Clinical Simulation and Patient Safety Laboratory

The Clinical Simulation and Patient Safety Laboratory will be a Multi-Professional Training area which will be based in Medical Unit II of Jinnah Postgraduate Medical Centre. It will be equipped with a variety of simulators and manikins to support the training of Clinical Skills. These skills will be taught in combined groups of Doctors, nurses and paramedical staff, thus mimicking the actual situation.

This is a new approach to enhance the quality of training programs delivered at undergraduate and postgraduate level. Among its objectives are to encourage self-study, to enable students to get accustomed to best suited learning strategies as well as to enhance study skills.

Anatomical models will promote learning of normal anatomy and to clarify concepts of various deviations from it in disease states. This will greatly enhance the quality of care delivered to the patients.

Simulation-based Training Program

Resuscitation station:

This will be state of the art resuscitation room for the training of Medical students, Doctors, Post graduate trainees, Nurses and other paramedical staff.

Review of written literature is necessary but not sufficient to achieve competency. Research indicates that optimal acquisition and retention of knowledge and skills by adults is achieved by active participation rather than by passive observation. Random observation of senior colleagues who theoretically have more experience in a particular field (learning by osmosis) assumes that those colleagues always serve as good role models, that their attributes can be incorporated into the behaviors of the trainee, and that the appropriate spectrum of situations is observed. This, however, is not universally true. Trainees may not be able to distinguish poor role models from those who are superb. Assimilation of certain professional attributes may prove a difficult task for particular trainees. The period of training or apprenticeship is limited in time and depth; therefore, the experience obtained by individual trainees may vary greatly. In addition to these factors, the characteristics of the training environment itself also have an impact on the trainee. Many professionals work in dynamic domains characterized by

intense time pressure, unpredictable responses, complex communication patterns involving multiple personnel and high risk. Successful operation within dynamic domains requires the use of decision-making skills that are distinctly different from those required in relatively static domains, such as those found in clinic-based medicine. Because many training environments lack the features associated with dynamic domains, the professionals training within these environments are not afforded the opportunity to acquire and practice these unique decision-making skills.

Many medical domains are as dynamic in nature as the cockpit of a plane. Although crises arise much more frequently in medicine than in aviation, some specific crisis situations may never be encountered during training, and only rarely during a career. Yet physicians and other health care personnel are expected to make rapid and correct decisions despite what may be a true lack of practical experience in managing a particular medical emergency. This was first noted by anesthesiologists—physicians charged with management of the technologic, pharmacologic, and human resources in the operating room. Recognizing the potential benefits of training in simulated medical environments, anesthesiologists and engineers developed life-like sophisticated adult patient simulators equipped with realistic physical and physiologic features and placed these devices within a physical environment containing real working medical equipment to simulate an actual operating room with high fidelity. Based in part on the Crisis Resource Management (CRM) programs used in aerospace, a training program in Anesthesia Crisis Resource Management (ACRM) was developed in 1990. This program combines training in the appropriate technical interventions with defined behavioral skills deemed vital to crisis resolution. Simulation-based ACRM training has been ongoing in anesthesiology for nearly a decade and at multiple sites around the world.

The dynamic nature of the delivery room is similar to that of the operating room. Because many neonatal morbidities actually have their genesis in utero, the pediatrician may be faced with a patient who requires vigorous resuscitation immediately at birth. Decisions made by the pediatrician may carry life-long consequences for both the infant and mother. Unlike the anesthesiologist, however, the pediatrician does not have the benefit of a sedated or anesthetized, well-monitored patient (as found in routine operating room cases in industrialized countries) and must rely on auditory (crying, breath sounds, and heart tones) and visual (skin color and muscle tone) cues present on physical examination, as well as on feedback from colleagues (eg, the bedside nurse) in determining the appropriate course of action.

The key to effective simulation-based training is achieving suspension of disbelief on the part of the subjects undergoing training, ie, subjects must be made to think and feel as though they are functioning within a real environment, where their actions are associated with real consequences. This is difficult to achieve in traditional training settings such as classrooms, which lack the multiple cues found in dynamic, complex, technical domains.

High-fidelity simulation-based training offers advantages over traditional training models. Simulators are controlled environments in which multiple intense clinical experiences can be provided in a relatively brief period. These clinical experiences can be scaled to fit the level of the trainee, whether he or she is a novice or veteran. Unlike the real world, the simulator offers the convenience of scheduling and the option of repetition. Because the simulator is stocked with real medical equipment and populated with interactive human colleagues, trainees must actively demonstrate appropriate technical and behavioral skills and are unable to simply talk their way through difficult scenarios. The use of videotape provides an objective, time-coded record of trainee communication and actions and creates a powerful stimulus for learning during facilitated debriefings. Because the activities in the simulator pose no risk to patients or to professional liability, trainees are allowed to witness the natural evolution of mistakes without the need for intervention by senior faculty. Finally, simulators reduce the use of hospital resources by supplanting expensive patient care arenas as the location for clinical teaching and recycling supplies and devices that normally would require disposal if used on real patients.

