

OPTIMAL RESOURCES FOR CHILDREN'S SURGICAL CARE

II. Supplies, Equipment and Infrastructure



GICS

Global Initiative for Children's Surgery

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1. Summary

This document is intended as a supplement to the Optimal Resources for Children’s Surgical Care: Guidelines for Different Levels of Care. It contains detailed information on the supplies, equipment and infrastructure necessary to perform essential children’s surgery. The information is organized by hospital level as well as by surgical and anesthesia subspecialty. Table 1 provides an overview of the surgical supplies needed for basic and intermediate surgical care by specialty. Tables 2-6 provide a detailed list of the essential supplies and equipment necessary to provide safe surgery at first-level hospitals¹. Table 7 summarizes the pediatric specific supplies required for intermediate surgical care delivered at first-level hospitals. This information was developed by the specialty working groups described in the OReCS: Guidelines for Different Levels of Care document.

Equipment recommendations by the WHO Essential Surgical Care (EESC) Compiled from the WHO Manual for Surgical Care at the District Hospital is contained in our itemized lists². The WHO list appropriately recommends both a pediatric anesthesia system and pediatric resuscitator sets at the district level hospital. We include specific equipment recommendations including ultrasound, and neonatal and pediatric sizes for sphygmomanometers, central venous catheters, chest tubes, ventricular drains, endotracheal tubes and cling film for bowel coverage.

The final section of this document details the essential supplies and equipment necessary to provide advanced and complex surgical care for children. This type of care would typically be delivered at the secondary and tertiary hospital levels. An overview table of supplies and equipment by specialty for advanced and complex care is provided in Table 8. Table 9 lists the pediatric specific surgical supplies required for advanced and complex surgical care for the second and third-level hospitals, and national children’s hospital.

2. Supplies and equipment for basic and intermediate Care

Table 1: Overview of essential childhood surgical supplies for basic and intermediate surgical care classified by specialty

Subspecialty	Pediatric Specific Supplies for Health Center	Pediatric Specific Supplies for Intermediate Care
Anesthesia	Pulse Oximeters, Thermometers, Non-invasive blood pressure monitors, Stethoscope	Oxygen supply, CO2 monitor, Laryngoscopes and Endotracheal tubes, Regional anesthesia & IV infusion
Cardiac Surgery	Pulse Oximeter with neonatal probe, Electrocardiogram	Echocardiography equipment
Critical Care	Equipment for acute care resuscitation, Basic medicine and equipment store	Equipment for resuscitation and stabilization, Equipment and supplies for airway management
General Surgery	Patient transfer ability to higher levels of care, Incision and Drainage Kit	Basic laparotomy instrument set, X-ray
Neurosurgery	Basic equipment to assess neurotrauma	Hudson Brace and Gigli saw for Burr Holes, Equipment for Trans-Fontanelle Ventricular Tap
Ophthalmology	Headlamp, Ophthalmoscope, Eye pads, Visual acuity chart, Saline for eye irrigation	Same as Health Center
Oral Maxillofacial Surgery	Dental Equipment- basic examination and surgical hand instruments, Arch bars & wires, Surgical drill and burs	Dental casting machine
Orthopedics Surgery	Wound care supplies, Splints, Plaster Bandages, Crepe Bandages	Basic orthopedic instrument set, Plaster rolls, X-ray machine, Equipment for plaster removal
Otolaryngology	Headlight, Basic ear and nose instruments, Screening Audiometer, Otoscope, Rhinoscope	Same as Health Center
Plastic Surgery	Suture material, Basic wound dressing packs: sterile field, dressing tray, dressing towel, cotton balls/swabs, forceps	Basic laparotomy or cesarean section instrument set
Radiology	Ultrasound, X-ray, C-arm	Computed Tomography Scanner
Urology	Wound care supplies, Antiseptics, Antibiotics	Urinary catheters, Basic minor surgical instrument set, Basic wound dressings packs

Table 2: Surgical equipment for the first-level hospital

OPERATING TABLE
Hydraulic or Motor Driven
Height: approximately 85 cm.
Tabletop dimensions: Length ~200cm, Width ~80 cm
Exposed metallic parts to be made from stainless, acid proof steel.
Mobile table base with central braking system
Flexible inclination angles for back rest and leg rest, kidney elevator, Trendelenburg and reverse-Trendelenburg positions
Trendelenburg and Reverse Trendelenburg at least 25°
Lateral tilt at least 18°
Back rest inclination angle at least +55° to -25°
Head rest inclination angle at least 45° up
Head rest inclination angle at least 20° down
Automatic stop in horizontal position
Accessories
Anesthetic Screen with clamp with telescopic tubes
Body restraint Strap with clamp
Padded Shoulder supports
Padded Leg support with swivel type clamp
Padded arm Rests 450 -500 mm long with two arm Clamps
Padded Lateral support with universal attachment Clamp
Padded rubber mattresses with Mackintosh covers
Head rest, IV drip stands attachable to the table
Gel cushions for head and neck support
ORTHOPAEDIC TABLE ACCESSORY
Attachments to operating table to allow positioning for specific procedures
Radiolucent surface
ORTHOPAEDIC TRACTION SYSTEM
MOBILE C-ARM X-RAY SYSTEM
Portable imaging system with digital Flat Panel Detector
Motorized, with range of movements: vertical >400 mm, horizontal travel >200 mm
Orbital movement -30 to +90 degrees
Swing/panning movement: +/- 12 degrees or more
Depth of C-arm: 650 mm or more
Needs to be lightweight, flexible and portable

