Facilitators Report

Achieving MDGs through strengthening capacities at primary health care facilities

WHO workshop with Ministry of Health on
Integrated Management for Emergency and Essential Surgical Training in Maldives

22-23 November 2005
Malé, Maldives

Workshop venue
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1. Executive summary

A Joint WHO workshop with Ministry of Health (MoH) on Integrated Emergency and Essential Surgical Care (IMEESC) was held in Malé, Maldives during 22-23 November 2005 for facilitators representing key policy makers, health providers, and partners of international organizations.

Lives saving surgical interventions are required in the management of any disasters from simple wound, shock and airway management, to reduce death and long term disability. These are often not available at primary healthcare facilities (atoll hospitals, health post). The overall objective of the meeting was to strengthen the emergency and essential surgical training capabilities of doctors, nurses, technicians to better manage, using standardized training "WHO Integrated Management on Emergency and Essential Surgical Care (IMEESC)" tools.

Visits were made and meetings were held with the directors and staffs of the regional, atoll hospitals, health centres (first referral level) for a situation analysis. The following major issues were discussed: the need for training in both emergency and essential surgical procedures and linked equipment and support of ongoing training activities including telemedicine. The main problems identified were the moving population of health professionals (expatriates) to sustain continuity of training programs for doctors, nurses, technicians and paramedics, inadequate training in the emergency procedures (surgical and anaesthetic) and related equipment.

The WHO IMEESC toolkit was very well accepted by the MoH and key health providers for incorporation into the education and training programs in order to be better prepared for emergencies and disasters.

Discussions were held at the WHO Country Office Maldives for the WHO Plan of Action for 2006. The Country office will support training workshops for identified Atoll health facilities with MoH to strengthen capacities of health workers in the management of life saving surgical interventions.

Key policy makers and health providers
2. Background

Maldives has an estimated population in 1999 of over 277,000 and consists of nearly 2000 small coral islands, of which about 200 are inhabited and grouped into 20 administrative atolls (26 natural atolls). Considering the difficulties in transportation between small widely dispersed islands there is a strong need for adequate management of the transport system.

The national health policy emphasizes that primary health care (PHC) is the most appropriate approach for attaining the goal of health for all (HFA). Attainment of the highest possible level of self-sufficiency in tertiary medical care within the available resources is also given priority. The Ministry of Health (MoH) emphasized the following priority programme areas for intensification and collaboration: Human resources development for health; Specific/integrated disease prevention and control programmes; Population issues, including maternal and child health; Environmental health, and Health education and health promotion.

The Government will strategically strengthen national capacities in management and development of the health system to achieve maximum self-reliance. High priority has been given to ensuring the availability of essential health services at the atoll and island levels with expansion of the health facilities and strengthening of the referral system.

Health services are organized into a four-tiered system comprising central, regional, atoll and island levels. However, with the expansion of health services, atoll hospitals are being established, beginning 2001, changing the system to a 5-tier system. At the top of this pyramid is the MOH, under which are the DPH, IGMH, National Thalassaemia Centre (NTC), and Maldives Water and Sanitation Authority (now being shifted to Ministry of Environment, Energy and Water). At the regional level are 5 regional hospitals, each catering to 2-5 atolls. At atoll level are the atoll health centres staffed by doctors and CHWs. Some of these health centers have recently been upgraded as atoll hospitals (10 at present) in order to provide emergency surgical facilities. An upgrading programme is currently underway to provide inpatient and enhanced maternal health care services. At island level, health services are provided by FHWs and Foolhumaas (TBAs).

Health systems faces major constraints due to lack of trained personnel particularly at the peripheral levels of service provision. Building capacity at those levels would enable addressing local health issues more appropriately. Government has given high priority to HRH development in allocating resources, both its own as well as external, for in-country and training abroad. The output was highest in the training of medical doctors and diploma level nurses, and lowest in the training of CHWs, paramedical and management personnel. The vertical training program for these categories failed to produce sufficient personnel to sustain the health status achieved during last two decades.

The emphasis is now towards training of preventive, management and paramedical support staff. However, due to financial resource shortages the actual training conducted in these categories has been limited. A large share of the WHO budget was spent for training of health personnel.
Maldives has national plans to meet certain kinds of emergency situations, such as plane crashes, oil spills and tidal waves. A multi-sector task force has been set up to promote preparedness and collaboration for emergencies. Currently an intersectoral task force has been set up to promote preparedness and collaboration for emergencies. An epidemic emergency preparedness plan will form part of the National Disaster Management Plan.