The use of real working medical equipment, sophisticated patient simulators, high-quality yet unobtrusive audiovisual recording and playback devices, and faculty with expertise in both the medical and educational aspects of simulation-based training is more expensive in comparison with traditional training programs. However, the experience in other high-risk domains, such as aerospace, indicates that the more realistic the simulator, the greater the suspension of disbelief on the part of trainees, and the more effective the training. Because of the expense of, and technical expertise required for, high-fidelity simulation-based training, both the aerospace industry and professionals in the field of anesthesiology use simulators as regional resources. Although cost prohibits the presence of a sophisticated simulator in every hospital, certain aspects of simulation-based training (such as recording the actions of trainees on videotape) may be easily incorporated (although in a less sophisticated fashion) on a local level.

Construction:

Area 12000 Sq Feet
Expected Cost 15 Million Rupees

a. Library/E-library space
b. Lecture rooms
c. Demonstration stations
d. Resuscitation stations

Manpower required:

Name of Post	BPS	No. of Posts	Qualification	Experience
1. Medical officers	17	02	M.B.B.S	One year
2. Manager/ Administrator	17	01	M.Sc/M.A	Three years
3. Skills Librarian	16	01	Graduate	Two years
4. Computer Operator	16	01	B.sc	Two years
5. Stenotypist	12	01	Graduate	Three years
6. Skills lab Assistant	11	04	F.Sc	Two years
7. Security Guard	01	01	Primary	6 months
8. Sanitary Worker	02	01	Nil	6 months

Furniture:

Expected cost: Rs: 6 Million

This will include Chairs, tables, demonstration tables for training manikins and models, computer tables, cupboards for library, 2 Beds for resuscitation.

Air Conditioning:

Expected Cost: Rs: 2 Million

As the lab will be equipped with sensitive equipment and machines, therefore it is essential that the temperature and dust be controlled for proper functioning and safety of the equipments.

E-Library Items:

Expected cost: Rs: 2 Million

This will include **08** Computers. **01** Scanner, **03** Printers **01** Multimedia Projector, **01** Barcode reader, **01** Powder Photostat Machine , 02 Video cameras, 02 Flat Screen Televisions.

Training Manikins and Models:

1. Skeletal Torso with Internal Organs :
Quantity 01, Expected cost Rs: 215,757

Measurements: 99, 1x40, 6x40, 6 cm

This model allows a student to study how the internal organs are positioned inside the skeleton.

Features include:

- Removable calvarium cap for neurocranial studies
- Breakaway maxilla revealing paranasal sinuses supported by spring-mounted, detachable mandible
- 2-part brain
- Rib cage with vertical split and hinged sternum allows access to lungs and heart
- Deluxe male pelvis is hinged and sagittally sectioned so right hip swings out 45°
- 2-part heart
- Lobar lung
- Organs removable for detailed study include the liver, stomach, pancreas, spleen, colon and mesentery, kidney and small intestine
- Stand

2. Brain with Arteries on Base of Head, 8-part
Quantity 01, Expected cost Rs: 34,679

Measurements: 15x15x23 cm

This C20 deluxe brain comes with opened head to allow detailed study of the brain's position in the skull. The head is horizontally divided above the skull base. The deluxe brain model is medially opened to show the brain arteries as well as the removable basilar artery.

Both halves can be disassembled into:
- Frontal with parietal lobes
- Temporal with occipital lobes
- Brain stem
- Cerebellum

3. Eye, 3 times full-size, 7-part
Quantity 01, Expected cost Rs: 22,601

Measurements:18x26x19 cm

This model shows the optic nerve in its natural position in the bony orbit of the eye (floor and medial wall). The eyeball is dissectible into:

- Both halves of sclera with cornea and eye muscle attachments
- Both halves of the choroid with iris and retina
- Lens
- Vitreous humour

On base.

4. Giant Brain, 2.5 times full-size, 14-part
Quantity 01, Expected cost Rs: 64,142

Measurements:34x30x37 cm

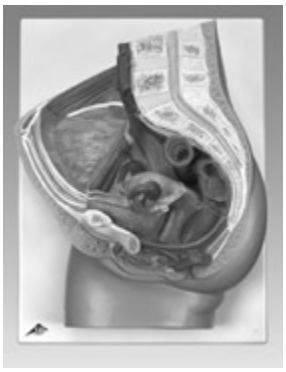
A comprehensive brain model that is also a very useful teaching aid, especially for large groups of students.
All structures of the brain and the ventricles are visible through median, frontal and horizontal divisions.
Delivered on removable base.