Imaging possible in multiple positions: sitting, supine (and possibly standing?)
Capability of pulse fluoroscopy to reduce radiation exposure
Connectivity to EMR database
Display - real-time imaging with viewing system
SURGICAL STOOL
Ergonomic design
Fixed flexible height with stump feet and anti-static cushion
Seamless upholstery
ANAESTHETIST STOOL
Ergonomic design
Seamless upholstery
MAYO TABLE
Stand for instrument trays
Antistatic castors, Stainless steel tray, 500 x 375 x 254mm
INSTRUMENT TROLLEY
Stainless steel shelves
Anti-static castors, 610mm X 460mm
ECG MONITOR
Recording ECG Leads: 12 standard Leads
Recording Channels: 3/1 User selectable
LCD display of ECG
Lead switching: manual and automatic
Sensitivity, mm/mV: 5, 10, 20.
Calibration signal: automatic and manual.
Diagnostic frequency range 0.67-150 Hz or greater
Filters for mains frequency, low frequency, muscle artefact, high frequency
Power requirements: 220 V, 50 Hz
Accessories
Patient cable
Chest electrodes
Limb electrodes
Strap electrodes
Bottle of ECG gel
OPERATING LIGHTS
Cordless

LED light source
Li-ion battery with cost-effective replacement
Ergonomic design
Adjustable light intensity
Light field size 15 - 30 cm.
Color temperature 4200° Kelvin
Working range without focusing approximately 70 - 140 cm
ELECTROSURGICAL UNIT
High-frequency electrosurgical unit for execution of monopolar and bipolar surgery
Maximum output 300 W for monopolar cut
Activation: Double pedal switch to toggle between monopolar and bipolar functions
Bipolar electrode with pedal switch or with automatic Start/Stop system for coagulation
Memory: User shall be able to use at least 4 working programs
Safety: Neutral plate safety circuit, notifications and alerts with automatic reductions in power for safety
Accessories
Operative Foot-switch (usable as alternative to handle)
Reusable neutral plate
Kit of autoclavable Electrodes
Bipolar Forceps: 6
Straight Forceps - 18 cm (7")
SUCTION PUMP
Suction unit for Major Surgery Procedures, should be mains-powered
Mobile on 4 anti-static castors
Oil-free pump, maximum suction of at least 500 mm Hg
Free flow rate at least 25 l/min
Pedal Action
Protective thermal cut-out relay
Motor-protection cap preventing aspirated liquids or secretions from reaching and damaging the vacuum pump
Suction command with continuous adjustment
2 X 2,000ml canisters with airproof screwing-cap and independent overflow devices
Fast connectors and silicone tubing
Power Supply: 220V AC 50Hz.
Ventilation Fan for overheating
Accessories
Silicone Tubing, Sterilizable

Transparent Cannula Holder, Sterilizable
Anti-Bacterial Filters
ANAESTHESIA MACHINE W/ VENTILATOR AND MONITOR
Anesthesia Machine used for delivering anesthetic agents to patient during surgery and ventilate patient
Patient monitoring system: ECG, EtCO ₂ , Pulse Oximeter and airway pressure, NIBP, Temperature
Anesthesia gas delivery system, O ₂ /N ₂ O/Compressed Air
Circle absorber system.
Precision vaporizer for halothane
Anesthesia ventilator
Accessories
Resuscitators, Adult / Child
Set of face masks, 3 Sizes
Corrugated hoses and tubing set for Pipeline O ₂
Corrugated hoses and tubing set for Pipeline Air
Hose assembly for piped Oxygen supply
Hose assembly for piped Nitrous Oxide supply
Hose assembly for piped Air-supply
Regulator and manometer for the pipe pressure hose (60 psi)
Connection from ventilator to anesthetic apparatus, autoclavable/reusable
Test bag, 1 liter
Peak Flow Meter
Power cord with grounding wire
OTHER FURNITURE
Kickabout with s/s bowl
Drip stands, Double-hooked, Telescopic
Radiation Shielding Apron, 0.35 mm Pb equivalent, Frontal, S, M, L, XL
Radiation Shielding Apron, 0.35 mm Pb equivalent, Full, S, M, L, XL

Table 3: Surgical consumables for the first-level hospital

DRESSING SUPPLIES
Precision Blood Glucose Test Strips
Glucometers
Gloves, Surgical, Sterile – 7, 7.5, 8, 8.5
Gloves, Examination, Latex, Non-sterile, S, M, L
IV tubing
Betadine Solution
Betadine Scrub
Syringe, 3 ml, 5 ml, 10 ml, 20 ml
Syringe, Insulin, 100 IU/1 ml + Fixed Needle
Cast Padding, 3 inch, 4 inch, 6 inch
Cast, Fiberglass, 3 inch, 4 inch
Resting ECG Electrodes
Gauze, Compression, Paraffin, 10 cm x 10 cm, sterile
Gauze, Compression, 10 cm, 12 plies, 17 threads, sterile
Cotton wool, hydrophilic, roll, 500 g
Tape, Adhesive, roll, 2 cm
Tape, Adhesive, roll, extensible, nonwoven, 10 cm x 10 m
Tape, Adhesive, roll, perforated, 10 cm
Bandage, Adhesive, elastic, 10 cm x 3 m
Bandage, Extensible, Non-adhesive, 6 to 7 cm x 4 m
Bandage, Crepe (Velpeau), 10 cm x 4 m
Bandage, Elastic Tubular Net, Arm/leg, roll 25 m
Strip, Adhesive for skin closure (Steri-strip), 6 mm, per 3
Dressing, Haemostatic (Quikclot ACS+), unit
Mask, Respirator, N95 (Fluidshield N95)
Mask, Surgical
Thermometers - digital
Thermometers – oral glass
Tegaderm, 4.75 cm x 4.75 cm, Transparent
Bag, Urine, 2 L, Drainable + Non-return valves, Sterile
Catheter, Urinary, Foley, Balloon, CH 10, 12, 16, 20 Sterile
Drawsheet, disposable, plastified, absorbable, 60 x 60 cm
Yankeur and pool suction tips - disposable/ reusable
Scrub dispensers

