

CAE

Healthcare

CAE Lucina User Guide



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Cautions and Warnings

It is important to read and understand these cautions and warnings before you use the Product.

CAUTION: These products are not suitable for use in locations where children may be present.

Electrical Safety

IMPORTANT! Do not use the product in any manner other than specified, as safety features designed for protection may be impaired.

- This product must be connected to an electrical outlet that is properly grounded. Take precaution to ground or polarize correctly.
- Connect only to a 100-240 VAC 50/60Hz power source.
- Always use only the supplied power supplies, cords, and connectors. Do not substitute.
- Always use the supplied power adapter to run the simulator from AC.
- Do not allow excess fluids to flow on or into electronic parts.
- Do not attempt to disassemble the simulator or service any of the electrical components without receiving instructions from Customer Service.
- Do not operate the manikin in rain. Apply water to the manikin only in accordance with the supported clinical procedures explained in this guide.
- Always remove the power cable and have simulator turned off if replacing fuses. Not all manikins have user-serviceable fuses.
- For manikins with thermal fuses, replace with MINI® Blade Fuses Rated 32V (silver-plated) 3A (Littelfuse p/n 0297003.WXNV) UL248-compliant.

Product Use Warnings

Review all the following information and precautions in each section:

Manikin

- Follow the instructions for use contained in this user guide.
- Make sure the manikin is set up on a stable, sturdy work surface that will not collapse and cause injury to users.
- Operate the manikin in ambient temperatures below 104°F (40°C).
Note: This only applies when using the manikin without the tablet where CAEMaestro software is installed. For information about temperature ranges for the tablet, see *Ambient Temperature Range* in the *Specifications* section of this User Guide.
- Do not place foreign substances into the airway, with the exception of small amounts of approved lubricant. Only perform invasive procedures supported by the Product as described in the applicable sections of the User Guide.

Cautions and Warnings

- Do not insert any materials into the manikin except the equipment or probes supplied.
- Do not lift the manikin by its limbs. Support the head and lift it from the torso. If necessary, have another person help you lift and move the manikin using a patient transfer device such as a patient transfer board, when available.
- Keep the manikin plugged in between training sessions due to a slow drain of the battery that occurs.
- Under normal circumstances, unplugging the external DC power used for powering and charging the manikin is not necessary because the charging stops when the battery is full. A topping charge is only applied when the battery voltage drops to a certain level.
- Do not spill fluids over the manikin's chest, abdomen, or inside the manikin's torso. This could damage the system and may also present a possible hazard for the operator. Special attention should be taken while using the the various fluid features.
- Do not use the manikin or equipment in locations where children are likely to be present.

Latex

The IV cannulation tubing in the left and right IV arm contains latex. Certain components of the simulator, such as vein tubing, contain latex. The user may come into contact when changing out the IV tubing during routine maintenance. Users with latex sensitivity should use caution.

Fluids System

For manikins such as Lucina that are equipped with fluid systems:

- Use **ONLY** distilled water with food coloring for simulated blood. **NEVER** use theatrical blood or other fluids in the bleeding system because they will cause damage.
- **ALWAYS** read and follow instructions for creating trauma fluids (e.g. simulated blood).
- Do not modify the reservoirs, tank or any assembly component.
- Always protect your eyes, skin, and clothing against accidental exposure.
- **NEVER** exceed 35 strokes at a time while pressurizing the tank. As the fluid level drops, additional strokes may be needed to maintain pressure, but the strokes should never exceed 35 at a time.
- **NEVER** fill the tank with more than 1.8 liters (0.5 gallons) of fluid.
- After use, **ALWAYS** release pressure and clean the tank. **DO NOT** store liquids in the tank.
- **ALWAYS** release tank pressure before servicing. **NEVER** transport or ship in a pressurized and/or full state or leave a pressurized tank unattended.

Skin

- Make sure the skin is fully installed and covering pulse points whenever the manikin is in use.
- Avoid contact with sharp surfaces and excessive pulling on skin.

Transport

- Prior to using the stretcher packed with the shipping container, the manikin must be wrapped in a sheet. Failure to wrap the manikin in a sheet may result in permanent damage to the manikin skin.
- CAE is not responsible for damage to the manikin skin if the manikin is not wrapped in a sheet while using the stretcher.

Battery

Manikins and tablets use lithium batteries that all have special handling requirements to avoid hazardous situations.

For more information about battery specifications, see the *Specifications* section. For more information about battery safety, see the *Battery Safety Information* section.

Simulator Batteries

Manufacturer	Inspired Energy, LLC 25440 NW 8th Place, Newberry, FL 32669 Website: https://www.inspired-energy.com/ Email: inquiries1606@inspired-energy.com
Phone number	(888) 5-INSPIRE (888-546-7747), or contact your national poison information center in the event of an emergency.

- Always store the polymer lithium-ion battery pack indoors.
- Always keep the battery away from objects or materials with static electric charges.
- Batteries can be charged while the manikin is between 32°F (0°C) and 113°F (45°C).
- Do not store, use or charge the battery inside of an automobile as temperatures can exceed 176°F (80°C).

Battery Replacement

- If the simulator battery power diminishes significantly, contact Customer Service to replace the battery. For safety, only replace the battery with an approved make and model.
- Before disposing of a simulator battery, apply vinyl tape to its positive (+) and negative (-) terminals to avoid short circuits.
- If a simulator battery needs to be replaced, immediately remove the old battery from the equipment to ensure no damage occurs.
- Do not dispose of the simulator battery into a fire. Dispose of or recycle batteries responsibly.

Battery Safety Information

For information about battery specifications, see the *Specifications* section of this user guide.

Important: Refer to the battery manufacturer's Safety Data Sheet (SDS) for complete safety instructions and handling information.

Precautions for Handling

Hazards are associated with the contents of the cell or battery. Under recommended use conditions, the electrode materials and liquid electrolyte are non-reactive, as long as the cell or battery integrity remains, and the seals remain intact.

Potential exposure should not exist unless the cell or battery:

- leaks,
- is exposed to high temperatures,
- is mechanically, electrically or physically abused/damaged.

If the cell or battery is compromised and starts to leak, based upon the battery ingredients, the contents are classified as hazardous. In general, if liquid leaks from the battery or foul odor is detected, DO NOT use the battery and keep it away from heat or flame.

- Avoid short circuiting the battery. Do not store with coins, screws or other similar objects.
- Do not immerse in water.
- Do not disassemble or deform the battery.
- Do not expose to, or dispose of the battery in fire.
- Avoid excessive physical shock or vibration.
- Keep out of the reach of children.
- For rechargeable batteries, the battery must be charged in an approved charger.
- Never use a modified or damaged charger.
- Store in a cool, dry, and well-ventilated area.
- Never use a battery that has been damaged or deformed.
- Do not short-circuit the positive (+) and negative (-) terminals.
- Do not place the battery in a device with the positive (+) and negative (-) terminals in the wrong positions.
- Do not solder a battery directly.

Potential Health Effects

- **Acute (short term):** In the event that the cell or pack ruptures, the electrolyte solution contained within the cell will corrode and can cause burns to skin and eyes.
- **Inhalation:** Inhaling materials from a sealed cell is not an expected route of exposure. Vapors or mists from a ruptured cell can cause respiratory irritation.
- **Ingestion:** Swallowing materials from a sealed cell is not an expected route of exposure. Swallowing the contents of an open cell can cause serious chemical burns to mouth, esophagus, and gastrointestinal tract.
- **Skin:** Contact between the cell and skin will not cause any harm. Skin contact with the contents of an open cell can cause severe irritation or burns to the skin.
- **Eye:** Contact between the cell and the eye will not cause any harm. Eye contact with the contents of an open cell can cause severe irritation or burns to the eye.
- **Interactions with other chemicals:** Immersion in high conductivity liquids can corrode or breach the cell or battery enclosure. The electrolyte solution inside of the cells can react with alkaline (basic) materials and present a flammability hazard.

Safety Measures

Review the precautions for handling before replacing a battery utilizing guidance from CAE.

Should exposure to hazardous battery components occur, or in the event of a fire, follow all local first aid measures and safety protocols.

Transport Information

CAE complies with the most current International Air Transport Association (IATA) Dangerous Goods Regulations when transporting and shipping Li-ion batteries. The following terms are defined as follows:

Consignment - Equivalent to the term "shipment," meaning one or more packages of hazardous materials accepted from one shipper at one time and at one address, receipted in one lot, and moving to one consignee at one destination address.


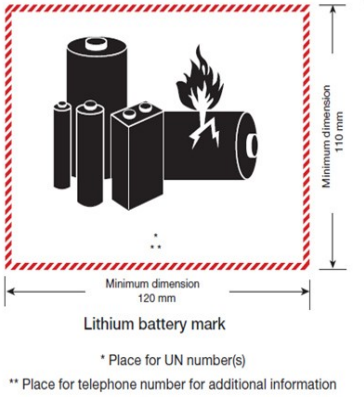
Equipment - The device or apparatus for which the lithium cells or batteries will provide electrical power for its operation.

It is the shipper's responsibility to ensure that the consignment is packed in compliance to the latest edition of the applicable regulations. Regulations require appropriate training for shipping dangerous goods. Shipping regulations and requirements may vary depending upon:

- Wattage of the battery.
- Whether the battery is shipped independent of, contained within, or packed with the equipment.

When transporting batteries CAE follows these documentation and labeling requirements:

Cautions and Warnings

	Item	Description
	Batteries Shipped Independent of the Manikin, Tablet, and Laptop	Batteries contained in or packed with the Manikin, StethoSym, Tablet, Laptop, and HoloLens
UN No.	3480	3481
UN Shipping Name:		Lithium-ion Batteries
Transport Hazard Class:	9	9
Labeling:		 <p>Lithium battery mark</p> <p>* Place for UN number(s)</p> <p>** Place for telephone number for additional information</p>

Specifications

All hardware and software needed for operating the simulator are provided with the shipment.

Size and Weight

Equipment	Size	Weight
Manikin/Simulator	69" H x 22" W x 15" D (175 cm x 56 cm x 38 cm)	111 lbs (50 kg)
Fetus	19" H x 6" W x 4.5" D (48cm x 15cm x 11.5cm)	5.5 lbs (2.5 kg)
Instructor Tablet/ Laptop*	Surface Pro 11.5" x 7.9" x 0.33" (29.2 cm x 20.1 cm x 0.85 cm)	Surface Pro 1.7 lb (775 g)

*The Surface Pro must be model 5 or later. The measurements and weight provided reflect the Surface Pro 7 and may differ somewhat for other models.

Ambient Temperature Range

Item	Operation	Storage	Relative Humidity
Manikin/Simulator	40°F to 104°F (4°C to 40°C)	40°F to 122°F (4°C to 50°C)	0% to 90% non-condensing
Laptop	50°F to 95°F (10°C to 35°C)	-13°F to 113°F (-24°C to 45°C)	0% to 90% non-condensing

Maximum Altitude

Item	Operation	Storage	Shipping
Laptop	10,000 ft (3,048 m)	15,000 ft (4,572 m)	35,000 ft (10,668 m)

Rechargeable Battery

Item	Description
Commercial product name	Inspired Energy Rechargeable Battery Pack
Additional Information	Battery-System: Lithium-ion Wh rating: 90 Wh

Disposable Batteries

Item	Description
Commercial product name	Energizer, Ultimate Lithium, L91, AA, 1.5v

Power

Item	Description
Power Adapter	<ul style="list-style-type: none">AC Input: AC 100 – 240 VAC, 50/60 HzConsumption: Maximum 150 W (charging), 100 W (charged), Typical 40 W
Manikin/Simulator	<ul style="list-style-type: none">Internal Batteries: 14.4 V 90-watt-hour lithium-ion, rechargeableRun Time: 4 hours (typical)
Fetus/Simulator	<ul style="list-style-type: none">Run Time: 7 hours (typical)
Laptop Power Adapter	<ul style="list-style-type: none">AC Input: AC 100-240 VAC, 50/60 HzRun Time: 2 to 4 hours (typical)

Communications

Item	Description
Simulator Network	<ul style="list-style-type: none">Wired: 10/100 EthernetWireless: IEEE 802.11 g
Wireless Voice	<ul style="list-style-type: none">537 MHz to 819MHz (Country Specific)

Electrotherapy

Item	Description
Defibrillation	<ul style="list-style-type: none">20 to 360 Joules (Monophasic, Biphasic)
Pacing	<ul style="list-style-type: none">20 mA to 180 mA

Air Supply

To properly regulate psi, the optional wall air kit must be used in conjunction with the facility supply source and facility wall adapter. The wall air kit is an additional optional accessory. When using a CAE External Air kit in conjunction with a supply source at a facility, it is recommended that the facility air supply be 30-psi to 60-psi (2-bar to 4-bar). The source should be clean, dry air.

System Requirements

This section describes the minimum and optimal requirements to run the simulator.

Software and Hardware

Any computer (or tablet) used to operate the Maestro or Patient Monitor software must meet **minimum** hardware and software requirements. However, optimal requirements should be met to enhance performance. These requirements also apply to devices running Maestro Standalone.

CAE Maestro Software

The following table identifies the software version associated with the release of this user guide.