Accidents and injuries are mostly minor, resulting from day-to-day living. The more serious accidents are due to fishing boat beachings/launchings, falls from coconut palm trees, and domestic burns/injuries following kitchen accidents and careless handling of petrol or kerosene.

3. Objectives

Overall objectives:
Meetings with policy makers, key health providers and stakeholders to support training of doctors, nurses, technicians for the management of life saving emergency and surgical interventions at primary health care facilities.
Specific objectives:
- Visits to teaching and district hospitals for a situation analysis for the proposed surgical training program
- Workshop for strengthening surgical (including anesthesia) training as a horizontal program for surgical interventions in trauma, obstetrics, general surgery.
- Introduce and facilitate the use of WHO Integrated Management on Emergency and Essential Surgical Care (IMEESC) tool in the training courses in surgery, trauma, emergency and anaesthesia in Maldives.

4. Field visits for a situation analysis

Field visits were made by the team and discussions held with the staff at the following health facilities:
- Health centre Himafushi
- National Referral Center, Indira Gandhi Memorial Hospital IGMH

Field visit to health centre, Himafushi

5. Planning Meeting at the WHO Country Office, Maldives

Discussions included:
- Briefings on the field visits and meetings held with staff of the health facilities visited
- Facilitators workshop agenda and participants.
- Incorporation of the WHO IMEESC tool in the wider surgical programs of Maldives for management of trauma, anesthesia, obstetrics emergencies and disasters in medical and nursing, technicians training programs.
- Establish a working group with focal points from MoH and health providers from various disciplines
- A Training of Trainers Workshop to be organized in Malé and in an identified Atoll in first quarter of 2006. The WHO Country office, Maldives will identify the dates, venue for the meeting and work out the local budget for the meeting.
6. Introduction to the workshop at IGMH

A WHO workshop with MoH on Integrated Management for Emergency and Essential Surgical training in Maldives was held to bring together stakeholders, policy makers and health providers. The Dr Didi, Director Medical Administration IGMH welcomed the participants, followed by Dr Luna, WHO Country Office Representative Maldives, Dr Sheena Moosa addressed the need for strengthening capacities of health providers at regional levels of care in training emergency situations at all levels of care. Dr Herbosa, WHO consultant for training in disasters, introduced the WHO's role working with partners to assist the MoH in building capacities for managing disasters. Dr Meena Cherian, WHO/Geneva introduced the Emergency & Essential Surgical Care project as a horizontal approach to improve access to basic life saving procedures at primary health care facilities through a standardized training of health providers.

The MoH welcomed the concept and looked forward to see how the concept can be replicated nationwide to benefit the frontline staff. The WHO IMEESC tool kit would be useful to incorporate it into the activities of the MoH.

7. Situation analysis of health facilities

Acute scarcity of skilled health personnel is a major constraint for sustainable health development. Shortages of professionally and technically skilled national health manpower in almost all the areas and levels of the health sector. Mostly expatriates staff the health institutions at island level (periphery). Most of the available local doctors prefer to stay at central level institutions. Only local nurses outnumber expatriates. The highest priority is, therefore, accorded to HRH development, realizing that capacity building is vital for self-reliance but takes time.

In 2000 there were two hospitals in Malé, and 5 regional hospitals, 3 atoll hospitals and 40 health centres (with beds) in the atolls. The total number of hospital beds was 470 giving a population to bed ratio of 577. In addition there were 30 private clinics in Male and 17 in the atolls. The Institute
of Health Sciences was upgraded as the Faculty of Health Sciences of Maldives College of Higher Education in 1999 provides basic professional training within the country for major categories of allied health professionals. The tertiary care hospital in Male (IGMH) serves as the highest referral centre in the country. Five regional hospitals provide medical care and overall health care at regional level, including supervision of atoll hospitals and health centers.

At present there are 10 atoll hospitals and 40 health centres with both preventive and curative services, which include the management of common medical problems, maternal care and the treatment of minor surgical conditions. Until recently these centres were entirely managed by CHWs, but from 1993 doctors have been posted to these centers for medical services. At island level, health care is provided by FHWs and trained TBAs.