5. Functional Larynx, 3 times full-size
Quantity 01, Expected cost Rs; 19,215

Measurements: 32x13x15 cm

Epiglottis, vocal cords and arytenoid cartilage are movable.

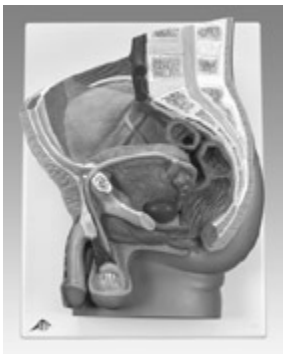
6. Female Pelvis, 2-part
Quantity 01 Expected cost Rs: 15,921



Measurements: 41x31x20 cm

Median section. One half of female genital organs with bladder, rectum is removable, one half is shown at the normal position in the female pelvis.
Delivered on baseboard offering the possibility to be mounted to the wall.

7. Male Pelvis, 2-part
Quantity 01 Expected cost Rs: 15,921



Measurements:41x31x17 cm

Median section. One half of male genital organs with bladder, rectum is removable, one half is shown at the normal position in the male pelvis. Delivered on baseboard offering the possibility to be mounted to the wall.

8. Ligament Skeleton Leo, on 5-feet- roller stand:
Quantity 01,Expected cost Rs: 65,880

In addition to the standard benefits of a 3B Scientific skeleton, Leo provides representations of the structural interaction between bones and ligaments. Is elastic ligaments on the major appendicular joints (shoulder, elbow, hip and knee) are mounted on the right side.

- Excellent price-performance ratio
- 3-year warranty
- First-class natural cast "Made in Germany"
- Manual final assembly
- Made of durable, unbreakable plastic
- Almost realistic weight of the approx. 200 bones
- Life-size
- 3-part mounted skull
- Individually inserted teeth
- Limbs are quick and easy to remove
- Stand and dust cover included

9. Skull on Cervical Spine, 4-part:
Quantity 01,Expected cost Rs: 15,098

Measurements: 20x13, 5x15, 5 cm

This flexibly mounted version on a stand with a cervical spine. Also represented are the hindbrain, spinal cord, cervical nerves, vertebral arteries, basilar artery and rear cerebral arteries. On stand.

- High-quality original casts
- Hand-made of hard, unbreakable plastic
- Highly accurate representation of the fissures, foramina, processes, sutures etc.
- Can de disassembled into Skull Cap, Base of Skull and Mandible

10. Classic Flexible Spine with femur heads and painted muscles:
Quantity 01 Expected cost RS: **14,615**

Measurements: 83 cm

Classic Flexible Spine with femur heads and painted muscles
Painted spines add a new dimension to demonstrations. Muscle origins (red) and insertions (blue) are painted on left innominate, femur and vertebrae.

- Extremely good valued and durable.
- Full pelvis and occipital plate
- Fully flexible mounting
- L3-L4 disc prolapsed
- Spinal nerve exits
- Cervical vertebral artery
- Male pelvis
- With movably mounted femur heads

Stand is not included, please see A59/8.

Replacement Parts & Options: A58/3

- Multifunctional Spinal Column Stand, 3-part (Options)

11. Dual-Sex Life-Size 41-part Human Model:
Quantity 01 Expected cost RS: 587,705

Measurements:174 cm

This totally new life-size (68") male/female model faciliates an understanding of human anatomy like no other model in the world! The dissectible human features a torso which has the skin removed from one half showing the underlying musculature of the chest, back, abdomen, head and neck. The front wall of the torso detaches to reveal the inner structures and organs in tremendous detail. In all, 41 component parts can be dissected from the model.

All removable parts:
- 2-part head
- Brain half
- M. sternocleido stoideus
- M. Deltoideus
- M. Biceps brachii
- M. Triceps brachii
- M. Palmaris longus with m. Felxior carpi radialis
- M. Brachioradialis with m. Extensor carpi radialis
- Skin of the left arm
- Muscled leg, upper part
- Muscle leg, lower part
- Skin of the left leg
- Abdominal cover
- Mammary gland
- 2 removable lungs
- 2-part removable heart
- Removable Liver
- 2-part removable stomach
- Removable kidney half
- 4-part removable intestines
- 3-part female genital insert with embryo
- 4-part male genital
- M. Satorius
- M. Gluteus maximus
- M. Rectus femoris
- M. Gastrocnemius
- M. Biceps femoris cap. L. with m. semitendinosus

12. Classic Heart with Conducting System, 2-part:
Quantity 01, Expected cost Rs: 8,784

Measurements: 19x12x12 cm

Highly transparent detailed 2-part heart at a price you will love.
The front heart wall is detachable to reveal the chambers and valves inside.
Just slightly smaller than life-size with exquisite detail throughout.
The complete conducting system is represented in color.
Delivered on removable stand.

