and airway management system consisting of: <ul style="list-style-type: none"> <li>○ Oxygen source</li> <li>○ Vaporizer(s)</li> <li>○ Hoses</li> <li>○ Valves</li> <li>○ Bellows or bag to inflate lungs</li> <li>○ Face masks (sizes 00–5)</li> <li>○ Work surface and storage</li> <li>○ Pediatric anesthesia system</li> <li>○ Adult and pediatric resuscitator sets</li> </ul> </li> <li>• Pulse oximeter</li> <li>• Laryngoscope Macintosh blades 1-3(4)</li> <li>• Oxygen concentrator[s] [cylinder]</li> <li>• Foot sucker [electric]</li> <li>• IV pressure infusor bag</li> <li>• Adult and pediatric resuscitator sets</li> <li>• Magill forceps (adult and child), intubation stylet and/or Bougie</li> </ul>	<p>Same as Level 2 with the following additions (one of each per OR or per ICU bed, except where stated):</p> <ul style="list-style-type: none"> <li>• Pulse oximeter, spare probes, adult and pediatric*</li> <li>• ECG (electrocardiogram) monitor*</li> <li>• Anesthesia ventilator, electric power source with manual override</li> <li>• Infusion pumps (2 per bed)</li> <li>• Pressure bag for IV</li> <li>• Electric sucker</li> <li>• Defibrillator (one per OR / ICU)</li> <li>• [Automatic B.P. machine*]</li> <li>• Capnograph*</li> <li>• [Oxygen analyzer*]</li> <li>• Thermometer [temperature probe*]</li> <li>• Electric warming blanket</li> <li>• Electric overhead heater</li> <li>• Infant incubator</li> <li>• Laryngeal mask airways sizes 2, 3, 4 (3 sets per O.R)</li> <li>• Intubating Bougies, adult and pediatric (1 set per O.R)</li> </ul> <p>* It is preferable to buy combined modalities all in one unit</p>
<b>EQUIPMENT: DISPOSABLE</b>	<b>EQUIPMENT: DISPOSABLE</b>	<b>EQUIPMENT: DISPOSABLE</b>
<ul style="list-style-type: none"> <li>• IV equipment</li> <li>• Suction catheters, size 16 FG</li> <li>• Examination gloves</li> </ul>	<ul style="list-style-type: none"> <li>• IV equipment (minimum fluids: normal saline, Ringer's lactate and dextrose 5%)</li> <li>• Suction catheters, size 16 FG</li> <li>• Examination gloves</li> <li>• Sterile gloves, sizes 6–8</li> <li>• Nasogastric tubes, sizes 10–16 FG</li> <li>• Oral airways, sizes 000–4</li> <li>• Tracheal tubes, sizes 3–8.5</li> <li>• Spinal needles, sizes 22 G and 25G</li> <li>• Batteries, size C</li> </ul>	<p>Same as Level 2 with the following additions:</p> <ul style="list-style-type: none"> <li>• ECG electrodes</li> <li>• Ventilator circuits</li> <li>• Yankauer suckers</li> <li>• Giving sets for IV pumps</li> <li>• Disposables for suction machines</li> <li>• Disposables for capnography, oxygen analyzer, in accordance with manufacturers' specifications: <ul style="list-style-type: none"> <li>○ Sampling lines</li> <li>○ Water traps</li> <li>○ Connectors</li> <li>○ Filters– Fuel cells</li> </ul> </li> </ul>