Document	Document Version	Software Version
Lucina User Guide	905K472152 v1.5	CAE Maestro v2.9

Note: Periodic system updates for Maestro can be downloaded from any device with an Internet connection. Updates are available at: <https://www.caehealthcare.com/support/software-updates/>

Windows[®] Operating System

Minimum Requirements	
Software	<ul style="list-style-type: none"> Win 10 Pro .NET 4.8
Hardware	<ul style="list-style-type: none"> Surface Pro Intel Pentium Gold Processor 4425Y 4 GB DDR3 RAM 32 GB Hard Drive space available 1920x1280 screen resolution USB-C Wireless 802.11 a/b/g/n/ac/ax

Approved Devices

Make/Model	<ul style="list-style-type: none"> MacBook Pro (Mid-2012 or newer), MacBook Air, or iMac
Software	<ul style="list-style-type: none"> macOS 10.14 Google Chrome
Hardware	<ul style="list-style-type: none"> Intel Core i5 1.6 GHz 4GB RAM (8 GB RAM recommended) 32 GB Hard Drive free space available 1440x900 screen resolution

System Requirements

Make/Model	<ul style="list-style-type: none">• Microsoft Surface Pro
Software	<ul style="list-style-type: none">• Windows 10• Google Chrome
Hardware	<ul style="list-style-type: none">• Intel Core i5 1.6 GHz• 4 GB RAM (8GB RAM recommended)• 32 GB Hard Drive free space available• 1366x768 screen resolution

Note: Upon installation, the software takes up 1.2 GB of hard drive space. For standalone versions of Maestro, the software can store approximately 30.8 GB of patient record files. If this storage capacity is expected to be maximized, plan for additional hard drive space.

Meet Lucina

Lucina has been designed to provide instructors and learners with advanced tools for obstetrical training and offers the components necessary for prepartum care, normal and complicated vaginal deliveries, and postpartum care. The simulator supports cephalic and breech delivery, placenta delivery, shoulder dystocia, nuchal cord, neonate crying, postpartum vaginal bleeding, and boggy and inverted uterus. In addition, the following medical interventions can be performed:

- ECG and electrical therapy
- Epidural administration
- Forceps delivery
- Intubation
- Leopold's maneuvers
- McRoberts maneuver
- Medication and fluid administration
- Mechanical ventilation support
- Neonate suctioning
- Rotational maneuvers
- Suppository administration
- Uterine massage and bimanual compression
- Vacuum delivery
- Zavanelli maneuver

For Maestro, Patient Monitor and CTG Monitor information, see the *Maestro for Lucina User Guide*.



Lucina

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Equipment Overview

Lucina is CAE's premier high-fidelity birthing simulator. Lucina comes with standard equipment as well as additional equipment. Optional equipment refers to items which are available for purchase.

Standard Equipment

Standard equipment is shipped with Lucina and includes all the necessary equipment for basic use:

Standard Equipment
Full Body Wireless Manikin
Tablet Instructor Workstation
Patient Monitor Workstation
Power Adapters and Cords (2)
Gown
Prepartum/Early Labor Kit
Vaginal Delivery Kit
Postpartum Kit
Accessories

Full Body Wireless Manikin

The autonomous simulator reacts to medical interventions with appropriate physiological responses and wirelessly communicates with the Instructor Workstation, creating an authentic experience for the learner and keeping the instructor informed as the scenario progresses.

Instructor Workstation

See the *Instructor Workstation* section of this guide.

Patient Monitor

The Patient Monitor is a touchscreen display monitor that utilizes the Patient Monitor or the CTG software. The CTG software represents the cardiotocography monitor for reading the fetal heart rate (FHR) and uterine contractions, as well as the maternal heart rate, NIBP, SpO₂ and body temperature.

Power Adapters and Cords

The simulator comes with two sets of power adapters and cords: one for the maternal simulator and one for the fetal simulator. No other power cords should be used with Lucina.

Gown

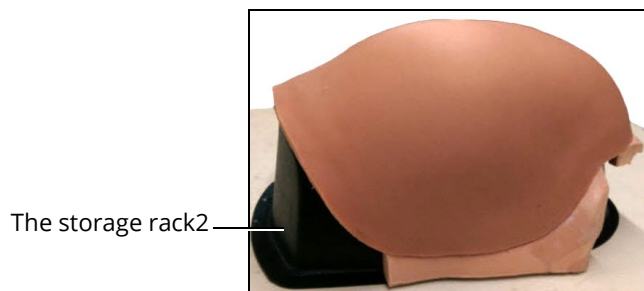
A gown is provided for the manikin to enhance the reality of the simulation.

Prepartum/Early Labor Kit

The Prepartum/Early Labor Kit contains the following items:

- Prepartum birth canal
- Static cervix backplate
- Static cervix retention plate
- Essential set of static cervices
 - Closed without effacement and permeable by one finger, firm, posterior
 - Closed, 50% effaced, permeable by one finger, medium, posterior
 - 4 cm dilated and 90% effaced, soft, intermediate
- Leopold fetus
- Leopold tub
- Prepartum abdomen with abdomen storage rack

Note: To prevent damage, apply a light dusting of baby powder to the storage rack and always store the abdomen on the rack when not in use.



The Abdomen and Storage Rack

Vaginal Delivery Kit

The Vaginal Delivery Kit contains the following items:

- Uterine funnel with delivery cervix
- Delivery fetus
- Placenta (intact)
- Placenta (fragmented)
- Placenta fragment
- Umbilical cord
- Delivery abdomen
- Lubricant (cottonseed oil)
- Lubricant spray bottle

Postpartum Kit

The Postpartum Kit contains the following items:

- Postpartum Birth Canal with Boggy/Contracted Uterus
- Blood Tank
- Trauma Fill Tank

Accessories

The accessories for Lucina include:

- Four ECG posts
- Pacing/defibrillation disks
- NIBP Adapter Kit
- IV priming syringe
- Priming tube
- Roll of hook and loop fastener (the softer side can be applied to the inside of Forceps for better traction during instrument delivery)
- Genitourinary (GU) filling tool
- Blood tank adapter
- Condensation drain
- IV Tubing Single Replacement Kit
- Wireless Voice Link Kit
- Lubricant spray (cottonseed oil)

Optional Equipment

To enhance the simulation experience, Optional equipment is available to accommodate special customer requirements. The following equipment is available to customize the specific needs of a wide variety of education environments.

Optional Equipment
Patient Monitor
Fundus Assessment Kit
Mircosoft Surface Pro Tablet
Supplemental Static Cervices Kit
Operation Supplemental Accessories

Patient Monitor

An all-in-one computer with touchscreen is used to display the patient monitor software.

Microsoft Surface Pro Tablet

The Microsoft Surface Pro tablet is used to display the Patient Monitor software.

Supplemental Static Cervices Kit

The supplemental static cervices kit contains a set of cervices in addition to the essential static cervices kit. The supplemental static cervices kit includes:

- Closed without effacement and not permeable by one finger, firm, posterior
- Closed 70% effaced and permeable by one finger, medium, posterior
- 2 cm dilated and 80% effaced, soft, intermediate
- 3 cm dilated and 80% effaced, soft, intermediate
- 5 cm dilated and 90% effaced, soft, anterior

Operation Supplemental Accessories

Operation supplemental accessories enhance realism and are available for individual purchase:

- Invertible uterus
- All-fours position kit:
 - Protective abdomen shell
 - All-fours position support straps
- Hands-free electrical therapy kit - Zoll
- Hands-free electrical therapy kit - Physio Quick Combo
- Hands-free electrical therapy kit - Philips AED
- Spanner (wrench)
- Wall air kit (required when using the facility supply source and facility wall adapter)

Additional Equipment

Some items are available for purchase as additional equipment:

- Arm skin
- Delivery birth canal (including perineum and vulva)
- Delivery fetus
- Hand skin (left or right)
- Leopold fetus
- Lubricant spray (cottonseed oil)
- Non-Gravid Abdomen
- Roll of hook and loop fastener (the softer side can be used to apply to the inside of forceps for better traction during instrument delivery)

- Uterine funnel with delivery cervix
- Umbilical cord
- Vein tubing replacement kit

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Unpacking the Manikin

The manikin comes in a custom-designed container that provides proper placement for all parts and accessories.

Follow the guidelines below when opening your shipment:

- Refer to the *Unpacking Your CAE Manikin* document provided in the shipping container to remove items from the shipping container.
- Exercise extreme caution when using sharp objects, such as a box cutter. A damaged container can lead to improper storage of the manikin, potentially damaging skin, body parts, and accessories.
- Reserve a space approximately 2 ft by 6 ft (61 cm by 183 cm) to store the shipping container before and after use. For more information, see the *Care and Maintenance* section of this user guide.
- Read and understand the Cautions and Warnings located in the beginning of this guide.
- Follow the sequence of the steps carefully. Complete all steps in order.
- Do not power on any components until instructed in the text.
- Verify the content of each item in the container against the shipping paperwork to ensure you received the correct product and parts.
- Keep original shipping materials, including boxes and foam. Warranty and repair items must be returned and shipped in their original packaging.

For more information, see the *Unpacking Your CAE Manikin* instructions in the storage container.

Setup Steps

The following instructions and guidelines inform users how to assemble the simulator and configure the instructor tablet.

Initial Preparation

Before you begin the setup steps, make sure to complete the initial preparation below to prevent any damage to the simulator.

- Prior to using the manikin, ensure it reaches room temperature.
- Ensure multi-plug AC power outlets exist in the workspace to charge the simulator and its powered components. The instructor tablet is battery-operated and enabled for wireless use; however, the patient monitor must be plugged into a power source during use.
- Do not power on any components unless instructed to do so in the *Setup Steps* section of this guide.

Setup Steps

Set Up the Lucina Simulator System	
1	Place the Lucina System in the Work Area
2	Power on the Maternal Manikin
3	Power on the Fetus
4	Power on the Instructor Tablet
5	Start Software to Run Lucina System
6	Connect a Patient Monitor to the Wireless Network (optional)

Step 1: Place the Simulator System in the Work Area

Select a work area with enough room for all equipment and ample space for access to the simulator. At a least 10' x 12' (3 meter x 4 meter) work area is recommended for movement and positioning of components around the simulator. The work surface must be able to support 200 pounds.

The simulator system components (maternal manikin, fetus, instructor tablet) can be operated from their batteries, allowing for wireless use. However, whenever possible, make sure a multi-plug AC power outlet exists within the workspace to easily recharge the simulator's battery and its powered components.

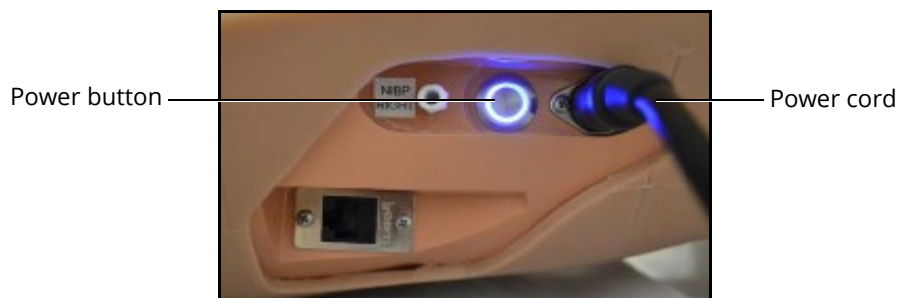
IMPORTANT: When positioning the manikin, never lift by the limbs. When lifting, always support the torso and head of the manikin.

Prior to using the stretcher packed with the shipping container, Lucina must be wrapped in a sheet. Failure to wrap Lucina in a sheet may result in permanent damage to the manikin's skin. CAE is not responsible for damage to the skin if the manikin is not wrapped in a sheet while using the stretcher.

Step 2: Power on the Maternal Manikin

To power on the manikin:

1. Prior to powering on the simulator, ensure the manikin has fully charged batteries inserted into the left side of the torso, or the power cord is attached on the right side of the torso.
2. Locate the power button on the right side of the manikin's torso.



Lucina Right Side

3. Press and release the power button.

The button illuminates when the manikin is powered on.

IMPORTANT: Wait three (3) minutes while the simulator establishes a wireless network before attempting to connect to the instructor laptop. Failure to wait will prevent proper connection if the user attempts to make a direct Ethernet connection to the simulator network. The manikin will say "Hello" when it is ready to be used with the software.

For information on recharging batteries, see the *Care and Maintenance* section of this user guide.

Step 3: Power on the Fetus

To power on the fetus:

1. Prior to powering on the simulator, ensure the fetus has fully charged batteries. For more information on charging the fetus, see the *Care and Maintenance* section of this user guide.
2. Locate and press the power button on the back of the fetus.
 - A green light will begin blinking in the umbilical indicating the fetus is powering up.
 - When the umbilical light begins alternating between green and orange, the fetus is powered on and communicating with the maternal mannequin.
 - When the umbilical light is a solid green, the fetus is running with good battery.
 - When the umbilical light is a solid orange, the fetus battery life is less than one hour.

IMPORTANT: Each fetus is specifically configured to connect to its designated maternal mannequin. The last three digits of the maternal mannequin's serial number are located on the back of the matching fetus under the skin below the USB power port.

If there are multiple units, keep each fetus with its designated maternal mannequin at all times.

For more information on charging the fetus batteries, see the *Care and Maintenance* section of this user guide.

Step 4: Power on the Instructor Tablet

To power on the instructor tablet:

1. Place the tablet near the maternal manikin in a convenient location.
2. Ensure the tablet battery is fully charged, or connect the AC adapter to the laptop and a surge-protected power outlet.
3. Power on the tablet.

Step 5: Connect the Instructor Tablet

Once the manikin and instructor tablet are both powered on, they automatically establish a wireless connection and, when the browser is opened, the software launches.

If the auto-connect does not occur, perform the following steps:

1. From the bottom-left corner of the screen, tap the WiFi icon. If necessary, turn WiFi on.



The WiFi Icon

2. Select your simulator's wireless network (for example, MFSxxx, where xxx is the serial number for the unit) and enter password. The case-sensitive network password is *caeadmin*.