13. Heart with Oesophagus and Trachea, 2 times life-size, 5-part:
Quantity 01, Expected cost Rs: 32,850

Measurements: 32x18x18 cm

This 2-times life-size heart model allows a very easy identification of all structures and is a perfect aid for lessons in big classrooms or lecture halls. The atrium walls and the front heart wall are removable to reveal the most professionally detailed and realistic heart available.Hand-painted in lifelike colours to depict dozens of items of anatomical interest.
Additionally depicts the upper section of the oesophagus, the upper bronchi and the ascending aorta and the front heart wall and the atrium walls can be removed.

14. Lung Model with larynx, 7-part:
Quantity 01, Expected cost Rs: 39,437

Measurements:31x41x12 cm

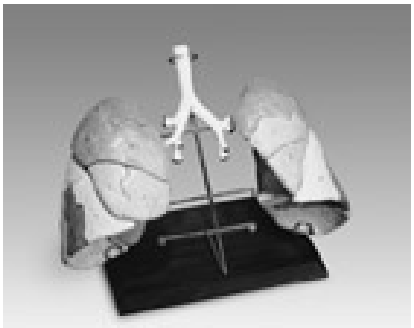
The first class model contains the following removable parts:
- 2-part larynx
- Trachea with bronchial tree
- 2-part heart
- Subclavian artery and vein
- Vena cava
- Aorta
- Pulmonary artery
- Esophagus
- 2-part lung (front halves removable)
- Diaphragm

On baseboard.

15. Arteriosclerosis Model, with cross section of artery, 2-part:
Quantity 01, Expected cost Rs: 5,033

With the help of this model doctors can explain changes in the blood vessels due to arteriosclerosis. A horizontally dissected artery fork is depicted with arteriosclerotic changes in four different stages, from slightly sedimented to a completely clogged vessel.

16. Segmented Lung Reproduction:
Quantity 01, Expected cost Rs: 82,442



Measurements:30x25x26 cm

Cast from actual human lungs with representation of bronchial tree, bronchioles and alveoli. 18 coded segments held together elastically and allow easy viewing of the internal structures.

17. Digestive System, 3-part:
Quantity 01, Expected cost Rs: 37,332

Measurements: 81x33x10 cm

Life-size model which demonstrates the entire digestive system in graphic relief.

Features:
- Nose
- Mouth cavity and Pharynx
- Oesophagus
- GI tract
- Liver with gall bladder
- Pancreas
- Spleen

The duodenum, caecum and rectum are opened. The transverse colon and front stomach wall are removable.
Mounted on baseboard.

18. Liver with Gall Bladder, Pancreas and Duodenum:
Quantity 01, Expected cost Rs: 10,614

Measurements: 4x20x18 cm

This excellent relief model shows the liver with:
- Ducts
- Gall bladder
- Pancreas
- Duodenum
- Vessels
- Extra-hepatic ducts with gall bladder
- Main pancreatic duct and their orifices

On baseboard.

19. Condom training model, white skin tone:
Quantity 01, Expected cost Rs: 6,863

Measurements: 7,5x7,5x19,5 cm

This model of an erect penis with testicles is used to quickly learn how to use a condom safely. The anatomical structures and its firmness are absolutely realistic, so that your students can train putting on and removing a condom in a realistic way. Supplied with 12 dry training condoms and a carrying bag.

- 12 Dry Condoms

20. Free-Standing Urinary System, male:
Quantity 01, Expected cost Rs: 49,776

Measurements: 51x33x20 cm

Represented are:

• Kidneys (right kidney in longitudinal section)
• Adrenal glands
• Abdominal aorta and its branches
• Inferior vena cava with branches
• Iliacal vessels
• Ureter
• Upper half of bladder and prostate (removable into pubic bone and symphysis as well as lower half of bladder and prostate).

21. Patient Care and BLS Manikin:
Quantity 01, Expected cost Rs: 228,018

Measurements:110x56x36 cm

This adult manikin features training of basic and advanced patient care as well as Basic Life Support functions.