8. Applicability of the WHO IMESC toolkit

The WHO IMESC tool was presented with its applicability in day to day practice and relevance to existing programs on emergency, disasters, maternal and child health. Participants discussed and went through the WHO IMESC tool kit comprising 1 CD on comprehensive policy guidelines, needs assessment, essential emergency equipment list, training curriculum, best practices and 4 CDs of training videos developed for capacity building for the health providers and policy makers.

9. Round table Discussions

The following issues were discussed:

- Access to basic surgical interventions is needed to save lives in many life threatening conditions (injuries, infections, pregnancy related complications, disasters) therefore, gaining attention as a public health issue. WHO is addressing this through the project Emergency & Essential Surgical Care at resource limited health care facilities.
WHO IMEESC toolkit is very appropriate and should be used to meet the need of training and policy level decisions based on WHO recommendations to meet basic minimum standards to improve essential surgical care.

Participants identified that some of the relevant contents of the WHO IMEESC tool for guidance on policies and training of health provider can be incorporated in training through this integrated approach, such as:

*Policy materials:*
- Policy guidelines: Aide-Memoire Essential Surgical Care
- Needs Assessment for Essential Emergency Room Equipment
- Essential Emergency Equipment generic list.xls
- Guide to Development of a Training Curriculum on Essential Emergency Surgical Skills
- Guide to Anaesthetic Infrastructure and Supplies at Various Levels of Health Care Facilities

*Teaching and training materials:*
- Surgical Care District Hospital (SCDH) manual pdf and html
- Surgical Care District Hospital (SCDH) teaching power point
- Evaluation of Self Learning based on WHO manual SCDH
- Best Practice Protocols for Clinical Procedures Safety
- Best Practice Guidelines on Emergency Surgical Care in Disaster Situations
- Surgery at the district hospital- training videos
- Sample brief report of training workshop
- Participants evaluation of training workshop
- Model Agenda training workshop

It was suggested that the IMEESC tool with the WHO manual *Surgical Care at District Hospital* be made available to teaching institutions and the districts.

- Visits made to the Intensive Surgical unit, Accident and Emergency Units of the hospital.
- Training for basic life saving emergency and essential surgical interventions.

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10. **Recommendations and follow up action plan:**

10.1 **Recommendations**

- Policy level decision should be made to use the WHO IMEESC toolkit to meet the need of a standardized training for life saving emergency and essential surgical interventions.
- The burden of IGMH could be reduced through access to life saving emergency and essential surgical care at Atoll hospitals and health centres based on WHO recommendations to meet basic minimum standards to improve essential surgical care, which will reduce the burden to the regional hospitals even for minor non urgent surgical interventions.
- The training of trainers workshop needs to be organized using the expertise of IGMH.
- Trainers should include the doctors and nurses who were sent by MoH to other countries for training in linked disciplines (trauma, surgery, obstetrics, anaesthesia, nursing, disasters, emergencies) to have consensus on a standardized best practice protocols.
- WHO partner organization should support such training.

![Discussions during workshop](image1.jpg)  ![Presentations during workshop](image2.jpg)

### 10.2 Action plan

Following action plan was agreed:
- Report to be prepared for dissemination and put on the webpage
- Possibility of putting the WHO IMEESC toolkit on the telemedicine program
- The IMEESC tool kit was given to the hospital for study and implementation for capacity development at districts.
- MoH will identify the regional and atoll hospitals and health centres for the implementation of IMEESC training
- MoH will form a working group including various disciplines to advise, venue, topics for a training of trainers workshop for health providers to manage basic emergency and surgical interventions to reduce death and disability as a result of injuries, infection and pregnancy related complications
- The MoH to advise on the dates in early part of 2006
- Needs assessment using the WHO tool for monitoring and evaluation in improving the quality of emergency care will be done for health facilities prior to training to monitor the impact of training. Based on the results of the assessment, most of the equipment is in place (through tsunami assistant most of the equipment was procured)
- Preparation of a joint proposal with UNICEF to support access to the essential emergency equipment for resuscitation and training for health providers at identified Atoll hospitals and health centres
- WHO will assist MOH on the next steps
- Implementation of Best practice protocols on clinical procedures safety in the emergency unit for IGMH