Ratex sponges - 4x4
Surgical Blades - Size 10, 11, 12, 15, 20
LINEN
Clogs, Operation theatre, Polyuretane, Washable
Drape, Surgical, woven, 1 x 1 m & 1.5 x 1.5 m
Drawsheet, Rubber, 100 x 180 cm, with rivets
Drawsheet, Disposable, plastified, absorbable, 60 x 60 cm
Drape, Sterile, nonwoven, 45 x 75 cm
Drape, sterile, nonwoven, Cover for Mayo table
Drape, sterile, nonwoven, Cover for Caesarian Section Set
Drape, sterile, nonwoven, Cover for Orthopaedics Set
Drape, sterile, nonwoven, Cover for Universal/Laparotomy Set
Isolation gown, single use, non-sterile
Gown, Surgical, woven M, L, XL, XXL
Shoe Cover, non woven, Single Use
Scrub Suit, Surgical, woven, S, M, L
SUTURES
Prolene- 2-0,3-0,4-0 cuticular
Prolene- 5-0 plastic
Prolene- 3-0,4-0 cardiovascular
Prolene - 0.0,1-0,2-0(general closure)
Silk 0.0,1-0(general closure)
Silk 2-0(gastro intestinal)
Ethibon- 0.0,1-0,2-0,5-0(general closure)
Ethilon- 3-0,4-0 cuticular
Ethilon- 5-0 plastic
Ethilon- 1-0(general closure)
PDS - 1-0(general closure)
PDS - 2-0(gastrointestinal)
PDS- 3-0, 4-0 cuticular
Vicryl - 0.0,1-0,2-0,3-0(general closure)
Vicryl - 2-0,3-0(gastrointestinal)
Vicryl - 3-0,4-0 cuticular
Chromic - 0.0,1-0,2-0,3-0(general closure)
Chromic - 2-0,3-0(gastro intestinal)

Chromic - 1-0,2-0(blunt needle 3/4 circle)
Surgical absorbable hemostat 3" x 4"

Table 4: Surgical instruments required for major procedures at the first-level hospital

ITEM	QUANTITY
ABDOMINAL/LAPAROTOMY SET	
Scalpel Handle (#4), Standard	1
Scalpel Handle (#4), Long	1
Forceps, Tissue, Standard, 14.5 cm/1x2 Teeth, Straight	1
Forceps, Tissue, Standard, 25 cm/1x2 Teeth, Straight	1
Forceps, Tissue-Grasping, Duval, 23 cm, Jaws 20 mm	2
Forceps, Tissue-Grasping, DeBakey, 15 cm, 2mm Atraumatic elastic jaw	1
Forceps, Peritoneal, Faure, 21 cm, Slightly curved	2
Forceps, Intestinal, Doyen, 23 cm, Straight, Atraumatic elastic jaw	2
Forceps, Intestinal, Doyen, 23 cm, Curved, Atraumatic elastic jaw	2
Forceps, Hemostatic, Kelly, 14 cm, Curved, Non-toothed	10
Forceps, Hemostatic, Bengolea, 20 cm, Curved, Serrated	4
Forceps, Hemostatic, Crafood, 24 cm, Curved	2
Forceps, Hemostatic, Halsted-Mosquito, 12.5 cm, Non-Toothed, Curved	6
Forceps, Hemostatic, Kocher, 14 cm/1x2 Teeth, Straight	2
Forceps, Hemostatic, Kocher, 14 cm/1x2 Teeth, Curved	2
Forceps, Hemostatic, Mixer, 14 cm, Very delicate	1
Forceps, Hemostatic, Mixer, 23 cm, Delicate	1
Forceps, Hemostatic, Heiss, 24 cm, Curved, Right-angled	1
Forceps, Dressing, Standard, 20 cm, Straight	1
Forceps, Towel-Clamp, Backhaus, 13 cm	8
Forceps, Sponge, Foerster, 24 cm, Straight, Serrated jaws	2
Needle-holder, Baby-Crile-Wood, 15 cm, Standard	1
Needle-holder, Mayo-Hegar, 23 cm, Standard	1
Scissors, Mayo, 17 cm, Curved	1
Scissors, Mayo, 23 cm, Curved	1
Scissors, Metzenbaum, 17 cm, Curved	1
Scissors, Metzenbaum, 23 cm, Curved	1
Retractor, General, Deaver, Standard, 30 cm, 38 mm Edge, Flexible	2
Retractor, General, Farabeuf, 15 cm, Double-ended	2
Retractor, General, Langenbeck, 24 cm, 160 x 45 mm	2
Retractor, Abdominal, Balfour, Standard, Complete Set	1
Spatula, Abdominal, 25 cm x 27 mm, Malleable	2

Suction Tube, Poole, 23 cm x 10 mm diameter, Straight	1
Kidney Dish, Medium, 250 x 140 x 40 mm, Stainless Steel	2
Galipot, Round, 500 ml, 12 cm diameter, Stainless Steel	2
Towel Clips	4
Towel Clips, Non-perforating	2
Sterile, Blade, No. 22 (for Scalpel #4)	1
Sterile, Suction Tip, Yankauer, 11.1" x 30F Tip	1
Basket, Instruments, wired 24 x 25 x 10 cm, for sterilization	1
CAESAREAN SECTION SET	
Scalpel Handle (#4), for 20 Blade	1
Forceps, Tissue, Standard, 14.5 cm/1x2 Teeth, Straight	1
Forceps, Tissue, Standard, 25 cm/1x2 Teeth, Straight	1
Forceps, Tissue-Grasping, Duval, 23 cm, Jaws 20 mm	4
Forceps, Hemostatic, Kelly, 14 cm, Curved, Non-toothed	2
Forceps, Hemostatic, Wertheim, 23 cm/1x2 teeth, Straight	2
Forceps, Hemostatic, Green-Armytage, 22 cm x 13 mm	2
Forceps, Dressing, Blank, 14.5 cm, Straight, Atraumatic serrations	1
Forceps, Towel-Clamp, Backhaus, 13 cm	4
Forceps, Sponge, Foerster, 24 cm, Straight, Serrated jaws	2
Needle-holder, Mayo-Hegar, 18 cm, Standard	1
Scissors, Mayo, 17 cm, Curved	1
Scissors, Metzemaum, 18 cm, Curved	1
Retractor, General, Farabeuf, 15 cm, Double-ended	2
Retractor, Abdominal, Gosset, Central + 2 x 28 mm Blades	1
Suction Tip, Poole, 23 cm x 10 mm diameter, Straight	1
Kidney Dish, Medium, 250 x 140 x 40 mm, Stainless Steel	2
Gallipot, Round, 100 ml, 80 x 35 mm, Stainless Steel	2
Towel Clips	4
Towel Clips, Non-perforating	2
Sterile, Blade, No. 22 (for Scalpel #4)	1
Sterile, Suction Tip, Yankauer, 11.1" x 30F Tip	1
Basket, Instruments, wired 24 x 25 x 10 cm, for sterilization	1
BASIC ORTHOPAEDIC SET	
Scalpel Handle (#4), for 20 Blade	1
Metal Ruler 15 cm	1

