SPECIFICATION OF ADULT ACLS AND VENTILATOR MANNEQUIN

1. The following general conditions should be met:

i)High fidelity Mannequin should be able to provide participants with a learning environment to develop technical and non-technical skills, that is safe and controlled so that the participants will be able to make mistakes, correct those mistakes in real time and learn from them, without fear of compromising patient safety

ii) The Mannequin should be able to deliver high quality simulation experience by providing flexible training and de-brief the participants.

iii) Vendor should provide training on products (Technical) as well as simulation training. Each training program should be of three full days which should include from how to get started,to basic simulation, to advanced use of Mannequin. In a year there should be four training program each at an interval of 3 months.

iv) The training courses should be done by experts in simulation and course should include basics of simulation, software usage, scenario building,refreshment course, exposing to various methodology of simulation, faculty development programs and customized training.

v) Should have power internal electrical and pneumatic power / battery backup of minimum four hours.

vi) Easy to clean and disinfect

vii) Features on bilateral side

2. The following multiple airway skills/features should be covered in Airway:

i. Controllable open/closed airway; automatically or manually controlled
ii. Head tilt/Chin lift
iii. Jaw thrust with articulated jaw
iv. Suctioning (Oral & Nasopharyngeal)
v. Bag-mask ventilation
vi. Orotracheal intubation
vii. Nasotracheal intubation
viii. Combitube, LMA, I-gel and other airway placement
ix. Endotracheal tube intubation
x. Retrograde intubation
xi. Fiberoptic intubation
xii. Transtracheal jet ventilation
xiii. Needle cricothyrotomy
xiv. Surgical cricothyrotomy
xv. Airway resistance – 3 settings (Open/Medium/Closed)

xvi. Right /left main stem intubation
xvii. Stomach distention

The following airway complications should be present:

i. Tongue fallback
ii. Tongue edema

3.The system should be able to connect to any ventilator and should be able to breathe spontaneously and hold PEEP at any level. Resistance and compliance should be minutely adjustable, allowing to simulate a vast number of patient disease states with realistic chest rise. And should be able to provide platform for hands-on training on the following:

a) Initiating mechanical ventilation for an ARDS, trauma, or post- op patient
b) Adjusting the ventilator after a change in patient conditions
c) Patient-ventilator dysynchrony
d) Lung protective ventilation
e) Weaning protocols
f) Technical specifications:

Tidal volumes	2 mL to 2.5 L
Functional Residual Capacity	200 – 1500 mL
Spontaneous breath rate	3 to 150 breaths/min
Peak flow	280 L/min ± 10% (t90Flow < 50 ms)
Resistance settings	3 to 500 cmH2O/L/s (linear and parabolic resistor types)
Compliance settings	0.5 to 250 mL/cmH2O
Breath profiles	user-defined pressure data files (breath profiles) or parameter-selected standard patterns
Airway pressure	uncertainty < than 1%
Accuracy	Resistance +/- 10% Compliance +/- 5% Flow +/- 2%

g) Should be compatible with all models and brands of ventilator and Anesthesia Work Station.

The following breathing features should be present:

i. Simulated spontaneous breathing
ii. Bilateral and unilateral chest rise and fall
iii. Normal and abnormal breath sounds
iv. Lung auscultation sites: posterior and anterior sites
v. Oxygen saturation and waveform.

The following breathing complications should be simulated:

i. Cyanosis
ii. Pneumothorax with unilateral chest movement
iii. Needle thoracentesis – bi-lateral
iv. Unilateral & Bilateral chest movement
v. Chest tube insertion – bilateral.

4: Cardiac

The following cardiac features should be present:

i. Extensive ECG library
ii. Heart sounds (normal and abnormal)
iii. ECG rhythm monitoring
iv. 12 lead ECG display
v. Defibrillation and cardioversion
vi. Pacing
vii. BP should be measured manually by auscultation of Korotkoff sounds
viii. Carotid, femoral, radial pulses should be synchronized with ECG
ix. Pulse strength variable with BP
x. Pulse palpation should be detected and logged

The following features of vascular access should be present:

i. IV access
ii. Intraosseous access (tibia / humeral)

The following features regarding CPR should be present:

i. Compliant with latest AHA and Indian guidelines
ii. CPR compressions generate palpable pulses, blood pressure wave form, and ECG artefacts
iii. Realistic compression depth and resistance
iv. Detection of depth, release and frequency of compressions
v. Should provide real-time feedback on quality of CPR

5. Other Features:

The eyes should have the following features:

i. Manually set to: Open, closed and partially open
ii. Shall be able to demonstrate the normal dilated and constricted pupil.
iii. Foley catheterization procedure
iv. Patient Voice
v. Pre-recorded sounds
vi. Custom sounds
vii. Instructor can simulate patient's voice wirelessly.

6. Drug Library:

The following aspects of Pharmacology should be covered:

a. Ability to administer Drug / fluids.
b. Should have extensive drug formulary
c. Should have automatic or programmable physiological responses

7. The following system features should be present:

i. Should have wireless control unit to operate the Mannequin remotely
ii. Should allow control of simulations from anywhere on your network
iii. Should have facility for multiple interfaces that can control/observe a single simulation.

The features of the operating software (OS) should include:

i. The OS should be single and intuitive interface: Shall be able to control and manage all Mannequins from one universal platform.
ii. It should have a dual operating mode: User control mode for total control over all parameters and auto-mode/physiological which will help run pre-programmed scenarios in a simple and effective way. Logged events, as well as events detected by the patient Mannequin, should automatically drive the scenario forward.
iii. User-friendly operation: Operating system should control parameters with drop-down menus and slider bars. The operating system should be capable of transferring radiographicI mages and procedural videos to the student screen.

8. Patient Monitoring: Operating system should have patient monitoring capabilities to provide concise clinical feedback for physiological parameters.

Simulated patient monitor parameters should include:

a. ECG (2 traces)
b. SpO_2
c. $ETCO_2$
d. ABP
e. CVP
f. NIBP
g. TOF
h. Cardiac Output
i. Temperature (core and peripheral)
j. AGT (labelled)
k. ICP
l. O_2
m. pH
n. X-Ray Display
o.12 Lead ECG Display
p. Record and Review: Operating system should log time stamped comments to the data log, bookmark important events and capture notes throughout the simulation. Operating system should have

straightforward logging capabilities and should allow integrated event log for more effective review, for improved learning outcomes.

q. Scenario drafting tool: Operating system should have tool to create or convert scenarios which can be run with all simulators/mannequins.

9.Ultrasound features should include:

i. Ultrasound module should be integrated into the Mannequin. This makes it easy to include diagnostic ultrasound featuring real ultrasound cases with pathological findings into full-scalesimulations.
ii. Should allow hand and eye coordination technique teaching in ultrasound.
iii. Should be provided with, Critical Care Bundle for rapid ultrasound for critical care (RUSHProtocol)
iv. Should be provided with portable ultrasound simulator and probe which can scan the Mannequin.
v. Simulation training provided by vendor should cover all aspects of simulation pedagogy including different debriefing methods.

10. Should be BIS/ISO certified.

11. Should have warranty of five years followed by five years of CMC.

12. Complete list of spares and accessories price list with freeze for two years.

13. Mannequin should be of latest make and model and should not be obsolete for the next ten years.