Features include:

• Oral and denture hygiene
• I.m. (arm and buttock), i.v and subcutaneous injection
• Ostomy care (colostomy, ileostomy, and suprapubic stoma, each connected to an internal tank)
• Naso-gastric lavage and gavage
• Male and female catheterisation
• Enema administration
• Vaginal douching and pap smear exercises
• Palpable prostate
• Breast palpation (interchangeable male and 7 abnormal female breasts)
• Amputation stump
• 2 decubitus ulcers
• Eyes open and close (one pupil is dilated)
• Regular or counter pulsation CPR (Anatomically painted outline of cardiopulmonary features)
• Mouth to mouth resuscitation
• Palpable carotid pulse
• CPR Monitor: Displays cadence and depth of compression and ventilation

Supplied with ten totally disposable one-piece airways, neck brace, and carrying bag.

Replacement Parts & Options: W45001

- 10 airways (Replacement Parts)
- CPR Computer Link (Options)
- Blood Pressure Training Arm (Options)
- Blood Pressure Training Arm with Speakers, 110 Volt (Options)
- Blood Pressure Training Arm with Speakers, 220 Volt (Options)

22. Blood Pressure Training Arm:
Quantity 01, Expected cost Rs: 83,540

Palpable antecubital pulse

- Blood Pressure Trainer with LCD guided operation
- Systolic, diastolic, heart rate and auscultatory gap are programmable
- Representation of both systolic and diastolic pressures
- Indication of gauge reading as pressure is increased or decreased
- Volume adjustable

Includes blood pressure trainer, cuff, 9-volt battery and carry case.

23. Blood Pressure Training Arm:
Quantity 02, Expected cost RS: 63,593 x 2 = 127,186

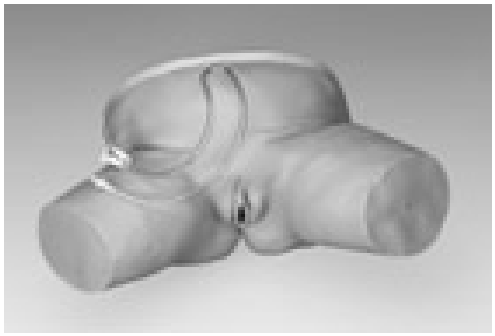
Measurements: 89x38x23 cm

This left arm connects to adult Patient Care Manikins
(if mentioned as an option).
Systolic and diastolic pressures, auscultation gap
and pulse rate are adjustable.
The cuff pressure can be seen on a display.

Features include:

- Palpable radial pulse when cuff pressure is less than the selected systolic blood pressure
- Korotkoff sounds K1 to K4 (K5 is silence) are audible in the antecubital area between systolic and diastolic pressures
- Korotkoff sounds are automatically silenced if auscultation gap is selected
- Korotkoff sounds are automatically adjusted depending upon selected heart rate and rate of cuff reduce space deflation

International power supply 100 to 240 V. Supplied with stethoscope, sphygmanometer cuff with tubing assembly and carrying bag.



24. Catheterisation Simulator, female
Quantity 01, Expected cost Rs: 41,999

Measurements: 61x40,5x33 cm

This simulator consists of a female abdomen and allows you to feel the pressure and resistance when a catheter is passed through the urethra and sphincter into the bladder. When the catheter enters the bladder, artificial urine (water) will flow through the catheter.
Realistically moulded external genitalia and perineum, labia minora, clitoris, urethral opening and vaginal introitus.

Delivered with catheter, lubricant, carrying case.

- 10 Urethral Catheter, CH16 (Replacement Parts)
- Ultrasonic Coupling Gel (Replacement Parts)

25. Catheterisation Simulator, male
Quantity 01,Expected cost Rs: 41,999

Measurements:43x25x30,5 cm

This simulator consists of a male abdomen and allows you to feel the pressure and resistance caused by the mucosal folds, bulbous urethra and the internal urethral sphincter, just prior to the entrance into the bladder. When the catheter enters the bladder, artificial urine (water) will flow through the catheter. Proper positioning and movement of the penis during the catheterisation can be easily practiced.

Delivered with catheter, lubricant and transport case.

- 10 Urethral Catheter, CH16 (Replacement Parts)
- Ultrasonic Coupling Gel (Replacement Parts)

26. Auscultation Trainer and SmartScope
Quantity 01, Expected cost Rs: 216,885

Measurements:68,6x43,2x27,9 cm

This simulator allows training of the auscultation of various heart and lung sounds as in a real patient.