Forceps, Towel-Clamp, Backhaus, 13 cm	4
Forceps, Hemostatic, Halsted-Mosquito, 12.5 cm, Curved	6
Forceps, Hemostatic, Pean, 14 cm, Straight	1
Forceps, Hemostatic, Collin, 16 cm, Oval jaws	1
Forceps, Dressing, Standard, 14.5 cm, Straight	2
Forceps, Tissue, Standard, 16 cm/1x2 Teeth, Straight	2
Forceps, Tissue, Allis, 15 cm/2x3 Teeth, Standard	2
Forceps, Tissue, Allis, 19 cm/5x6 Teeth, Standard	2
Forceps, Tissue, Stand, 14.5 cm x 1x2 Teeth, Straight	1
Needle-holder, Mayo-Hegar, 18 cm, Serrated	1
Needle-holder, Baby-Crile-Wood, 15 cm, Delicate	1
Scissors, Dissecting, Mayo, 17 cm, Curved	2
Scissors, Dissecting, Metzenbaum, 18 cm, Curved	2
Scissors, Operating, 14 cm, Straight, Sharp/Sharp	1
Scissors, Operating, 14 cm, Straight, Sharp/Blunt	1
Scissors, Operating, 14 cm, Curved, Sharp/Blunt	1
Scissors, Bandage, Lister, 20 cm, One larger ring handle	1
Clamp, Bone-Holding, Verbrugge, 24 cm, prehensile	1
Forceps, Bone-Holding, Lewin, 17.8 cm, Serrated	1
Forceps, Bone-Cutting, Liston, 19.7 cm, Angled	1
Forceps, Bone-Cutting, Stille-Liston, 26.7 cm, Straight	1
Rongeur, Bone, Luer, 15 cm x 5 mm, Curved	1
Rongeur, Bone, Stille-Luer, 23 cm x 10 mm, Double-acting	1
Curette, Bone, Volkman, 17 cm x 3.6 mm	1
Curette, Bone, Volkman, 17 cm x 6.8 mm	1
Curette, Bone, Volkman, 17 cm x 8.5 mm	1
Curette, Bone, Volkman, 17 cm x 13.0 mm	1
Raspatory, Bone, Lambotte, 21 cm Sharp, 10 mm Curved	1
Raspatory, Bone, Lambotte, 21 cm Sharp, 20 mm Curved	1
Retractor, Bone, Hohmann, 24 cm, 18 mm	1
Retractor, Bone, Verbrugge-Hohmann, 25 cm, 65 mm	1
Forceps, Towel-Clamp, Backhaus, 9 cm	4
Forceps, Towel-Clamp, Backhaus, 13 cm	12
Kidney Dish, Medium, 250 x 140 x 40 mm, Stainless Steel	2
Gallipot, Round, 100 ml, 80 x 35 mm, Stainless Steel	2

Towel Clips	4
Towel Clips, Non-perforating	2
Tourniquet for limb surgery with adult cuff 66 x 11cm (26 x 4")	1
EXTERNAL FIXATION SUPPLEMENT	
Brace, External fixator	1
Connectors, Ø 15/15 mm	12
Pin, self-drilling, Ø 4 mm, 100 mm	6
Pin, self-drilling, Ø 5 mm, 110 mm	6
Pin, self-drilling, Ø 5 mm, 140 mm	6
Pin, self-drilling, Ø 5 mm, 170 mm	6
Pin, self-drilling, Ø 5 mm, 210 mm	6
Pin, transfixing, Ø 5 mm, 250 mm	1
Sleeve, Reduction, 15/4 mm	6
Sleeve, Reduction, 15/5 mm	12
Sleeve, Reduction, 15/9 mm	2
Handle for Trocar/sleeve	1
Trocar/Sleeve without handle, 70 mm, Ø 5 mm	1
Tube, Carbon-Fibre, 100 mm, Ø 15 mm	2
Tube, Carbon-Fibre, 125 mm, Ø 15 mm	2
Tube, Carbon-Fibre, 150 mm, Ø 15 mm	2
Tube, Carbon-Fibre, 200 mm, Ø 15 mm	2
Tube, Carbon-Fibre, 250 mm, Ø 15 mm	2
BONE PINNING & WIRING SUPPLEMENT	
Drill, Hand, Manual, with 3-jaw Chuck	1
Pliers, Wire-Cutting, 21 cm, Front-acting	1
Pliers, Flat Nose, 17 cm, Serrated jaws, 17 cm	1
Bone Suturing Wire, Soft, Coil 10 m, 0.5 mm	1
Bone Suturing Wire, Soft, Coil 10 m, 2.0 mm	1
Wire, Kirschner, 23 cm, Trocar point Ø 1.8 mm	10
Wire, Kirschner, 23 cm, Trocar point Ø 2.5 mm	20

Table 5: Surgical instruments required for minor procedures at the first-level hospital