The wireless connection is established.

The operational software can now be launched.

Step 6: Launch Maestro

To launch Maestro:

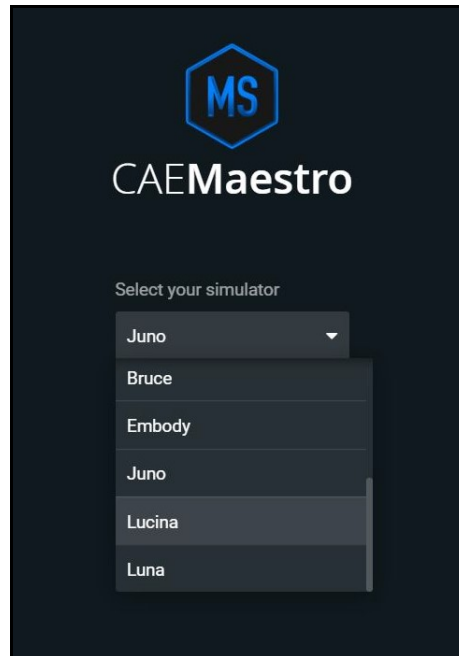
1. From the desktop, tap the Maestro app.



The CAE Maestro Desktop Icon

The Maestro start page appears.

2. From the 'Select your Simulator' drop-down menu, select Lucina.



Select Your Simulator Drop-Down Menu

3. Tap **Continue**.

The Maestro application starts and is ready to be used with the simulator. It will connect to the simulator automatically in the future.

For more information on starting and using the software, see the *Maestro for Lucina User Guide*.

Optional Step: Connect to the Patient Monitor Network

Set up Patient Monitor

To set up the Patient Monitor:

1. Power on the simulator.
2. Power on the instructor workstation/tablet.
3. Connect the power adapter to the back of the Patient Monitor.
4. Connect the other end of the power adapter to a power outlet.

To connect the wireless keyboard and mouse:





1. Insert the provided batteries in the wireless keyboard.
2. Insert the provided batteries in the wireless mouse.
3. Insert the USB wireless mouse receiver and USB wireless keyboard receiver in the USB ports on the side of the Patient Monitor.
4. Power on the wireless mouse using the ON/OFF switch located on the bottom of the mouse.

Check the Network Connection

To check the wireless network connection:

1. Power on the Patient Monitor.
2. Using the mouse, drag the pointer to the bottom of the Patient Monitor screen until the Windows taskbar appears.
3. In right corner of the taskbar, tap the **Network** icon to access the Network window.

There are four potential network icons that are displayed depending on the status of connectivity:

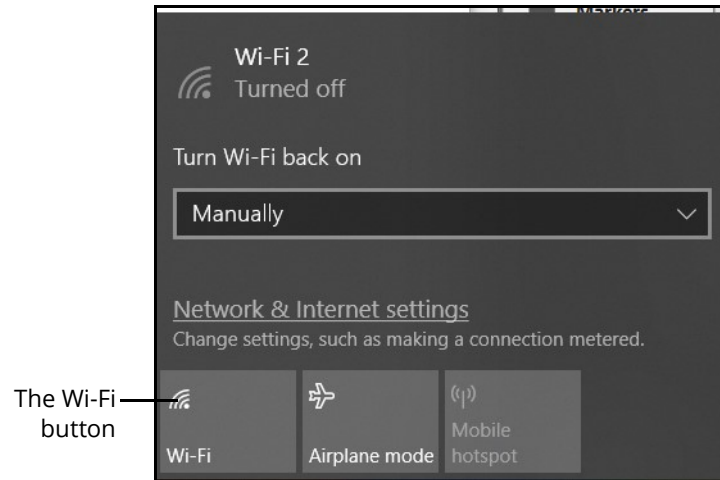
Connectivity Status	Icon Display
No WiFi	
WiFi without Network Connection	
WiFi with Network Connection	
Hardwired Connection	

No WiFi

If the No WiFi icon appears:

1. Tap the Network icon.

The Network window appears.



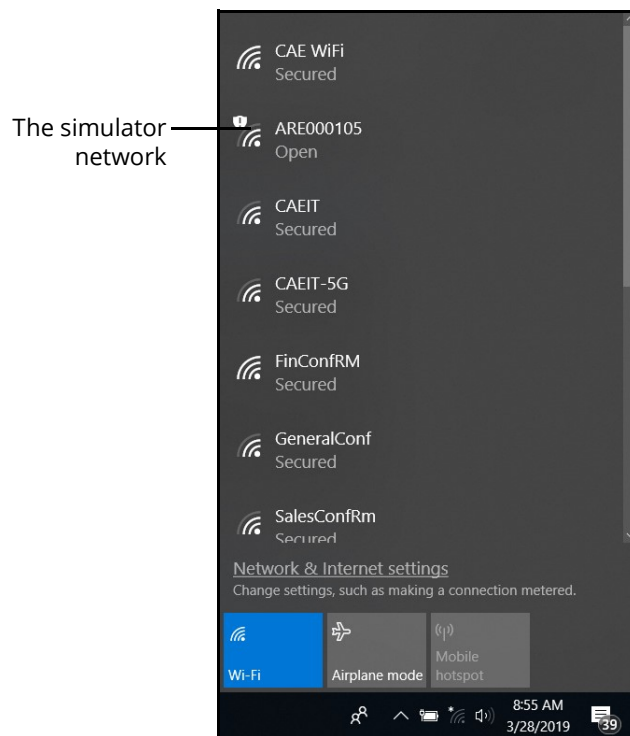
The Network Window

2. Tap **Wi-Fi** button to turn on WiFi (button turns blue).

Select the Network

To select the proper network for the simulator's router:

1. In the Network window, locate the simulator network from the list of available networks.



The Network Window

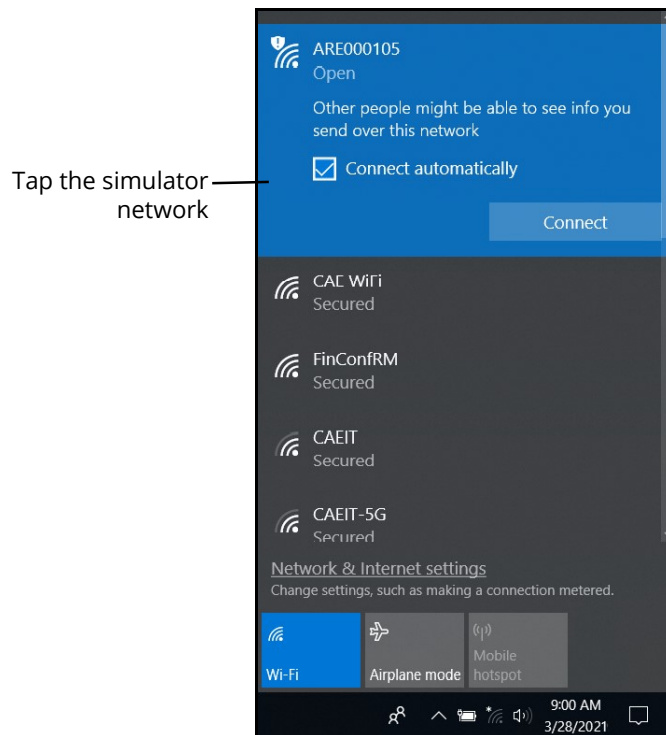
Setup

The simulator networks are named with the simulator prefixes and a number that represents simulator serial numbers:

- If **"Connected"** appears next to the simulator network, proceed to *Launch Patient Monitor*.
- If **"Connected"** does not appear next to the simulator network, proceed to **step 2**.

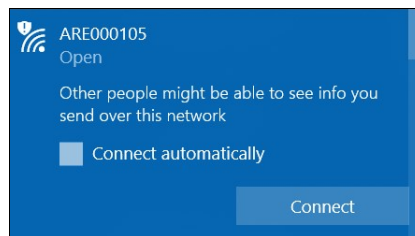
2. Tap on the simulator network.

The connection options appear.



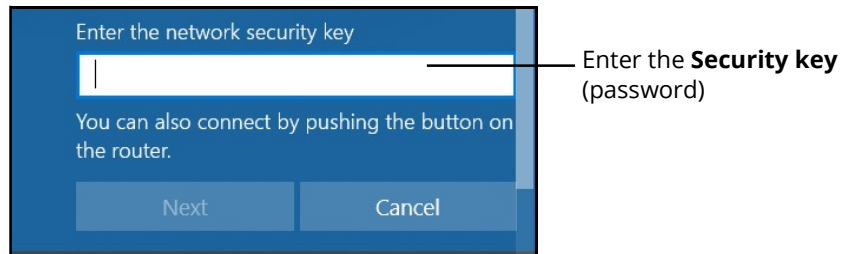
The Network Window

3. Check the **Connect automatically** box.
4. Tap **Connect**.



The Simulator Network

The Enter a network security key window appears.



Entering the Security Key (Password)

5. Enter the **Security key** (password). See the *Passwords* section for information about the password for your simulator network.
6. Tap **Next**.

The Connecting message appears, then disappears when the Patient Monitor is finished connecting to the simulator network.

Passwords

The password for the simulator network varies depending on the simulator type and unit number. The password is case-sensitive.

The password *caeadmin* is used for Lucina.

Launch Patient Monitor

Note: The Maestro software must be running a simulation or SCE on the instructor workstation prior to launching the Patient Monitor application.

To launch Patient Monitor for all patient simulators, from the desktop screen, tap the **CAE Patient Monitor**.



The Patient Monitor Desktop Icon

The Patient Monitor application launches and the Patient Monitor is ready to be used with the simulator. It will connect to the simulator automatically in the future.

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Configuring the Manikin

The maternal manikin must be configured properly in order to run the various SCEs. Prior to beginning a configuration, users must select an SCE in the *Maestro* software.

Note: To avoid any unexpected behavior, users must end any currently running SCE prior to selecting a new SCE and configuring the manikin.

The table below outlines which processes are necessary to properly configure the manikin for each type of SCE.

Process	Prepartum & Latent	Active (Non-Delivery)	Vaginal - Vertex*	Vaginal - Breech*	Postpartum - Boggy/Contracted Uterus
Installing the Rotation Ring	No	No	Yes	Yes	No
Removing the Rotation Ring	Yes	Yes	No	No	Yes
Installing the Support Tub	Yes	Yes	No	No	No
Filling the Blood Tank**	No	No	No	No	Yes
Installing the Blood Tank	No	No	No	No	Yes
Installing the Boggy/Contracted Uterus	No	No	No	No	Yes
Installing the Prepartum Birth Canal	Yes	No	No	No	No
Installing the Static Cervix	Yes	No	No	No	No
Installing the Backplate	Yes	No	No	No	Yes
Installing the Retention Plate	Yes	No	No	No	No
Installing the Uterine Funnel with Dynamic Cervix	No	Yes	Yes	Yes	No
Installing the Placenta	No	Yes	Yes	Yes	No
Loading the Fetus	Yes	Yes	Yes	Yes	No
Installing the Prepartum Abdomen	Yes	Yes	No	No	Yes

Configuring the Manikin

Process	Prepartum & Latent	Active (Non-Delivery)	Vaginal - Vertex*	Vaginal - Breech*	Postpartum - Boggy/Contracted Uterus
Installing the Delivery Abdomen	No	No	Yes	Yes	No

*When in the Vaginal Delivery Operating Mode, if the user selects *Proceed To Postpartum* after the baby is marked as delivered, do not stop the SCE. However, it is necessary to reconfigure the manikin for postpartum configuration prior to proceeding.

**This process may be completed before or after installing the blood tank, depending on which filling method is chosen (internal or external).

For more information on selecting an SCE, see the *Maestro for Lucina User Guide*.

For more information on processes such as priming the genitourinary system, or using the epidural site or IV system, see the *Using Lucina* section of this user guide.

Prepartum/Early Labor Configuration

Remove the Rotation Ring

To remove the rotation ring from inside the manikin's torso:

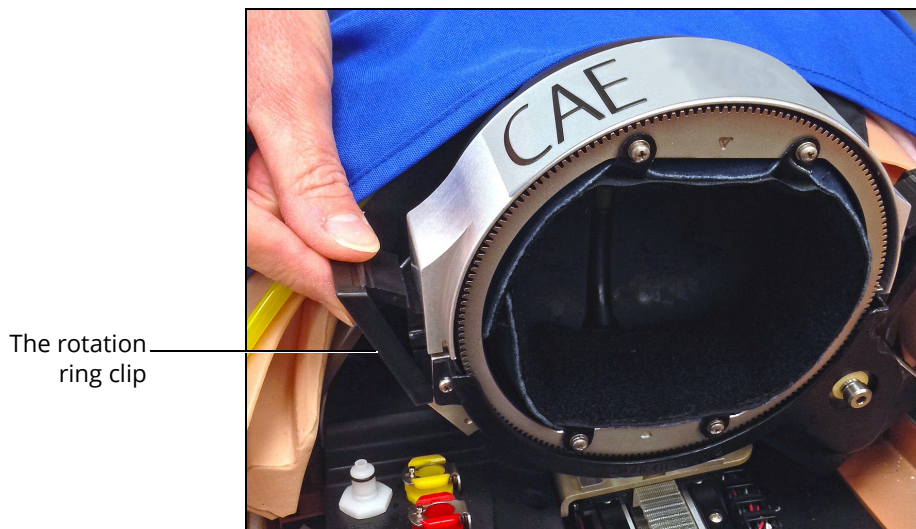
1. Unfasten the yellow air compression tube at the baffle by pressing the metal release clip.