The instructor can select various conditions by a wireless remote control. When the student has identified the correct auscultation sites by palpating, the heart and lung sounds can be heard by using a special Stethoscope SmartScope. The simulator has 6 heart sites and 2 lung sites on the anterior and 16 lung sites on the posterior. One remote control can operate multiple sets of SmartScopes and manikins simultaneously so that this simulator is also great for group instruction. Remote control works over a range of up to 30 meters. The simulator is supplied in a storage case and comes with one remote control and one SmartScop with single- and dual-user headpieces.
Operates using three “AAA” batteries (included).

The following sounds can be auscultated:

Heart sounds:
1. Normal
2. Aortic regurgitation
3. Pulmonary stenosis
4. Mitral stenosis
5. Holosystolic
6. Mid-systolic
7. S3 Gallop
8. S4 Gallop
9. Systolic click
10. Atrial septal defect
11. PDA
12. VSD

Lung sounds:
1. Normal tracheal
2. Normal vesicular
3. Wheezes
4. Mono wheeze
5. Fine crackle
6. Coarse crackle
7. Ronchi crackle
8. Stridor
9. Cavernous
10. Bronchovesicular
11. Bronchial
12. Pulmonary edema
13. Infant
14. Friction rub
15. Egophony
16. Pectoriloquy

27. I.v. Injection Arm
Quantity 01, Expected cost Rs: 33,855

Measurements:74x19x14 cm » Product Manual

This injection arm, made of 3B SKINlike silicone, is unique in quality and design and allows realistic training to teach competence to medical staff. It is also very suitable for group instruction because of its high quality, stain resistance and easy-to-clean soft material. It is ideal for practicing:

• Intravenous injections
• Correct puncture of peripheral veins for blood sampling. The following veins can be punctured: basilic vein, cephalic vein, median cubital vein, dorsal venous rete of hand
• Positioning of a venous catheter
Delivered with stand, artificial blood, 2 replacement tubing systems, plastic bottle, syringe and deluxe storage carton.

28. I.m. Injection Simulator
Quantity 01, Expected cost Rs: 186,477

Measurements:10x41,5x15 cm

This easy to handle simulator represents an upper arm from elbow to shoulder and allows practicing of both intramuscular and subcutaneous injection. Bones such as clavicula, humerus and acromion can be felt to find the correct position for injection in which injection liquid (water) can be poured in. If the injected part is incorrect, a buzzer, which works with a 9 volt battery and a red light, will give a warning sound. The durable, soft and very realistic skin shows no needle marks even after many exercises.

29. Adult CPR Manikin with Light Controller
Quantity 01, Expected cost Rs: 91,043

Measurements: Length: 165 cm
This full-size manikin allows the training of BLS rescue techniques and CPR.
The resiliency and weight of the body is very realistic.

Features include:

• Natural resistance to chest compression
• Palpable carotid pulse
• Anatomical landmarks such as sternum, ribcage and sub-sternal notch
• Airway ball valve which allows the lungs to inflate only if the head is extended and accurately positioned
• Light controller which confirms correct hand placement, ventilation volume and compression depth

30. Intradermal Injection Simulator
Quantity 01, Expected cost Rs: 14,640

Measurements: 33x28x13 cm

The simulator features a forearm from the wrist to just below the elbow.
Vinyl skin provides realistic feel and appearance to ensure a realistic training experience. The simulator features eight sites for practicing intradermal injections.
If fluid is properly injected, a characteristic skin welt will form. The welt is removed by withdrawing the fluid after practice. Each site is reusable by dozens of students.
Supplied with sealant, syringe and storage box.

31. Two-in-One i.m. Injection Model of Buttock
Quantity 01, Expected cost1 Rs: 567209

Measurements:38x35x22 cm

This unique model of an human buttock has a special two-in-one function:
On the right hand side, the anatomy of the bones, ilium crista, greater trochannter, m. gluteus medius, nerves and veins can be studied through the transparent outer structure.
The student can transfer what he has learned about the position of nerves, veins etc. to the left hand side on which intra-muscular injections can be practiced. Anatomical landmarks can be palpated through the soft skin to identify the correct positions for injection. The injection of fluid (water) is possible. Correct injections are confirmed by a green light, if the injection is placed in a wrong position or too deep, a red light will appear and a buzzer will sound.

32. Prostate Examination Simulator
Quantity 01, Expected cost Rs: 67,253

Measurements: 54,5x38x30,5 cm

This simulator consists of a male abdomen body and 4 different interchangeable prostate glands which can be inserted to allow realistic practice in diagnosis by rectal examination.

The 4 prostate glands represent the following characteristics:

- Benign, slightly enlarged, but otherwise normal
- Beginning stage of carcinoma, a discrete, hard nodule is palpable in the upper right quadrant
- The spread of carcinoma is demonstrated, the small nodule has increased in size and has become an external hard mass on the surface of the gland
- Totally replaced with carcinoma, the entire gland feels hard and irregular

Supplied with lubricant, cleaner and transport case.