ITEM	QUANTITY
MINOR ABDOMINAL SURGERY	
SCALPEL HANDLE for blades 10 -15 mm	1
SCALPEL HANDLE for blades 18 - 36 mm	1
SCISSORS straight 145 mm	1
DISSECTING SCISSORS curved 140 mm	1
ABDOMINAL SCISSORS heavy design, curved 160 mm	1
DISSECTING SCISSORS curved 230 mm	1
DISSECTING SCISSORS Curved, blunt 115 mm	1
TENDON SCISSORS curved, sharp 110 mm	1
DISSECTING FORCEPS straight, toothless 145 mm	2
DISSECTING FORCEPS 140 mm	1
TISSUE FORCEPS 1X2 teeth 145 mm	2
INTESTINAL GRASPING FORCEPS 160 mm	2
ATRAUMATIC GRASPING FORCEPS 7 mm 200 mm	2
DRESSING FORCEPS straight 220 mm	1
TOWEL CLAMP curved 85 mm	4
TOWEL CLAMP straight 160 mm	4
HOLDING RING HANDLE INSTRUM 105 mm	2
ARTERY FORCEPS straight, 1X2 teeth 145 mm	2
MOSQUITO FORCEPS curved 140 mm	2
NEEDLE CASE perforated 50X25X5 mm	1
NEEDLE HOLDER 125 mm	1
GUIDING NEEDLE char 16 190 mm	1
RETRACTOR 55 X 47 mm 205 mm	2
RETRACTOR medium, 55 mm deep 200X170 mm	1
RETRACTOR double ended, 10 mm set of 2, 125 mm	2
FISTULA HOOK 2 sprong 220 mm	2
UNIVERSAL TROCAR set of 4 tips 1 handle	1
STERILIZATION CONTAINER 300X274X247 Size ½ mm	1
ROUND BOWL 8.3 X 5.4 X 4.1 cm	1
INCISION & DRAINAGE	
SCALPEL HANDLE for blades 10 -15 mm	1
SCALPEL HANDLE for blades 18 - 36 135 mm	1

SCISSORS straight 145 mm	1
DISSECTING SCISSORS curved 140 mm	1
DISSECTING SCISSORS Curved, blunt 115 mm	1
TISSUE FORCEPS 1X2 teeth 115 mm	1
TOWEL CLAMP curved 85 mm	4
MOSQUITO FORCEPS curved 140 mm	2
NEEDLE HOLDER 125 mm	1
STERILIZATION CONTAINER 250 x 110 x 40 mm	1

Table 6: Anesthesia supplies for the first-level hospital

ANESTHESIA CONSUMABLES/SINGLE-USE
Airway, Guedel, Size 0, Pediatric, Re-usable
Airway, Guedel, Size 00, Neonate, Re-usable
Airway, Guedel, Size 01, Infant, Re-usable
Airway, Guedel, Size 02, Toddler, Re-usable
Airway, Guedel, Size 03, Adolescent, Re-usable
Airway, Guedel, Size 04, Adult, Re-usable
Airway, Guedel, Size 05, Large Adult, Re-usable
Mask, Anesthesia, with Rim + Hook, Size 2: Child
Mask, Anesthesia, with Rim + Hook, Size 4: Adolescent
Mask, Anesthesia, with Rim + Hook, Size 5: Adult
Mask, Anesthesia, Size 1: Neonate
Self-inflating bag (Ambu), Adolescent/Child + Masks
Self-inflating bag (Ambu), Child/Neonate + Masks
Catheter Mount, 150 mm
Laryngeal Mask Airway, Size 2, 3, 4, 5 Re-usable
Bag, Urine, 2 L, Drainable + Non-return Valves, Sterile
Filter, Breathing Circuit, Neonate
Filter, Breathing Circuit, Adult
Catheter, Urinary, Foley, Balloon, CH 10, 12, 16 Sterile
Tube, Endotracheal, Cuffed, Balloon, Ø 5.5 mm, 6.0 mm, 6.5 mm, 7.0 mm, 7.5 mm, 8.0 mm, 8.5 mm,
Tube, Endotracheal, Uncuffed, Balloon, Ø 3.0 mm, 4.0 mm, 5.0 mm
Tube, Oxygen, Conical Tip, 40 cm, CH 10
Tube, Suction, Conical Tip, 50 cm, CH 10, CH 12, CH 14, CH 16, Single use
Gauze, Compression, 10 cm, 12 plies, 17 threads, sterile
Tape, Adhesive, Roll, 2 cm
IV Cannula, injection port, s.u. 16 G (1.7 x 55 mm), Grey
IV Cannula, injection port, s.u. 18 G (1.2 x 45 mm), Green
IV Cannula, injection port, s.u. 20 G (1.0 x 32 mm), Pink
IV Cannula, injection port, s.u. 22 G (0.8 x 25 mm), Blue
Needle, 19 G (1.1 x 40 mm), Cream, IV
Needle, 21 G (0.8 x 40 mm), Green, IM
Needle, Intra-Osseous, 16G
Needle, Intra-Osseous, 18G
Needle, 22 G (0.7 x 90 mm), Blue

Needle, 25 G (0.5 x 90 mm), Orange
Set, Infusion, 'Y', Luer lock with air inlet
Set, Infusion, Pediatric
Syringe, 5 ml, 10 ml, 20 ml
Bougie, Gum Elastic, 50 cm, CH 5, CH 8, CH 14 Sterile
INTRAOPERATIVE EQUIPMENT
Handle for Laryngoscope
Laryngoscope, with Bulb, Fiberoptic
Laryngoscope, Macintosh blades, Adult
Laryngoscope, Macintosh blades, Pediatric
Spare bulb for Laryngoscope (2.7V)
Stylet for Intubation
Spare batteries for Laryngoscope, Dry cell, Alkaline, 1.5V, C(LR14)
Self-inflating Bag (Ambu), Adult/Child + Masks
Self-inflating Bag (Ambu), Child/Neonate + Masks
Valve for Self-inflating bag Ambu, Adult, 1 inlet, Complete
Valve for Self-inflating bag Ambu, Pediatric, Complete
Tourniquet, Pneumatic, Arm Cuff + Manometer + Leg Cuff
Concentrator, Oxygen, 10 L, 230V, 50 Hz
Pump, Suction, Electrical, 100-240 V
Pump, Suction, Mechanical (Twin Pump) + Collection bottles
Bandage, 6 cm x 5 m
Pressure Cuff, for pouch 500/1000 ml
Sphygmomanometer, One-hand manometer, Adult, Velcro
Sphygmomanometer, One-hand manometer, Pediatric, Velcro
Stethoscope, Double Cup, Clinician
Tourniquet, 100 x 1.8 cm, Elastic
Forceps, Hemostatic, Pean, 14 cm, Straight
Scissors, Dressing, 14.5 cm, Straight, Blunt/Blunt
Forceps, Magill, 24 cm, Adult
Forceps, Magill, 15 cm, Child
Battery, Dry cell, Alkaline, 1.5 V, R14 (C)
Connector, Biconical, Symmetrical, Ext. Ø 7-11 mm, Autoclavable
Oxygen Mask, Adult size
Oxygen Mask, Pediatric size