The Manikin's Torso - Rotation Ring Compressor Connection

2. Unfasten the clips on each side of the ring:
 - a. Push the top of the clip out to unsnap.
 - b. Push slightly down to unclip the bottom of the clip.

Note: If the top of a clip will not fasten, check that the side connections on the left and right of the rotation ring are properly aligned with the rotation ring supports.



The Manikin's Torso - Rotation Ring Side Clip

3. Lift the ring out of the torso and place the rotation ring in a secure location for later use.



The Manikin's Torso - Rotation Ring Removed

4. The manikin's torso is empty and ready for the next piece of equipment to be installed.

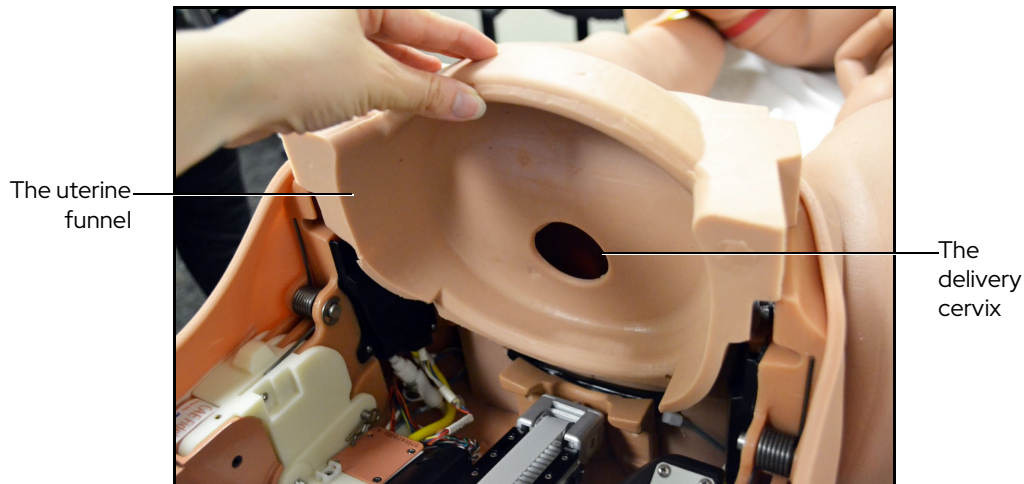
CAUTION: Avoid contact with any other part of the manikin while removing the rotation ring. Do not place pressure or any object on the rotation ring support arms while the rotation ring is removed.

Install the Static Cervix

Prepartum and Latent Cervix Installation

To install a static cervix for a prepartum and latent SCE:

1. Remove the uterine funnel with delivery cervix by lifting the part up and out of the manikin's pelvis.



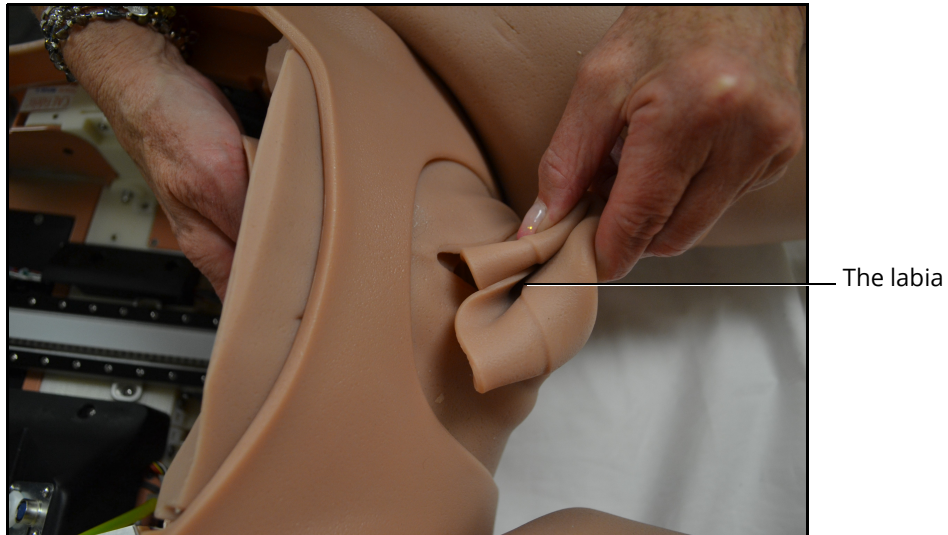
The Uterine Funnel with Delivery Cervix Removal

2. Install the prepartum birth canal.

Note: *The prepartum birth canal is installed within the standard birth canal.*

- a. Using the cottonseed oil provided, lightly lubricate the inside of the standard birth canal, the labia, the perineum, and the vaginal labia of the prepartum birth canal.

- b. Place the prepartum birth canal inside the manikin's torso and pull the perineum section out through the standard birth canal.



The Prepartum Birth Canal

- c. Tuck the skin shorts over the extended flaps.

To install the static cervix, lubricate the anterior part of the static cervix, then insert the static cervix at the posterior end of the prepartum birth canal with the arrow pointing upward.



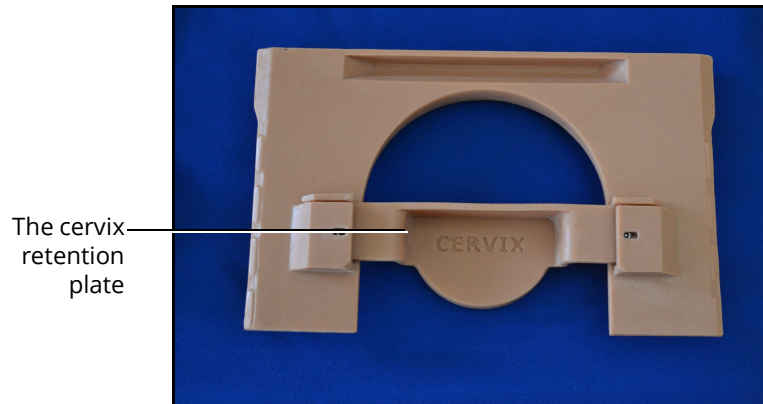
The Prepartum Birth Canal and Static Cervix

Install the Backplate

Prepartum and Latent Backplate Installation

To install the backplate for a prepartum and latent SCE configuration:

1. Ensure the cervix retention plate is placed into the grooves located in the center of the backplate.

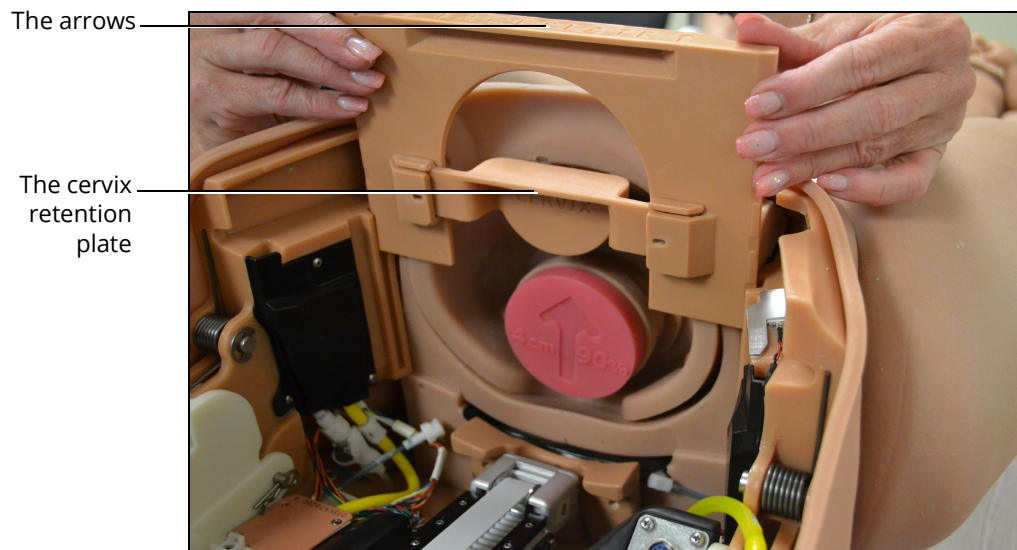


The Backplate

2. Install the backplate with the cervix retention plate.

The retention plate should be flush against the static cervix.

Note: *Ensure the arrows on the top of the plate point towards the manikin's feet.*



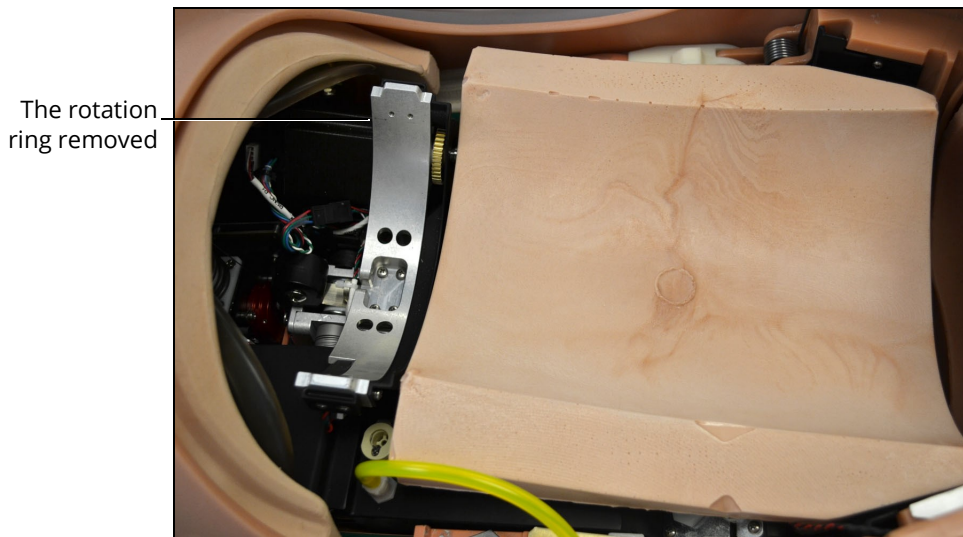
The Backplate Installed

The backplate is now installed for a prepartum and latent SCE.

Install the Support Tub

The support tub is used to hold the fetus during prepartum/latent phase.

1. Install the Leopold support tub in the manikin's torso.



The Manikin's Torso - The Support Tub

The manikin is ready for installing the Leopold fetus.

CAUTION: Do not place pressure or any object on the rotation ring support arms while the rotation ring is removed.

Load the Fetus - Prepartum

Prepartum and Latent

To load the Leopold fetus:

1. Ensure the Leopold support tub is installed in the manikin's torso.
2. Place the empty placenta pouch on top of the support tub.
3. Place the Leopold fetus on top of the placenta pouch and tub in the desired position.
4. Cover with the prepartum abdomen.

Active Phase

To load the delivery fetus:

1. Install the placenta pouch.
2. Attach the umbilical cord to fetus and placenta.

Configuring the Manikin

3. Place the placenta inside pouch.
4. Place the delivery fetus on top of the placenta pouch.
5. Cover with the prepartum abdomen.

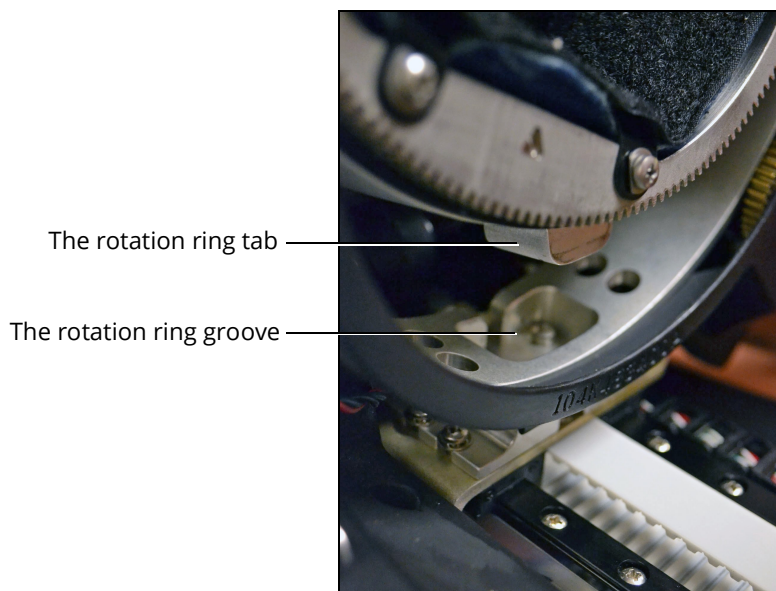
Delivery

Install the Rotation Ring

The rotation ring must be installed prior to running a delivery SCE.

To install the rotation ring inside the manikin's torso:

1. Align the rotation ring tab, which is located on the side opposite of the CAE logo, with the rotation ring groove inside the manikin's torso.



The Rotation Ring

2. Secure the clips on each side of the rotation ring:
 - a. Ensure the side connections are fully inserted and aligned.
 - b. Latch the bottom of the clip to the rotation ring.
 - c. Push the top of the clip in to securely fasten.

Note: If the top of a clip will not fasten, check that the side connections on the left and right of the rotation ring are properly aligned with the rotation ring supports.



The Manikin's Torso - Rotation Ring Clip

3. Connect the yellow compression tubing on the rotation ring to the compressor connection on the baffle.

Note: It is recommended to align the metal release clip to the outside of the mannequin to allow for easier removal of the compression tubing.