33. Adult ACLS Manikin with Interactive Arrhythmia Simulator

Quantity 01, Expected cost Rs: 420,443

Measurements:119 cm

This full body manikin offers a wide range of ACLS training possibilities including arrhythmia recognition and confirmable defibrillation. The manikin is supplied with a storage case and allows training of the following ACLS procedures:

CPR
• Palpable and visual landmarks
• Fully articulated head, neck and jaw
• A printer unit allows CPR evaluation (adult/child mode, confirmation of proper hand placement, shows compression rate and depth plus ventilation duration and volume)

Airway Management
• Realistic anatomy of the mouth, tongue, oral pharynx, larynx, epiglottis, vocal cords, trachea and oesophagus
• Cricoid cartilage allows for practice of Sellick manoeuver
• Separate left and right lungs for auscultation
• Suctioning capabilities
• Oral, nasal and digital intubation capabilities

I.v. and I.m. Injection (at arm)
• Articulated at the biceps for antecubital and dorsal access
• Bony landmark at shoulder to identify muscle tissue for i.m. injections
• Realistic flashback from a pressurized system

Blood Pressure Measurement
• Instructor determines systolic and diastolic levels, heart rate and sound volume
• Speaker in arm reproduces real blood pressure sounds
• 5 Korotkoff phases can be turned on and off
• Auscultatory gap can be turned on and off

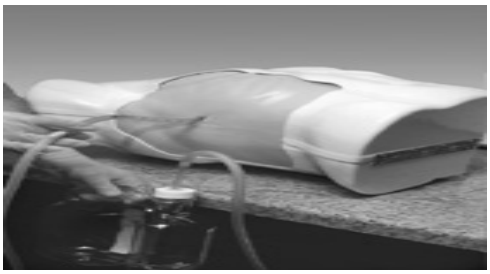
Defibrillation Chest
• Internal load box absorbs full strength of every shock
• Manual, semi-automatic, automatic defibrillation
• Monitor manikin like a real patient at 4 ECG sites and 2 defibrillation sites
• Compatible with all standard brands and types of defibrillators and ECG-monitors

Interactive ECG-Simulator
This external unit allows defibrillator and pacer training directly on the manikin. (A training without a manikin is also possible). Various ECG rhythms can be generated and displayed on an ECG-monitor (not included) for diagnostic and defibrillation training. All arrhythmias can be displayed in adult or pediatric mode so that a total of 34 rhythms are available.

• The following 6 different arrhythmias are available for pacer training: Sinus Brady, Junctional Brady, 2nd degree type I A-V block, 2nd degree type II A-V block, 2nd degree type II A-V block with PVCs and 3rd degree A-V block.
• Cardioversion can be simulated by defibrillating the manikin with a manual, semi-automatic, or automatic defibrillator. The following 11 arrhythmias are available for defibrillator training: V. Fib, V. Tach (fast), V. Tach (slow), V. Tach (polymorphic), A. Fib, A. Flutter, SVT, Sinus Tach, Sinus rhythm with PVCs, Asystole and NSR.
• An LED illuminates for: pacer pulse detection, defibrillator discharge detection, adult mode, pediatric mode and low battery. Battery saver feature powers-off simulator automatically when not in use.

34. Chest Drain Simulator

Quantity 01, Expected cost Rs: 164,609



Measurements:57 x 37 x 43 cm

FOR ADVANCED TRAUMA LIFESUPPORT COURSES

This innovative design not only simulates realistic body tissue but provides an alternative to the use of animals. The design is unique in having a replaceable chest wall with ribs that are encased into the realistic simulated flesh that forms the torso. This fleshy part is replaceable and can used for up to 25 incisions. It is housed in a white plastic torso-shaped box that is firmly secured and has strong sucker-feet to ensure non slip use on smooth table-top surfaces. The torso presents as a patient lying on his back.