Tube, Silicone, Internal Ø 5 mm, 25 m, Autoclavable
Tube, Silicone, Internal Ø 8 mm, 10 m, Autoclavable
Thermometer, Electronic, Accuracy 0.1° C
Anesthesia Ventilator + Scavenger + Accessories
Capnograph/Pulse Oximeter, Portable
Monitor, Multiparameter + Accessories
Portable Anesthesia System + Scavenger
RECOVERY ROOM
Airway, Guedel, Size 0, Paediatric, Re-usable
Airway, Guedel, Size 00, Neonate, Re-usable
Airway, Guedel, Size 01, Infant, Re-usable
Airway, Guedel, Size 02, Toddler, Re-usable
Airway, Guedel, Size 03, Adolescent, Re-usable
Airway, Guedel, Size 04, Adult, Re-usable
Airway, Guedel, Size 05, Large Adult, Re-usable
Mask, Anesthesia, with Rim + Hook, Size 2: Child
Mask, Anesthesia, with Rim + Hook, Size 4: Adolescent
Mask, Anesthesia, with Rim + Hook, Size 5: Adult
Self-inflating Bag (Ambu), Adult/Child + Masks
Self-inflating Bag (Ambu), Child/Neonate + Masks
Concentrator, Oxygen, 10 L, 230V, 50 Hz
Oxygen Mask, Adult size
Oxygen Mask, Paediatric size
Oximeter, Pulse + Accessories
Sphygmomanometer, One-hand manometer, Adult, Velcro
Sphygmomanometer, One-hand manometer, Pediatric, Velcro
Stethoscope, Double Cup, Clinician
Tourniquet, 100 x 1.8 cm, Elastic
Torch, Pen Light, 2 x R6 batteries
Pump, Suction, Electrical, 100-240 V
Pump, Suction, Mechanical (Twin Pump) + Collection bottles

Table 7: Pediatric specific surgical supplies for intermediate surgical care (essential surgical package for first-level hospital)

Equipment	
Operating Room Positioning Supports for Children (Soft pads, Jelly pads, Pediatric OR straps)	
Temperature control- Bair Hugger; Radiant Warmer (Panda, Giraffe, Bassinet); Cotton Wool (Large Rolls)	
Flat weighing scales (infant)	
Post-operative crib with over-head safety constraints	
Ultrasound with Echocardiography capability	
Sphygmomanometers with pediatric cuffs (neonatal, small, medium, large)	
Otoscope and Screening audiometer	
Rhinoscope	
Ophthalmoscope	
Consumables	
Central Venous Catheters (Pediatric Sizes- 3- 7)	
Urethral Catheters (Pediatric Sizes- 6F, 8F, 10F, 12F)	
Nasogastric and Feeding Tubes (Pediatric Sizes- 6F, 8F, 10F, 12F)	
Plastic bags for eviscerated intestines or Preformed Silo	
Peritoneal dialysis catheters (Pediatric Sizes- 8F-10F)	
Chest tubes (Pediatric Sizes- 10F- 20F)	
Ventricular Drains (Pediatric Sizes)	
Cling film for bowel coverage	
Instruments (Major Procedures)	
No additional instruments necessary	
Instruments (Minor Procedures)	
Item	Quantity
Pediatric Cut Down Set	
Forceps, Artery, Halsted-Mosquito Curved 4 ^{3/4} "	3
Forceps, Artery, Halsted-Mosquito Straight 4 ^{3/4} "	3
Forceps, dissecting, Adson straight, 1/2 Teeth 4 ^{3/4} "	1
Forceps, dissecting, Adson straight, Non-Teeth 4 ^{3/4} "	1
Forceps, sponge holding 7"	1
Skin hook, Gillies, sharp	2
Skin hook, Blunt	1
Vessel hook 4 ^{3/4} "	2
Bard Parker handle for Surgical Blade No. 3	1
Needle holder, Mayo 5 ^{3/4} "	1

Scissors, ligature, Spencer 3.5"	1
Iris scissors Curved 3.5" & 4.5"	1
Iris scissors Straight 3.5"	1
Gallipot 30mls	1
Kidney dish 100mls	1
Anesthesia Supplies	
Tube, Endotracheal, Uncuffed, Balloon, Ø 2.5 mm for neonates and small children	
Tube, Endotracheal, Uncuffed, Balloon, Ø 3.0 mm for small children	
Laryngoscope, Miller blades, Neonates, Size 00 and 0	
Ambu Bags (bag valve mask, neonatal sizes)	

3. Supplies, Equipment and Infrastructure for Advanced and Complex Care

Table 8: Overview of essential childhood surgical supplies for referral hospitals by specialty (essential surgical package for advanced/complex surgical care)