The Manikin's Torso - Rotation Ring Compressor Connection

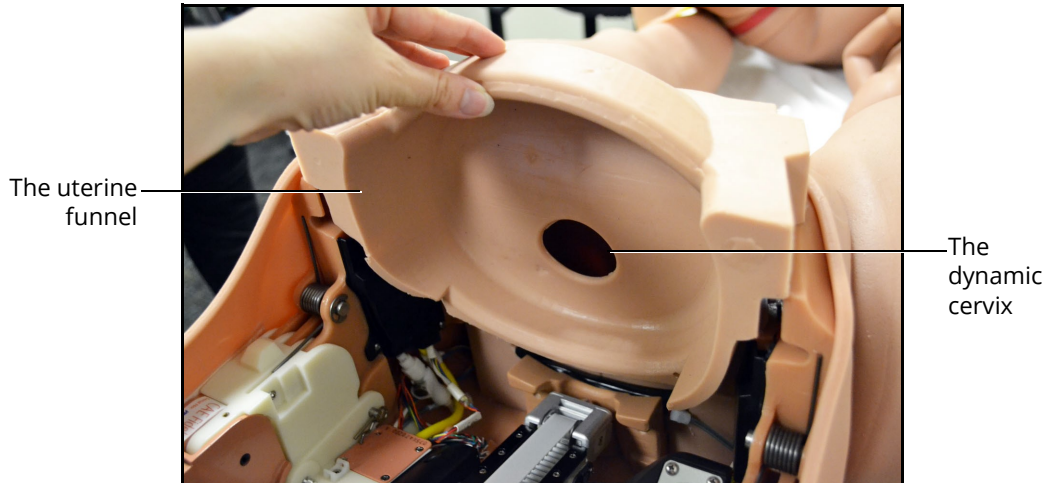
4. Use the upward arrow on the gripper button pad located on either side of the manikin's torso to move the rotation ring to the highest (Home) position in the manikin's torso.

The rotation ring is now ready for installing a fetus.

Install the Uterine Funnel with Dynamic Cervix

The uterine funnel with dynamic cervix is used for **active** and **delivery** SCE configurations.

To install the uterine funnel with dynamic cervix, slide the uterine funnel with delivery cervix into the grooves located on each side of the manikin's pelvis.



The Uterine Funnel with Dynamic Cervix Installed

Note: Lightly lubricate the dynamic cervix with the cottonseed oil provided to ensure the fetus will pass through without damaging the cervix.

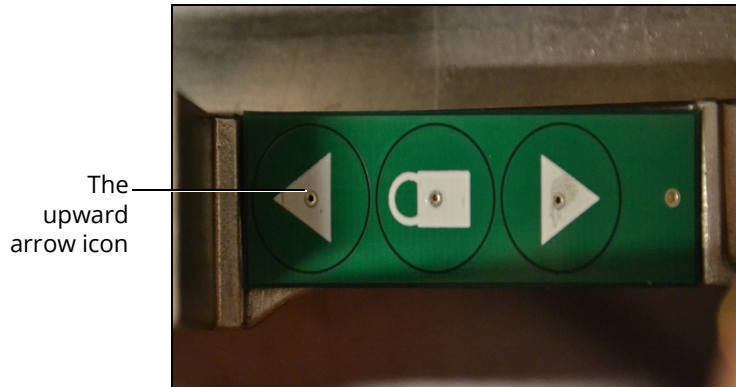
The uterine funnel with dynamic cervix is now ready for use.

Load the Fetus - Delivery

Note: Prior to loading the fetus, ensure that the descent mechanism is properly returned to the "Home" position. Failure to do so will require the user to reload the fetus.

To manually return the rotation ring to the Home position:

1. Press the upward arrow button on the Gripper button pad.



The Gripper Button Pad

2. Hold for three seconds after the rotation ring reaches the top of the descent mechanism and wait until the rotation ring rotates to the "Home" position.
3. Ensure there are no kinks in the yellow tubing on the rotation ring.

Note: If the SCE does not require loading a fetus, ensure the descent mechanism is retracted to the most superior position prior to running the SCE.

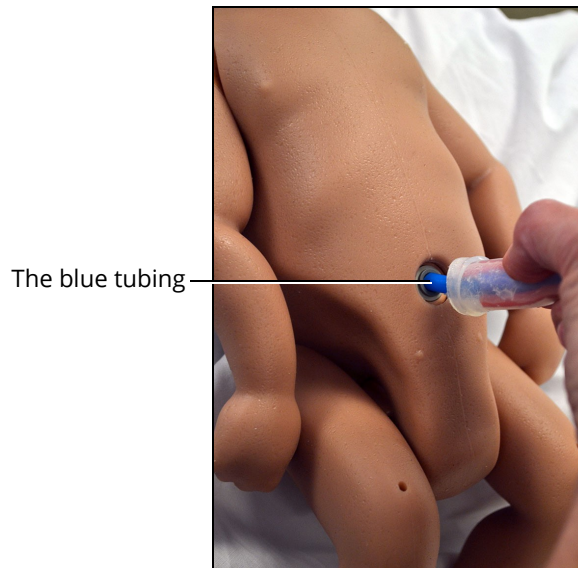
Vaginal Delivery - Breech

To load the delivery fetus for a vaginal delivery in a breech presentation:

1. Ensure the rotation ring from inside the manikin's torso is installed and returned to the "Home" position.
2. Ensure the delivery uterine funnel with dynamic cervix is installed.
3. Ensure the fetus is powered on, indicated by the illuminated power light in the umbilical opening on the front of the fetus.

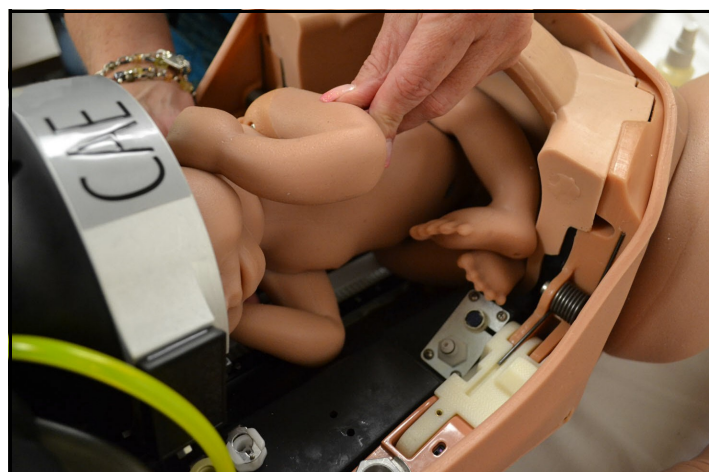
Configuring the Manikin

4. Ensure the umbilical cord is connected to the fetus. To attach the umbilical cord to the fetus, push one of the blue ends of the cord into the umbilical opening.



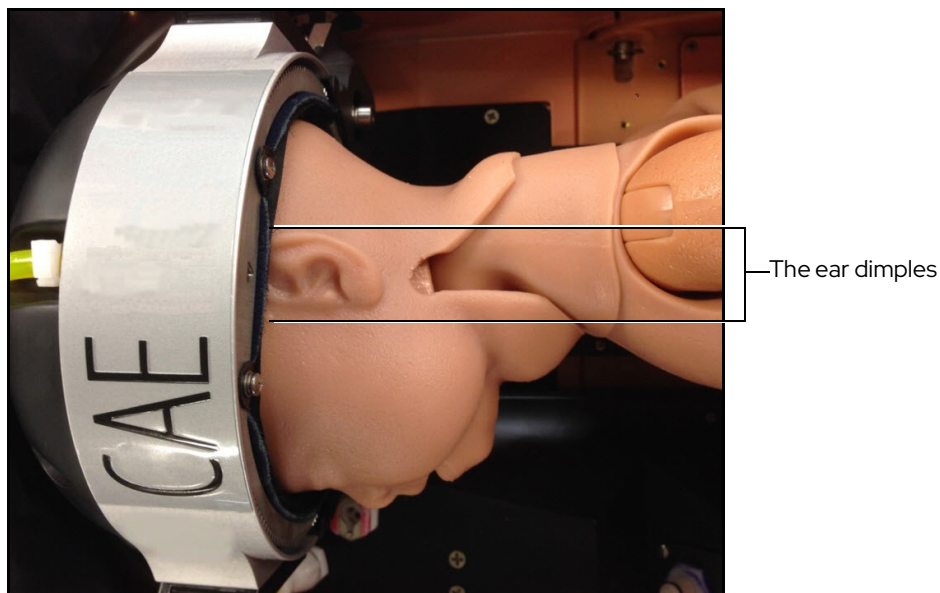
The Umbilical Cord Attached to the Fetus

5. Confirm the protective cap over the USB charging port on the back of the fetus is closed.
 6. Lubricate the fetus' buttocks, legs, and lower torso using cottonseed oil. DO NOT lubricate under the fetus' arms.
- Important:** Wipe off (remove) any lubrication from the fetus' head.
7. Insert the fetus by placing the buttocks of the fetus into the birth canal (cervix) with legs bent towards the fetus' chest.



The Fetus in the Rotation Ring - Breech Presentation

8. Insert the head into the rotation ring approximately 0.5 cm past the two dimples near the top of the ear (this allows the ring to line up with dimples when inflated).



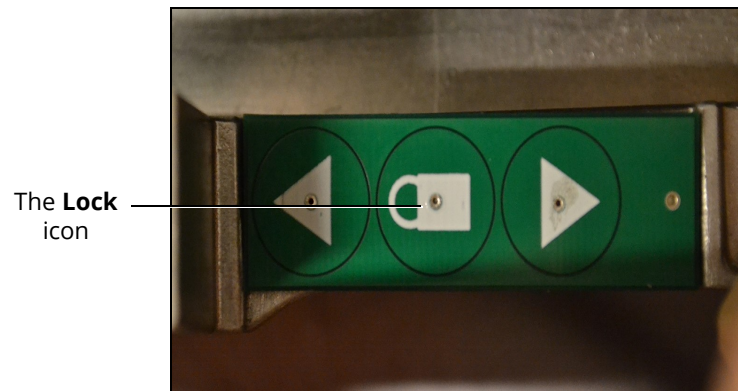
The Fetus in the Rotation Ring - Breech Presentation

Important Notes:

- For Left Sacrum breech presentation, the fetal head should be facing the mother's right side when placed into the rotation ring.
- For Right Sacrum breech presentation, the fetal head should be facing the mother's left side when placed into the rotation ring.
- Ensure fetal head skin is over (on top of) the neck skin and the neck skin is over (on top of) the fetal torso skin, as shown in picture above.
- Ensure that the ear dimples are evenly aligned with the rotation ring by not allowing the fetal head/neck to flex as the head is inserted into the rotation ring.

Configuring the Manikin

- Inflate the rotation ring by pressing the Lock icon on the gripper button pad, located on either side of the manikin's torso.



The Gripper Button Pad

- Position the arms firmly adducted against the torso of the fetus with the hands of the fetus towards its back, not its front.



The Breech Fetus in the Rotation Ring - Arms Adducted

Important: Ensure the umbilical cord exits the placenta pouch on the same side that the fetus is facing to prevent snag during delivery.



The Breech Fetus in the Rotation Ring

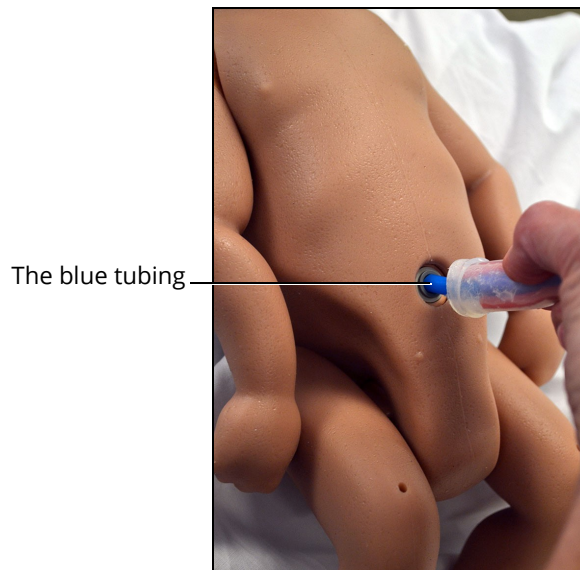
Vaginal Delivery - Vertex

To load the delivery fetus for a vaginal delivery in a vertex presentation:

1. Ensure the rotation ring from inside the manikin's torso is installed and returned to the "Home" position.
2. Ensure the delivery uterine funnel with dynamic cervix is installed.
3. Ensure the fetus is powered on, indicated by the illuminated power light in the umbilical opening on the front of the fetus.
4. Ensure the umbilical cord is connected to the fetus.

Configuring the Manikin

5. Attach the umbilical cord to the fetus by pushing one of the blue ends of the cord into the umbilical opening of the fetus.



The Umbilical Cord Attached to the Fetus

6. Lubricate the fetus' head, neck, and upper torso using cottonseed oil. DO NOT lubricate under the fetus' arms.

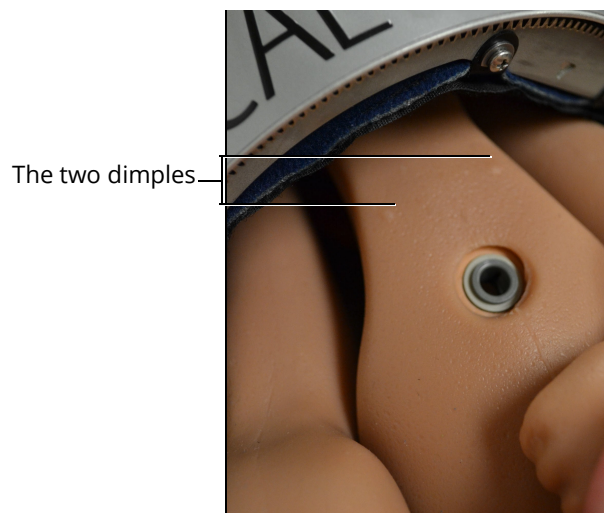
Note: Wipe off (remove) any lubrication from the fetus' buttocks.