· Surgical access is lateral to the pectoralis major
· The arm has been removed for easier access and extended for anatomical relevance
· The ribs can be clearly felt below the surface of the skin
· Trainees can make an incision through the fleshy part, surgically dividing the tissue with blunt forceps until the plural cavity is clearly felt by finger insertion
· Complete finger rotation is possible, allowing the trainee to ensure that there are no obstructions before a drainage system can be introduced
· The popping effect of passing through the pleura is realistic and a unique feature
· A drain can be securely sutured into position onto this simulated flesh
· The trainer needs no preparation, no refrigeration, no messy disposal after use and no unpleasant odours

Trainer includes a replaceable:
• Chest wall
• Pericardiocentesis where fluid can be drawn into a syringe
• A realistic Tension Pneumothorax where air can clearly be heard and felt exhaling between the 2nd and 3rd ribs

35. Ambu Man Full Body

Quantity 01, Expected cost Rs: 232,407

The Ambu Man is an adult-sized training manikin that provides an exceptionally lifelike representation of the human anatomy, particularly those features important to training in modern resuscitation techniques.
Ambu's patented hygienic system protects the student and makes internal cleaning entirely unnecessary. The stiffness of the chest is infinitely variable, allowing students to train on different body builds. The Ambu Man is ACD CPR-compatible. Airways open only when head is correctly hyperextended. A carotid pulse can be activated manually by the instructor. It is also activated during chest compressions. The lifelike anatomy makes it suitable for training of correct placement of defib pads in training use of Automated External Defibrillators (AED).

36. Ambu Airway Management Training:

Quantity 01, Expected cost Rs: 123,225

The Ambu Airway Management Trainer is for teaching Intubation techniques with all known tubes and supraglottic airway devices The left side of the head is open, permitting supervision of the student's performance. The walls of the pharynx and trachea are transparent, enabling the student to follow the tube down the throat. Acoustic signals triggered by excess pressure on the teeth help the student to correct mistakes. If desired, signal sensitivity can be adjusted. Intubation difficulty can be adjusted so that different patient types can be simulated.

Features:

- Accurate simulation of mouth, nostrils, teeth, tongue, pharynx, epiglottis, vocal cords, trachea, esophagus, lungs,
- Realistic lifting and tilting of head and movement of the spine
- Realistic movement of the head, cervical spine and jaw simulate relevant anatomical changes during intubation.
- Open left side of face allows control over trainee's techniques
- Transparent walls of pharynx and trachea permitting instructor to follow progress of endotracheal tube
- Acoustic signals help trainee correct mistakes
- Realism at an affordable price
- Can be used to train use of LMA and Combitube
- Easy cleaning and maintenance.

37. Ambu CPR:

Quantity 01, Expected cost Rs: 22,785

Ambu meets the challenge of making advanced CPR training manikins that will improve student's CPR skills thereby saving lives.

The Ambu patented hygienic system protects the student and makes internal cleaning entirely unnecessary. Look - Listen - Feel. Just as in real life, ventilation can be seen and exhalation through the nose and mouth can be felt and heard. Lightweight and sturdy, hence very easy to transport. The airways open only when the head is correctly hyper-extended and stomach inflation is indicated by a whistling sound. ACD CPR-compatible (optional ACD CPR base board). It is a lightweight and sturdy manikin, hence it can easily be transported. Meets all of the American Heart Associations recommended manikin guidelines.

Features:

- Meets all of the American Heart Associations recommended manikin guidelines
- Moveable Jaw
- No internal cleaning necessary
- Ambu's patented hygienic system
- Audible indication of stomach inflation
- Open airway only when head tilt, chin lift or jaw thrust is correct
- Interchangeable face pieces with all models
- 2 face piece and 25 head bags included
- Carry case included

38. Ambu Defib Trainer System:

Quantity 01, Expected cost Rs: 277,605

The system is designed for practising early defibrillation with AEDs, semi-automatic and manual defibrillators. Furthermore, mouth-to-mouth and mouth-to-barrier ventilation can be trained.

The manikin has the tried and tested mechanical monitoring instrument that gives you instant feedback on ventilation volume, stomach inflation, chest compression depth and wrong hand position. Patented hygienic system, avoiding cross-infection and internal cleaning, and letting the manikin exhale through nose and mouth. Chest rigidity is adjustable so that different body builds can be simulated.

Flexible defib electrodes allow training with all leading brands of defibrillators. PC connection is possible, so that Ambu CPR Software Kit can be connected. Ambu ECG Box simulates as many as 26 rhythms and 2 artefacts, giving you a wide variety of ECG options. The ECG Box has two optional power sources: an internal battery pack or an external 9V AC adapter, giving you the flexibility to train on location and the security of knowing that the system will always work even if the batteries are low or missing.

An upgrade kit for the ordinary BLS Ambu Man can be purchased, enabling your BLS manikin to function as an early defibrillation manikin as well. Available in 2 models: Basic and Advanced. The latter has additional features, i.e. 3-4 lead ECG and electronic pulse.

The Fundaments of pre-hospital training

Compatible with all popular defibrillators

- Pre-programmed with 26 defibrillation scenarios plus 2 artifact simulations
- Provides realistic training sequences in the use of automatic, semi-automatic, and manual defibrillators
- Equipped with an interactive ECG simulator and chest electrode attachments