### 11. Conclusion:

This meeting identified the health facilities for involvement of the proposed surgical training program for strengthening capacities at primary health care facilities for access to basic surgical care. This will benefit all surgical interventions to reduce death and disability in the management of trauma, obstetrics emergencies and disaster using the WHO IMEESC tools. This meeting gave a good opportunity to discuss the WHO collaborative approach on reducing disability through prevention, rehabilitation and access to timely appropriate surgical interventions, in Maldives.
10. Acknowledgements to collaborations and support:

Directors and staff of the health facilities visited
Ministry of Health Maldives
UNICEF
German Red Cross
WHO country office Maldives, WHO/SEARO
Departments of CPR/EHT, Patient Safety/EIP, VIP, MPS, WHO/Geneva, Switzerland

Faculty MoH, Director, WHO

12. Annexes

Annexe 1: Participants list
Annexe 2: Programme Agenda
Annexe 3: WHO training tools for improving skills of health personnel
Annexe 1: Participants list

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Annexe 2

Program Agenda

WHO Workshop with Ministry of Health Maldives

on

Integrated Management on Emergency and Essential Surgical Care (IMEESC)

towards achieving the Millennium Development Goals (MDGs)

1. Opening session:
   - Introduction: MOH/ WHO, Maldives
   - Introduction to the WHO Emergency Surgical Care project: CPR/EHT/WHO/Geneva

2. Situation analysis of the need for basic surgical skills (participants)

3. Using the IMEESC toolkit CPR/EHT/WHO/Geneva

4. Discussions:
   - Situation analysis of the need for basic surgical skills (by participants)
   - Training in WHO IMEESC e-learning tool for local adaptation in training and education
     of doctors, nurses, technicians, paramedics: WHO/ Maldives

5. Recommendations and Action Plan for collaborations on strengthening capacities: MOH/
   WHO, Maldives

6. Closing session: Conclusions: WHO/ MoH, Maldives
Annexe 3

Needs Assessment and Evaluation Form for Resource Limited Health Care Facility

Essential Emergency Equipment in Emergency Room*

*At an entry point in any health facility such as:
Emergency room/ Admission room / Treatment room/ Casualty room

1. Name/Address of Health Care Facility ____________________________________________

2. Type of Health Care Facility (please check one)
   - Primary or First referral level facility/ District Hospital/Rural Hospital □
   - Health Centre □

3. Human Resources in emergency room (please indicate number of health staff)
   - Doctors ___ Nurses ___ Clinical or Health officers ___
   - Technicians ___ Paramedical staff ___

4. Physical Resource

   (a) Infrastructure

<table>
<thead>
<tr>
<th>Is there an area or room designated for emergency care?</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is there running water?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- If yes: Interrupted / Uninterrupted (please circle one)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is there an electricity source?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- If yes: Interrupted / Uninterrupted (please circle one)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   (b) Equipment

   - Is a list of essential emergency care equipment available? □
   - Is following available
     - Oxygen Cylinder: Interrupted /Uninterrupted (please circle one) □
     - Oxygen Concentrator: Interrupted /Uninterrupted (please circle one) □
     - Equipment for oxygen administration available (tubes, masks) □

   Essential Emergency (EE) Equipment

<table>
<thead>
<tr>
<th>Are the EE equipment in working order?</th>
<th>Yes, in some equipment</th>
<th>Yes, in all equipment</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is there access to repair if equipment fails?</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Is there access to repair within the health care facility?</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Is there access to repair outside the health care facility?</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>- If yes, how far (in km): 1-25 / 26-50 / 51-200 / &gt;200 (please circle one)</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Is there an agreement for the maintenance of the equipment with the supplier?</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Do the health care staff in the emergency room get training in the use of the equipment?</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>
5. Quality, safety, access and use

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes, in some procedures</th>
<th>Yes, in all procedures</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are the best practice protocols for management of essential emergency procedures available?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Are the protocols for safe appropriate use of equipment in essential emergency procedures available?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

How often is ‘room to room inspection’ performed to ensure that EE equipment and supplies required for the essential emergency procedures are available and functioning? (please circle one)