7. Insert the fetus by placing the head against the delivery cervix and facing upright. Ensure that the fetus' arms are firmly adducted against its torso.



The Fetus in the Rotation Ring - Vertex Presentation

8. Insert the buttocks of the fetus into the rotation ring approximately 0.5 cm past the two dimples below the umbilicus (this allows the ring to line up with the dimples when inflated).



The Fetus in the Rotation Ring - Vertex Presentation

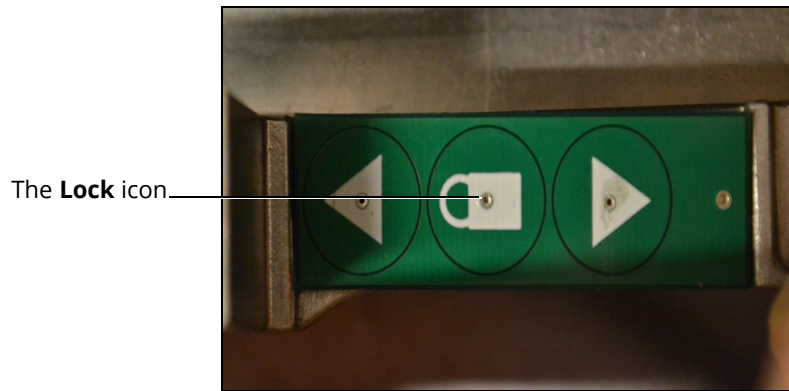
9. Bend the legs at the knees and tuck the feet into the rotation ring up to the ankles.



The Fetus in the Rotation Ring - Bent Legs

Configuring the Manikin

10. Inflate the rotation ring by pressing either grip button inside the manikin's torso indicated by the lock icon.

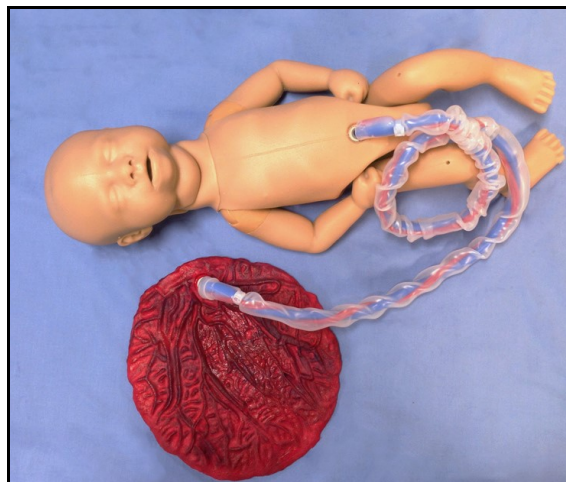


The Gripper - Lock Icon

The fetus is now installed for a vertex vaginal delivery.

Install the Placenta

Note: For active and vaginal delivery configurations, prior to installing the placenta, the fetus and placenta should be connected to the umbilical cord.

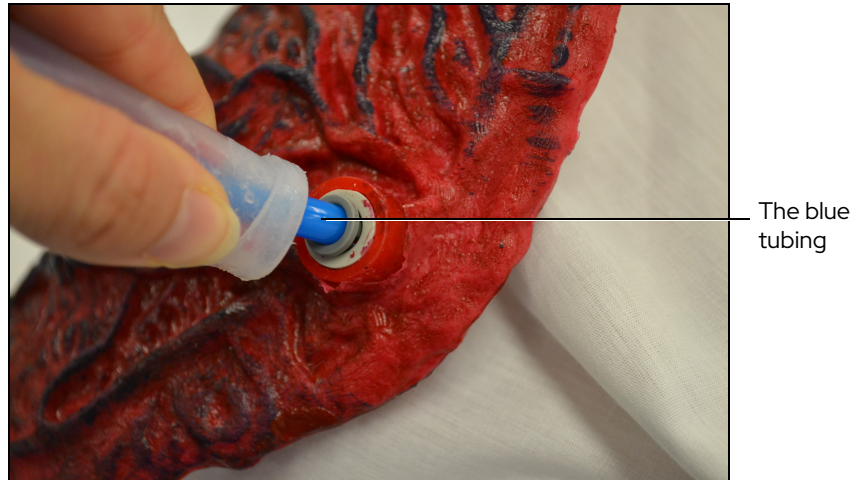


The Fetus, Umbilical Cord, and Placenta Connected

For more information on attaching the umbilical cord to the fetus, see *Loading the Fetus*.

To install the placenta:

1. Connect one end of the umbilical cord to the placenta by pushing the extended blue tubing into the opening on the placenta.



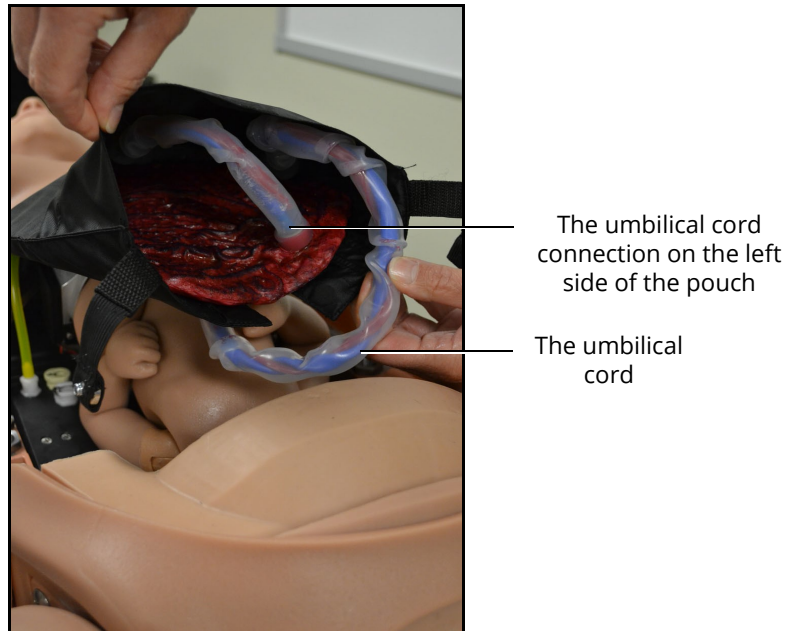
The Umbilical Cord Connected to the Placenta

2. Lubricate the placenta and umbilical cord with cottonseed oil spray. If the placenta and umbilical cord connection or the umbilical cord and fetus connection detaches too easily, use rubbing alcohol to clean the blue tube of the cord and remove the cottonseed oil.
3. Place the placenta in the placenta pouch with the umbilical cord connection facing up and oriented towards the opening of the pouch.

Note: The connection must be positioned on the left or right side, not in the center of the pouch, to ensure a snag-free delivery.

Configuring the Manikin

4. Coil the remaining umbilical cord inside the placental pouch ensuring that the cord exits the placenta pouch on the same side that the fetus is facing.

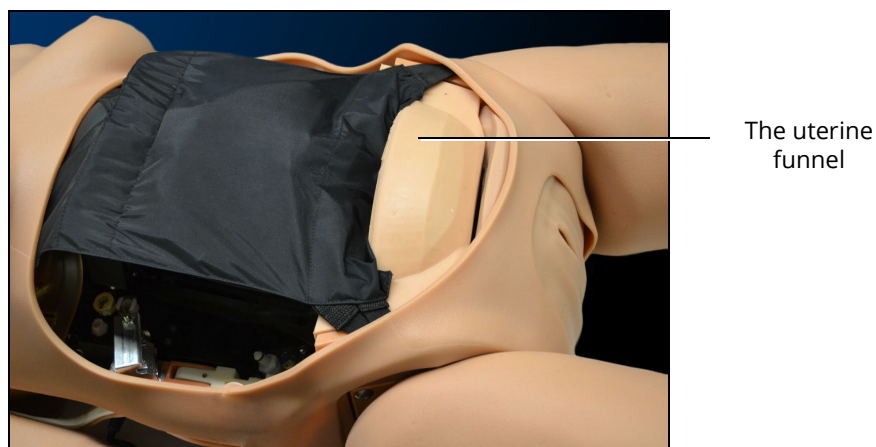


The Placenta Inside the Placenta Pouch

Vaginal Delivery Placenta Pouch Placement

For a vaginal delivery configuration:

1. Cover the fetus with the placenta pouch
2. Ensure that the front of placenta pouch (closest to the uterine funnel) is tucked under the top part of the uterine funnel



The Placenta Pouch Covering the Torso

3. Attach the placenta pouch to manikin's pelvis by connecting the pouch straps to each side of the pelvis



The Placenta Pouch Strap Connection

The placenta pouch is installed.

Important: If the placenta and umbilical cord are not properly positioned, the simulator motor may become obstructed and begin to make a clicking or knocking sound. If the noise does not stop right away on its own, open the abdomen and ensure the placenta and umbilical cord are not jammed. Once the placenta and umbilical are in the proper position, close the abdomen and delivery will automatically resume.

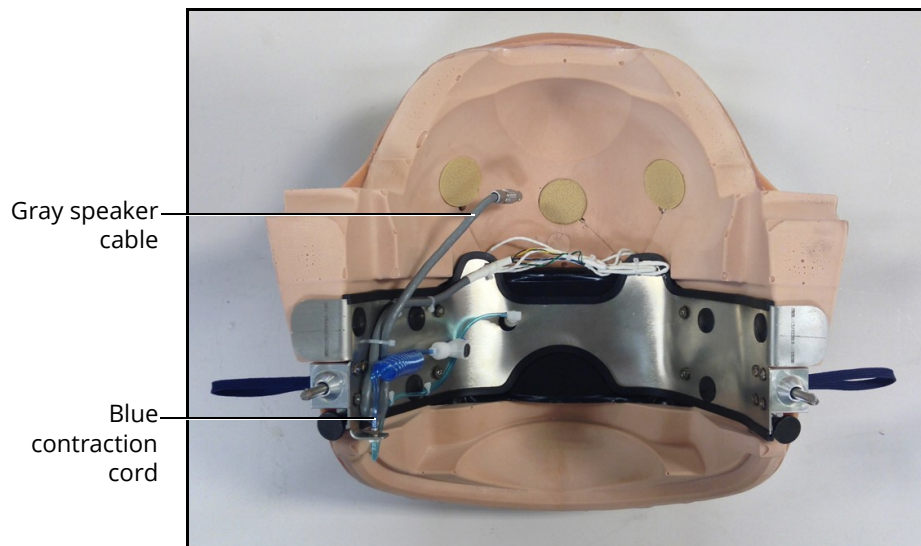
Install the Abdomen

Note: *Ensure the abdomen is installed on the torso whenever the manikin is in an upright position.*

Delivery Abdomen Installation

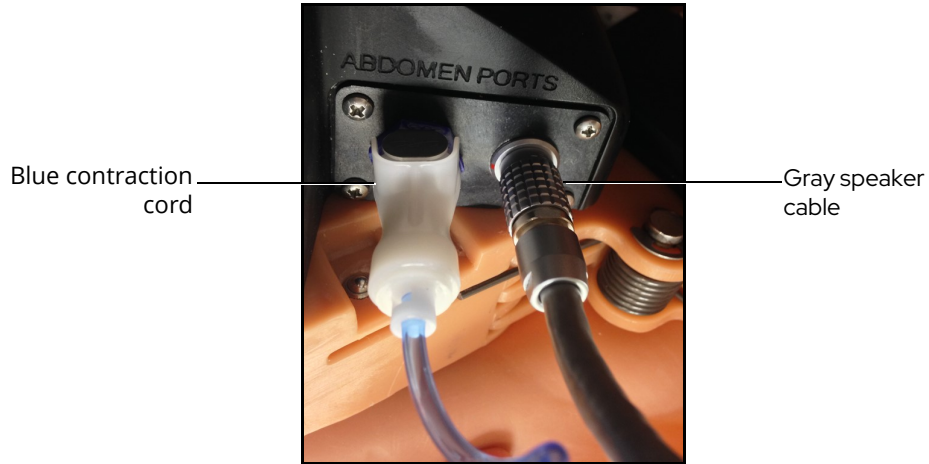
To install the delivery abdomen:

1. Locate the speaker system cable and the palpable contraction system cord inside the abdomen shell.



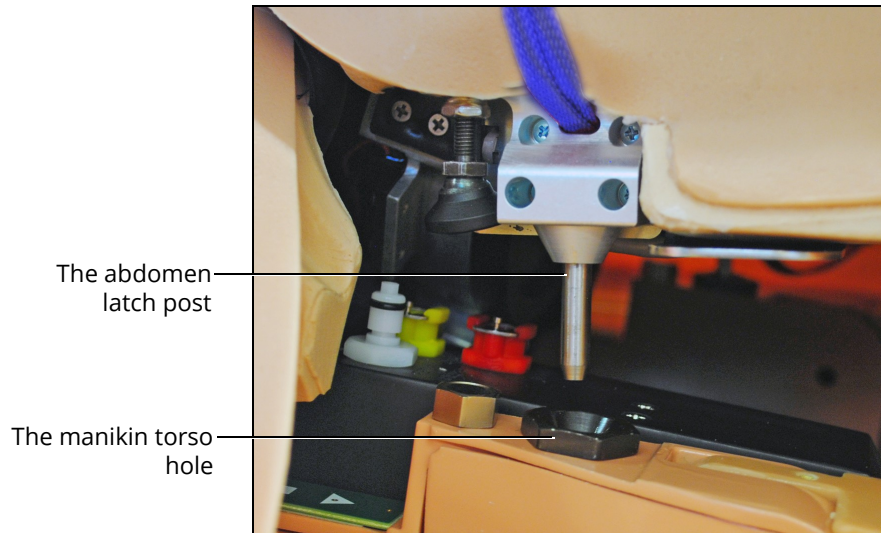
The Abdomen Contraction and Speaker Cables