Subspecialty	Pediatric Specific Supplies for Advanced Surgical Care	Pediatric Specific Supplies for Complex Surgical Care
Anesthesia	Multi-parameter intra-operative monitor	Automated Anesthesia Machine, Continuous and invasive intra-operative monitor
Cardiac Surgery	Same Supplies for First Level Hospital	Cardiopulmonary bypass machine, Catheterization laboratory with pediatric-sized arterial and venous catheters
Critical Care	Equipment for Neonatal Intensive Care Unit and Pediatric Intensive Care Unit, Equipment for full hematologic lab, Arterial Blood Gas Machine	Equipment for Burn Unit and Dialysis Unit
General Surgery	Infant Laparotomy Set, Pediatric Thoracotomy Set	Laparoscopic and Thoracoscopic Equipment, Endoscope, Colonoscope
Neurosurgery	Craniotomy instrument set	Intra-operative neurophysiology monitoring, Neuro-navigational system, Surgical microscope, Neuro-endoscopy
Ophthalmology	Slit lamp and lens, Direct ophthalmoscope	Optic Laser for ROP, Cataract surgical set, Orthoptic and Optometric equipment
Oral Maxillofacial	Dental laboratory casting machine	Dental surgical instrument set
Orthopedics Surgery	Pediatric Orthopedic Set (extra fine and fine), Antibiotic loaded cement, Prostheses, Surgical Drill and Saw, Functioning Arthroscope, Fracture Fixation Equipment	K-wire Kit, Broken Screw removal instrument kit, Spine instrument set, Hip & Pelvic osteotomy set, Limb reconstruction system, microdrill system
Otolaryngology	Same Supplies for First Level Hospital	Operative Microscope, Airway stents, Airway balloon dilators, Bronchoscopy, nerve monitoring system, FESS instruments
Plastic Surgery	Skin-graft mesher, Plastic surgery instrument set, Dermatome Knife	Vascular Doppler Machine, Electric dermatome, Operating microscope, Microsurgery instrument set
Radiology	Magnetic Resonance Imaging, Fluoroscopy Unit	Same as Advanced Surgical Care
Urology	Pediatric Urology Instrument Set	Urethroscope, Cystoscope, Ureteroscope, Lithotripsy machine, dialysis catheters

Table 9: Select pediatric specific surgical supplies for advanced and complex surgical care (essential surgical package for second-level, third-level and children’s national hospital)

Equipment
Orthopedic Equipment
Flexible nails
Trochanteric entry nails
Rush nail
Ender’s nail
Pediatric condylar plates and locked plates
AO type plate and screw set (small and standard)
Cannulated screw set
Kirschner wire (pediatric sizes)
Steinmann pin
8 plate set for temporary epiphysiodesis
Nerve stimulator (Botox infections)
Plastering and cutting equipment
Occupational and Physical Therapy Equipment (mobility aids)
Accessories for positioning children lateral and prone
Spica table
Orthopedic beds with traction apparatus
Hegar’s Dilator Set (full range of 8 dilators, double ended)
3mm/4mm
5mm/6mm
7mm/8mm
9mm/10mm
11mm/12mm
13mm/14mm
15mm/16mm
17mm/18mm
Radiology
X-ray Machine (fixed, conventional)
X-ray Machine (mobile, conventional)
X-ray Machine with Fluoroscopy
X-ray Machine (Low dose/Lodox®)
Ultrasound Machine (conventional)

Ultrasound Machine (Vascular Doppler/Duplex)	
Computed Tomography Scanner	
Magnetic Resonance Imaging Machine	
Equipment Necessary for Additional Specialty Units	
Neonatal Intensive Care Unit	
Pediatric Intensive Care Unit	
Burn Unit	
Dialysis Unit	
Catheterization laboratory & Cardiopulmonary bypass machine	
Endoscopic Suit (Upper, colonoscope, Urethroscope, etc.)	
Consumables	
Ventricular Drains	
Instruments (Major Procedures)	
Item	Quantity
Infant Laparotomy Instrument Set	
Bard Parker Scalpel Handle No. 3	2
Op Sciss Str Sh/bl 5 1/2"	1
Halsted Mosq Fcp Str 5"	6
Halsted Mosq Fcp Cvd 5"	6
Crile Fcp Str 5 1/2"	4
Crile Fcp Cvd 5 1/2"	3
Kocher Fcp Str Del 1x2 5 1/2"	3
Kocher Fcp Cvd Del 1x2 5 1/2"	3
Metz Lahey Del Crv Sciss 5 3/4	1
Metzenbaum Sciss Del Cvd 7"	1
Roch Pean Str Del 5 1/2"	3
Roch Pean Cvd Del 5 1/2"	3
Semkin Dress Fcp Nar Serr 5"	1
Semkin Tiss Fcp Nar 1x2 5"	1
Babcock Fcp 5 1/2"	3
Allis Tiss Fcp Del 4x5 6"	3
Yankauer Suct Tube Ped	1
Miller Senn Retr Shrp D/e 6"	1
Miller Senn Retr Blnt D/e 6"	1
Balfour Retr pediatric 1 1/4"	1
Adson Tiss Fcp 1x2 Del 4 3/4"	1

Adson Dress Fcp Serr Del 4 3/4	1
Parker De Retr Set/2 5/8x5	1
Zalkind Ribbon Retr 1/2"x7.75"	1
Zalkind Ribbon Retr 3/4"x7.75"	1
Ballengr Spng Fcps Str Serr 7"	2
Doyen-Baby Intestinal Clamps/Forceps (Straight, Non-crushing/attraumatic) 5"	2
Doyen-Baby Intestinal Clamps/Forceps (Curved, Non-crushing/attraumatic) 5"	2
Payr Intestinal Clamp 5-3/4"	2
Benson Pylorus Separator (Spreader) 5-3/4"	1
Autoclavable Instrument Tray/Box	1
Pediatric Urology Instrument Set	
Hartmann Mosquito Straight Delicate Ser 3 -1/2"	3
Hartmann Mosquito Curved Delicate Ser 3 -1/2"	3
Halsted Mosquito Forceps Straight 5"	6
Halsted Mosquito Forceps Curved 5"	6
Bard Parker Handle No. 3	2
Mayo-Hegar NH 7"	1
Crile-Murray NH Serrated 6" T-C Grip	1
Ryder Micro NH Serrated 6" T-C	1
Slender Tip Scissors Curved 5 -1/2"	1
Ragnell Dissecting Scissors Curved 5"	1
Semkin Dressing Forceps Nar 5"	2
Semkin Tissue Forceps Narrow 1x2 5"	2
Miller-Senn Retractor Sh D/E 6"	1
Miller-Senn Retractor Bl D/E 6"	1
Aim Retractor 2-3/4"	1
Operating Scissors S/BSt 5-1/2"	2
Strabismus Scissors Straight 4 -1/2"	1
Mayo Dissecting Scissors Straight 5 -1/2"	1
Mayo Dissecting Scissors Curved 6 -3/4"	1
Scissors Blunt Curved 5 -3/4"	1
Crile Forceps Straight 5 -1/2"	12
Crile Forceps Curved 5-1/2"	12
Wagner Scissors Straight S/S 4 -3/4	2
Wagner Scissors Curved S/B 4 -3/4"	1
Brown Adson Tissue Forceps 4-3/4"	2