Daily / weekly / monthly / 6-monthly / yearly / once in ___ years / never

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are the information, education and training materials on emergency procedures and equipment available in the emergency room for health care staff use?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Are there introductions of any new procedures/interventions?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>If yes, which procedure/intervention: (please specify)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has referral to other health facility decreased because of skills and knowledge of procedures and intervention?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Are records maintained?</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

6. Policy

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is there a policy to promote training for health care staff in the essential emergency management of trauma, obstetric care and anaesthesia?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Is there a policy to update the protocols for the emergency management of trauma and obstetric care adapted to local needs?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Are there any guidelines on donation, procurement, and maintenance of all EE equipment?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Is there a list of extra health personnel to be contacted in disaster situations?</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

For guidance use WHO generic list of Essential Emergency Equipment

Department of Essential Health Technologies
World Health Organization,
20 Avenue Appia, 1211, Geneva 27, Switzerland
Fax: 41 22 791 4836 Internet: www.who.int/surgery
WHO Generic Essential Emergency Equipment List

This checklist of essential emergency equipment for resuscitation describes minimum requirements for essential emergency surgical care at the first referral health facility (small or rural hospital/health centre)

<table>
<thead>
<tr>
<th>Capital Outlays</th>
<th>Quantity</th>
<th>Date checked</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resuscitator bag valve and mask (adult)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resuscitator bag valve and mask (paediatric)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oxygen source (cylinder or concentrator)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mask and Tubings to connect to oxygen supply</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light source to ensure visibility (lamp and flash light)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stethoscope</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suction pump (manual or electric)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood pressure measuring equipment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermometer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scalpel # 3 handle with #10,11,15 blade;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scalpel # 4 handle with # 22 blade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scissors straight 12 cm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scissors blunt 14 cm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oropharyngeal airway (adult size)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oropharyngeal airway (paediatric size)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forcep Kocher no teeth 12-14 cm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forcep, artery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kidney dish stainless steel appx. 26x14 cm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tourniquet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Needle holder</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Towel cloth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waste disposal container with plastic bag</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sterilizer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nail brush, scrubbing surgeon's</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaginal speculum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bucket, plastic</td>
<td></td>
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<td>Drum for compresses with lateral clips</td>
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<tr>
<td>Examination table</td>
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<tr>
<td>Wash basin</td>
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**Renewable Items**

| Suction catheter sizes 16 FG                                                 |          |              |
| Tongue depressor wooden disposable                                           |          |              |
| Nasogastric tubes 10 to 16 FG                                                |          |              |
| Batteries for flash light (size C)                                            |          |              |
| Intravenous fluid infusion set                                               |          |              |
| Intravenous cannula # 18, 22, 24                                              |          |              |
| Scalp vein infusion set # 21, 25                                              |          |              |
| Syringes 2ml                                                                   |          |              |
| Syringes 10 ml                                                                 |          |              |
| Disposable needles # 25, 21, 19                                               |          |              |
| Sharps disposal container                                                     |          |              |
| Capped bottle, alcohol based solutions                                        |          |              |
| Sterile gauze dressing                                                        |          |              |
Bandages sterile
Adhesive Tape
Needles, cutting and round bodied
Suture synthetic absorbable
Splints for arm, leg
Urinary catheter Foley's disposable #12, 14, 18 with bag
Absorbent cotton wool
Sheeting, plastic PVC clear 90 x 180 cm
Gloves (sterile) sizes 6 to 8
Gloves (examination) sizes small, medium, large
Face masks
Eye protection
Apron, utility plastic reusable
Soap
Inventory list of equipment and supplies
Best practice guidelines for emergency care

Supplementary equipment for use by skilled health professionals
Laryngoscope handle
Laryngoscope Macintosh blades (adult)
Laryngoscope Macintosh blades (paediatric)
IV infusor bag
Magills Forceps (adult)
Magills Forceps (paediatric)
Stylet for Intubation
Spare bulbs and batteries for laryngoscope
Endotrachael tubes cuffed (# 5.5 to 9)
Endotrachael tubes uncuffed (# 3.0 to 5.0)
Chest tubes insertion equipment
Cricothyroidotomy

This list was compiled from the following WHO resources:
WHO training manual: Surgical Care at the District Hospital
WHO Emergency Relief Items, Compendium of Basic Specifications
WHO/UNFPA Essential drugs and other commodities for reproductive health services.
WHO Essential Trauma Care Guidelines

* For specifications refer to this book