2. Plug the cables into the corresponding connections inside the manikin's torso.



The Abdomen Contraction and Speaker Connections

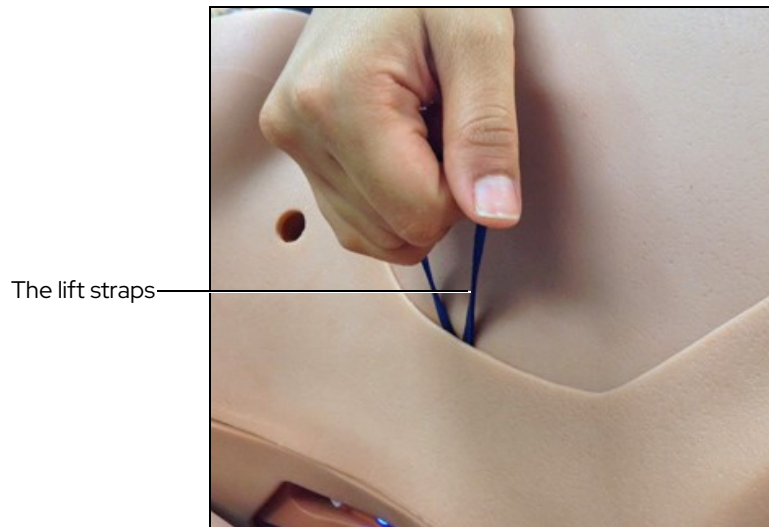
3. Latch the abdomen shell into the manikin's torso and ensure the speaker cable is not pinched or constricted.



The Abdomen Placement

Configuring the Manikin

The abdomen is ready for use.



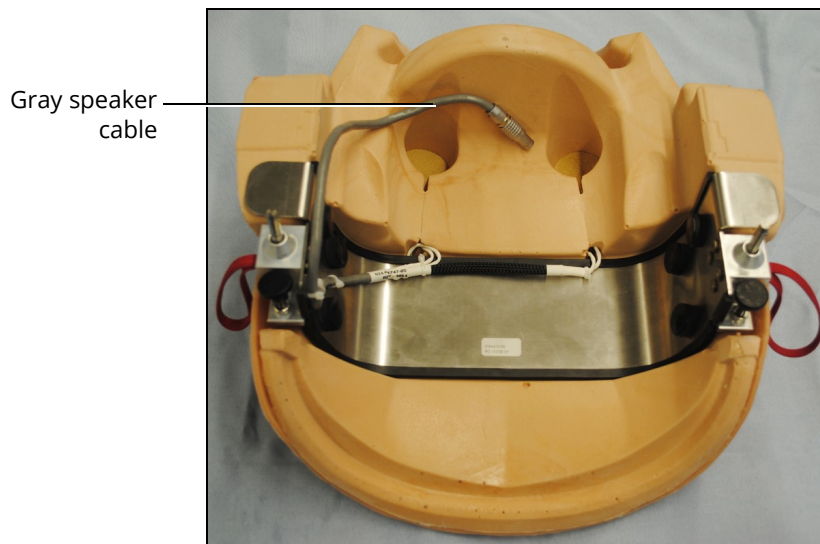
The Abdomen Removal

Important: Use only the lift straps attached to the abdomen to lift and remove the abdomen from the manikin's torso.

Non-Gravid (Non-Pregnant) Abdomen

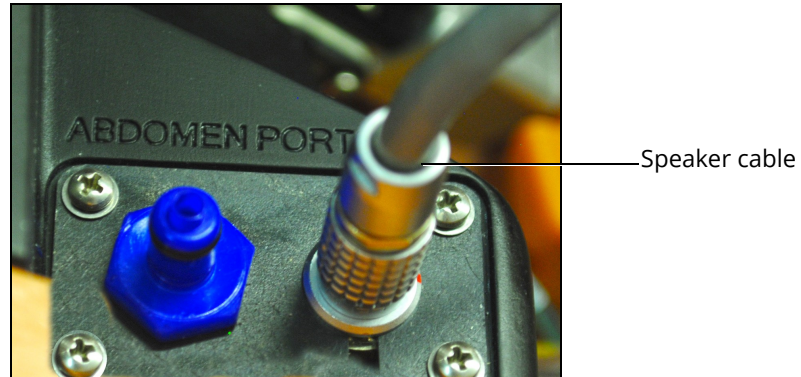
Important: Ensure the birthing mechanism on the manikin is at the highest position and the Leopold Tub is installed (for support).

1. Locate the speaker system cable inside the abdomen shell.



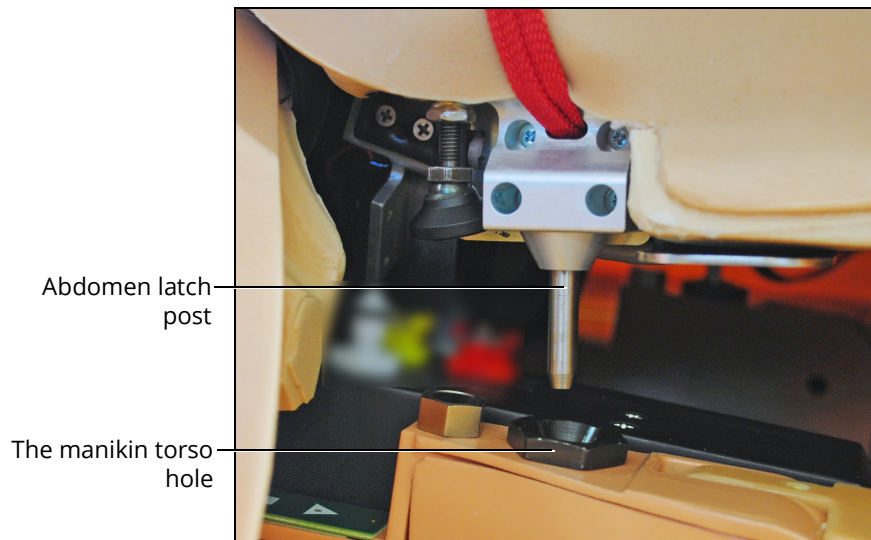
The Non-Gravid Abdomen Speaker Cable

2. Plug the cable into the corresponding connection inside the manikin's torso.



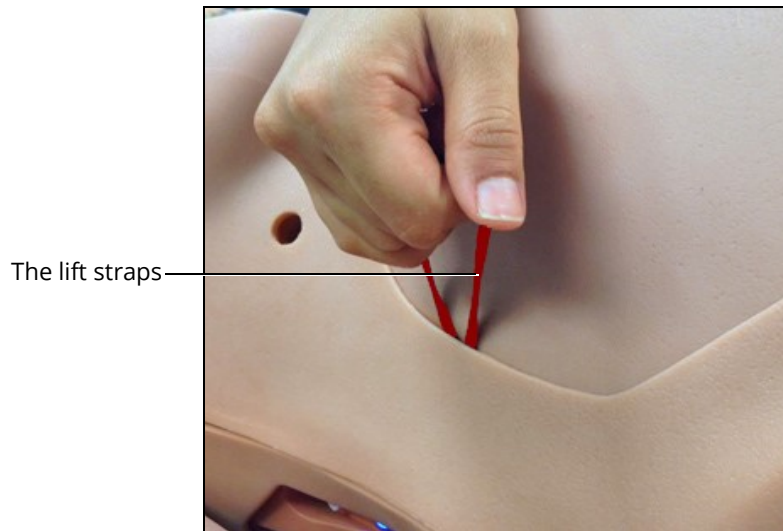
The Abdomen Speaker Connection

3. Latch the abdomen shell into the manikin's torso and ensure the speaker cable is not pinched or constricted.



The Abdomen Placement

The abdomen is ready for use.

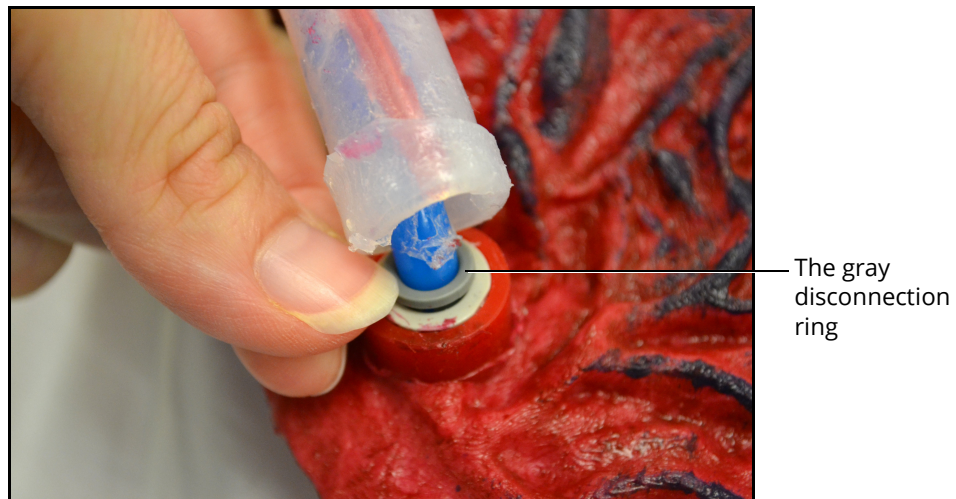


The Abdomen Removal

Important: Use only the lift straps attached to the abdomen to lift and remove the abdomen from the manikin's torso.

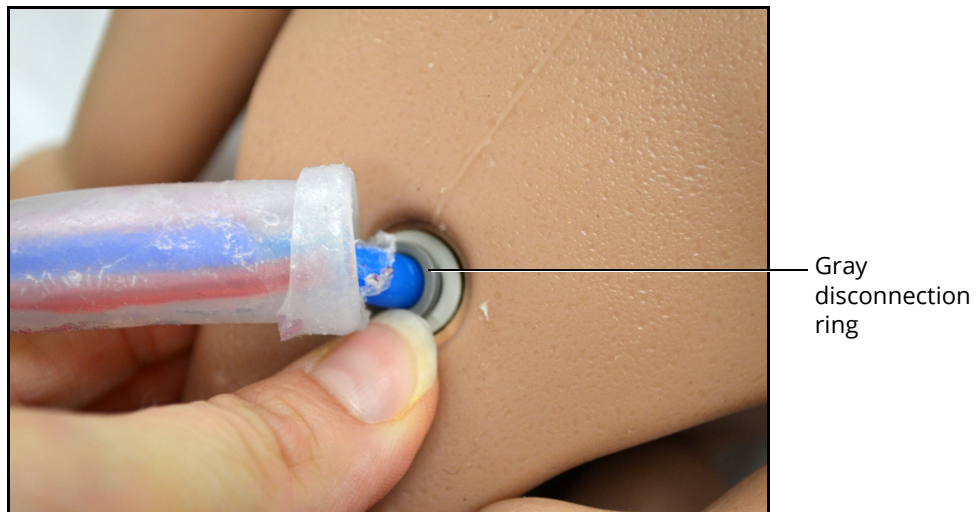
Disconnect the Umbilical Cord

To disconnect the umbilical cord from the placenta, push down on the gray disconnection ring and pull the blue tubing out of the connection port.



The Umbilical Cord Placenta Disconnection

To disconnect the umbilical cord from the fetus, push down on the gray disconnection ring and pull the blue tubing out of the connection port.



The Umbilical Cord Fetus Disconnection

Postpartum Configuration

Fill the Blood Tank

The blood tank has a 2 liter fluid capacity. There are two ways to fill it:

1. Internally (e.g., when the blood tank has been installed in the manikin)
2. Externally using the Blood Tank Adapter accessory (e.g., when the blood tank needs to be prepared prior to starting a simulation to decrease the time spent changing the configuration from delivery to postpartum)

Before filling, prepare the simulated blood mixture. You will need:

- 1 oz (30 ml) Red food coloring (provided with Lucina's supplies)
- 1 gal (3.8 l) Distilled water

In a separate container, add 1 oz (30 ml) of red food coloring to 1 gallon (3.8 l) of distilled water. Do not use a higher ratio of food coloring because it may stain the manikin or cause a clog.