Jansen Retractor Sh 3x3 4"	1
Adson Forceps Straight 7 -1/4"	3
Adson Forceps Curved 7 -1/4"	3
Frazier Suction Tube 12 Fr	2
Adson Tissue Forceps 1x2 4 -3/4"	1
Adson Dressing Forceps Serrated 4 -3/4"	1
Gemini Clamp Delicate Ang 5 -1/2"	2
Crile Retractor D/E Small	2
Zalkind Ribbon Retractor - 3/4" x 7"	2
Autoclavable Instrument Box/Tray with Cover	1
Pediatric Thoracotomy Set	
Weinstein Instrument Holder 10	2
Halstead Mosq Fcps Cvd Satin 5"	2
Crile Fcps Cvd Satin 5.5"	4
Crile Fcps Str Satin 5.5"	2
R-Pean Fcps Cvd Satin 4.5"	2
R-Pean Fcps Cvd Satin 5.5"	2
R-Pean Fcps Cvd Satin 6 1/4"	2
Allis Tiss Fcps 4x5 teeth 5 1/4"	2
Allis Tiss Fcps 5x6 teeth 6 1/4"	2
Allis Tiss Fcps 5x6 teeth 7"	2
Babcock Tiss Fcps Atraumatic 6"	2
Babcock Tiss Fcps Atraumatic 7"	2
Ochsner Fcps Str Satin 6 1/4"	2
Schmidt Fcps Closed Ring 7 1/2"	2
Bridge Fcps Cvd Paediatric	2
Mixer Fcps Baby 5 1/4"	2
Mixer-O'Shaughnessy Fcps Horiz Serr 7 1/4"	2
TC Masson Needle holder 10 1/2 "	1
TC Mayo-Hegar Needle holder 5 3/4"	1
TC Mayo-Hegar Needle holder 6 1/4"	1
TC Mayo-Hegar Needle holder 7 1/4"	1
TC Mayo Scs Cvd 4 1/2"	1
TC Metz Scs Cvd 6 3/4"	1
TC Metz Scs Cvd 7 1/8"	1
TC Metz Scs Cvd 8 1/8"	1

TC Mayo Scs Str 6 ^{3/4} "	1
Debakey Tangent Vascular Clmp Pediatric 3 ^{7/8} "	2
Debakey Tangent Vascular Clmp Pediatric 4 ^{7/8} "	2
Debakey Tangent Vascular Clmp Pediatric 5 ^{7/8} "	2
Duval Lung Fcps 7 ^{3/4} "	2
Foster Sponge Fcp Str Satin 7 ^{1/8} "	1
Edna Towel Fcps 3.5"	2
Backhaus Fcps Satin 4 ^{3/8} "	2
Bard Parker Handle for Surgical Blade 3	2
Dressing Fcps Serrated 4.5"	2
Dressing Fcps Serrated 5 ^{3/4} "	2
Dressing Fcps Serrated 6 ^{7/8} "	2
Tissue Fcps 1x2 teeth 4.5"	2
Tissue Fcps 1x2 teeth 6 ^{7/8} "	2
Debakey Vasc Tiss Fcps 6 ^{1/4} "	2
Debakey Vasc Tiss Fcps 7 ^{7/8} "	2
Potts-Smith Dress Fcps 7 ^{1/8} "	2
Russian Tiss Fcps 6"	2
Adson Tiss Fcps 1x2 teeth 4 ^{3/4} "	2
Us Army-Navy Retr Set/2 6"	1 (set)
Cushing Vein Retr 7"	1
Richardson Retr Loop-Handle Small	2
Richardson Retr Loop-Handle Medium	2
Kelly Retr Loop-Handle Small/Medium	2
Balfour-Baby Abd Retr 4 ^{7/8} "	1
Finochietto Rib Retr Infant	1
Finochietto Rib Retr Baby	1
Finochietto Rib Retr 135 mm spread	1
Bailey-Baby Rib Contractor 6 ^{1/8} "	1
Bailey Rib Contractor (short claws) 7 ^{7/8} "	1
Bailey Rib Contractor (long claws) 7 ^{7/8} "	1
Killingbeck/Allison Lung Retr Infant	1
Killingbeck/Allison Lung Retr Pediatric	1
Autoclavable Instrument Tray/Box with cover	1
Pediatric Orthopedic Instrument Sets	
Bone instruments	

Bone levers	
Hohman's retractors blunt and sharp	
McDonald's retractor	
Nibblers	
Mallet	
Osteotomes (all sizes)	
Cobb's elevators	
Periosteal elevators	
Sequestrum forceps	
Bone Curettes and bone hooks	
Fine instrument set	
Hand drill	
Hand saw	
Gigli saw	
Power instruments (Small and Large)	
Air pen drives	
Drill	
Microdrill system	
Saw	
Burr and K-wire Driver	
Pediatric Orthopedic Trauma instruments	
Dynamic compression plates and screws	
Mini-fragment set	
Cannulated screw set 4 mm and 7 mm	
Mini-external fixators	
Tubular fixators	
Circular fixators	
Limb reconstruction system	
Corticotomes (pediatric sizes)	
Miscellaneous	
Kirshner-wire Kit	
Broken Screw Removal Instrument Kit	
Spine Instrument Set	
Hip/Pelvic Osteotomy Set	
Joint and bone replacement Sets (replacement after tumor resections)	
Needles for soft tissue biopsy, bone biopsy, bone marrow aspiration	

Rang retractors for sciatic notch	
Additional Surgical Instrument Sets and Kits	
Laparoscopic and Thoracoscopic Equipment	
Pediatric Plastic Surgery Set	
Functioning Arthroscope with related equipment	
Craniotomy Instrument Set	
Dental surgical instrument set	
Instruments (Minor Procedures)	
Instrument	Quantity
No additional Minor Procedure Sets Necessary	
Anesthesia	
Multi-parameter intra-operative monitor	
Automated Anesthesia Machine, Continuous and invasive intra-operative monitor	

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