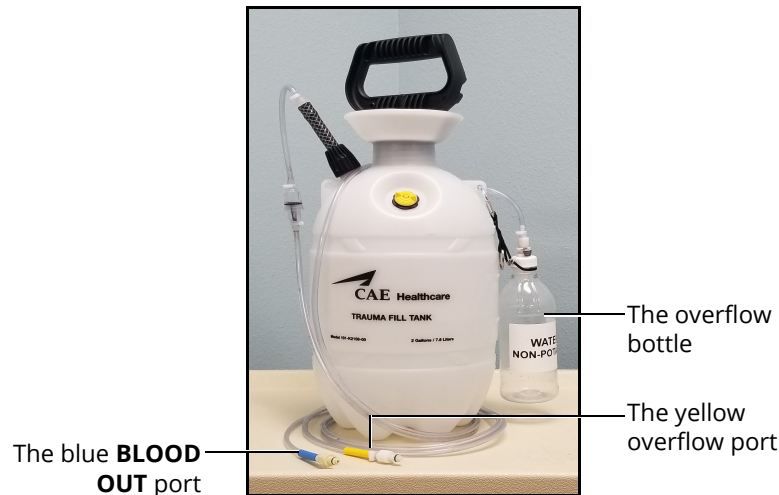
IMPORTANT! Use ONLY the distilled water and food coloring mixture in the Trauma Fill Tank. DO NOT use any other simulated blood or fluid. ***Use of other fluid will clog the valve that pumps the blood.***

Configuring the Manikin

Internal Filling

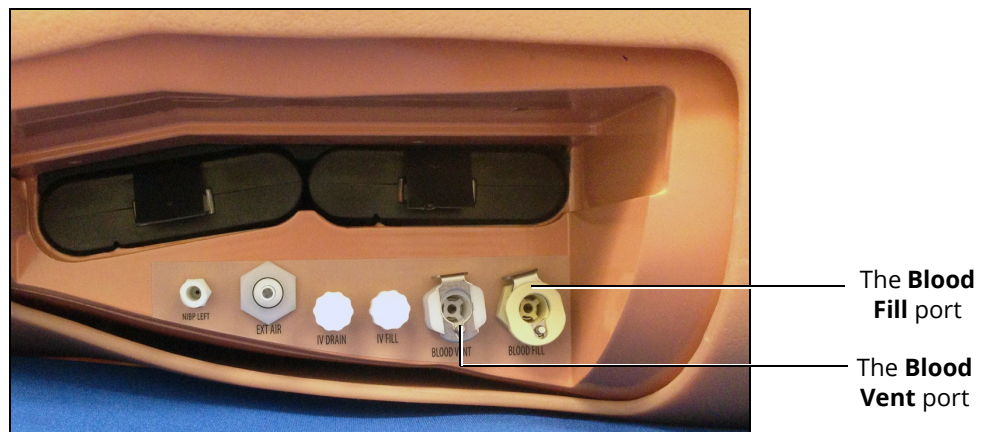
To fill the blood tank after it is installed in the manikin:

1. Fill the trauma fill tank with the simulated blood mixture (holds up to 7.6 liters).



The Trauma Fill Tank

2. Connect the trauma fill tank to the ports located on the left side of the manikin. The blue tube connects to the **Blood Fill** port and the yellow tube connects to the **Blood Vent** port.



The Battery Compartment and Ports

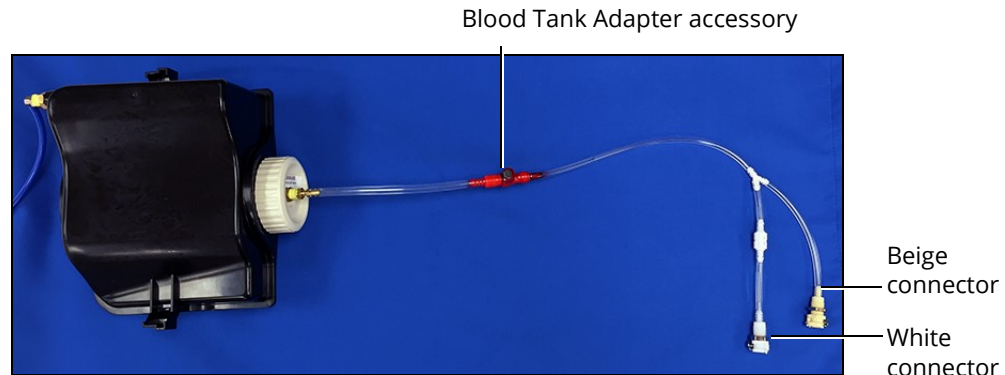
3. Ensure the yellow pressure relief knob on the trauma fill tank is closed and pressurize the trauma fill tank by pumping no more than 35 times.
4. Wait until there is good return of fluid in the reclaim bottle (will start dripping slowly first then accelerate to an almost constant flow; this may take a few minutes). A constant flow into the reclaim bottle indicates the blood tank is full.
5. Disconnect the trauma fill tank from the manikin and depressurize.

The blood tank is ready for use.

External Filling

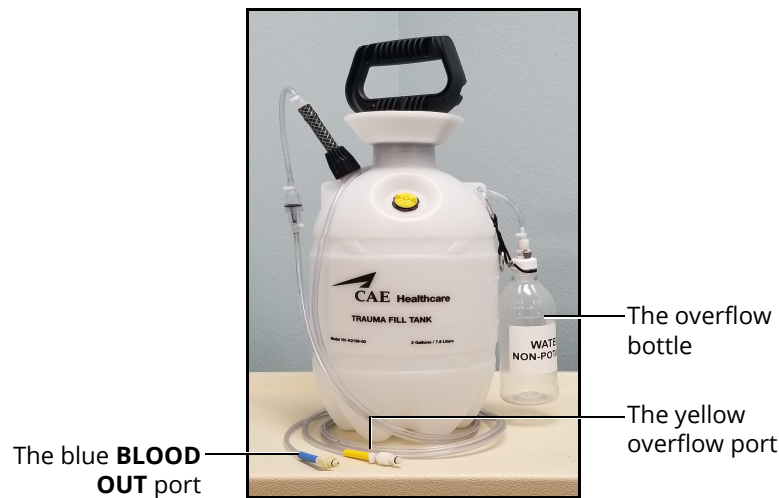
To fill the blood tank before it is installed in the manikin:

1. Locate the Blood Tank Adapter accessory.
2. Connect the red connector to the blood tank **Blood In** tube.



The Blood Tank Adapter Accessory

3. Locate the trauma fill tank.

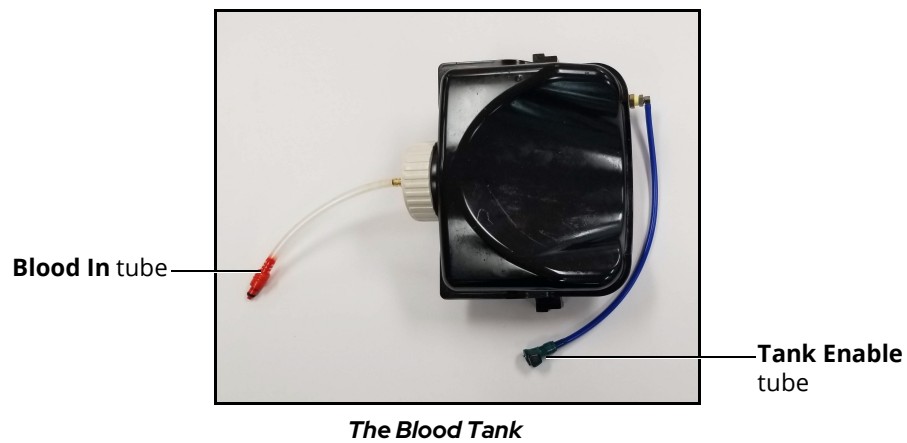


The Trauma Fill Tank

4. Connect the beige connector to the trauma fill tank **BLOOD OUT** port (blue tube).
5. Connect the white connector to the trauma fill tank overflow port (yellow tube).
6. Fill tank as per above instruction for internal filling (steps 3 and 4). When the tank is full, disconnect all ports.

The filled blood tank is now filled and ready to be installed in the manikin.

Install the Blood Tank



To install the blood tank:

1. Ensure the rotation ring is removed from inside the manikin's torso.

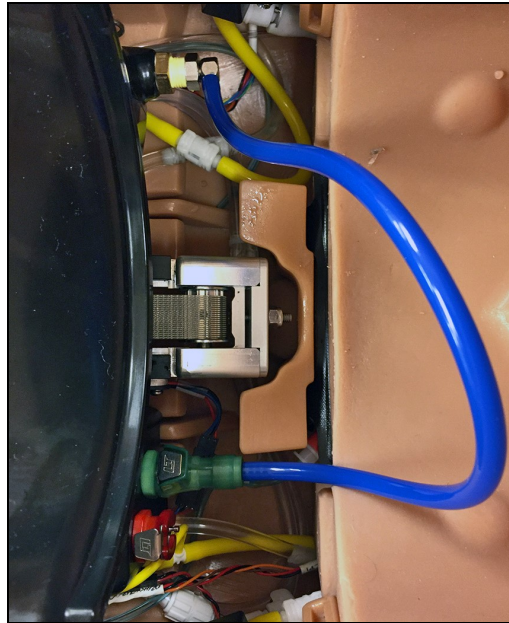
CAUTION: Do not place pressure or any object on the rotation ring support arms while the rotation ring is removed.



The Manikin's Torso - Rotation Ring Removed

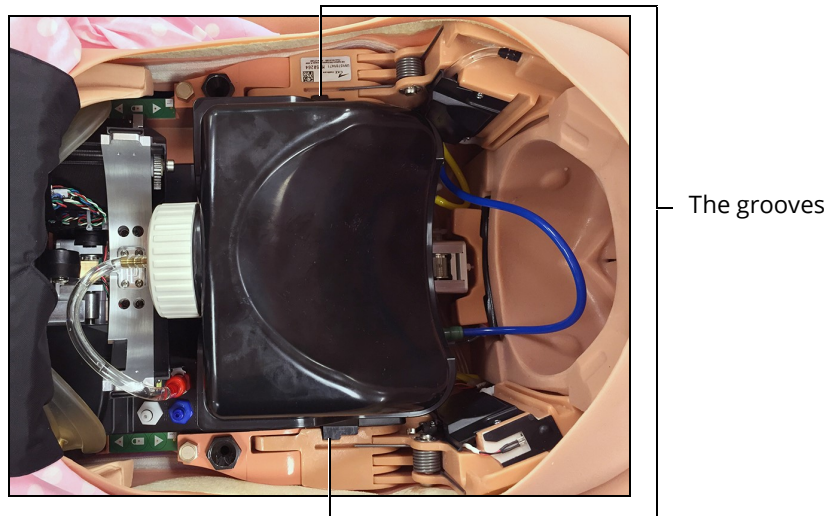
2. Ensure no other birth canal is installed within the standard delivery birth canal. The standard birth canal is installed by default.

3. Connect the **Tank Enable** tube (green connector) to the lower green port on the baffle.



The Tank Enable Tube Connection

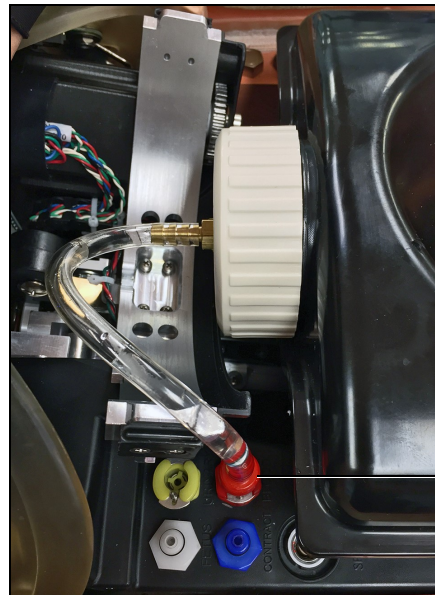
4. Insert the blood tank into the manikin torso; the tank flanges will slide into the grooves.



The Blood Tank Installed

Configuring the Manikin

5. Connect the **Blood In** tube on the tank (red connector) to the red Blood port on the baffle.



The **Blood In** connection

The Blood Tank Connection

6. Place the placenta pouch on top of the bleeding tank with no placenta or umbilical cord inside.

Install the Boggy/Contracted Uterus

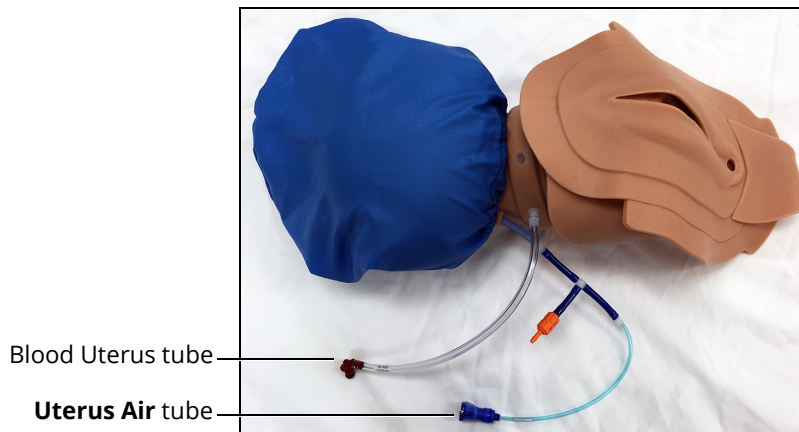
Important Notes:

- Ensure the blood tank is installed with the use of the postpartum boggy/contracted uterus, whether or not the bleeding function is used. The postpartum boggy/contracted uterus is placed inside the abdominal cavity over the blood tank.
- The uterus bag should be installed and used with the boggy/postpartum uterus at all times.

The uterus has two connections:

- An air connection to inflate the uterus and create the perception of a boggy uterus (Uterus Air tube)
- A blood connection to support vaginal bleeding (Blood Uterus tube)

Follow these configuration instructions carefully to ensure that no fluid infiltrates the electrical area inside the manikin and damages the simulator.



The Boggy/Contracted Uterus

To install the boggy/contracted uterus:

1. Ensure the rotation ring is removed from the manikin's torso
2. Ensure the blood tank is installed
3. Ensure the placenta pouch is placed on top of the blood tank
4. Connect the **Blood Uterus** tube (red connector) to the red Blood Out port on the lower baffle. For proper placement, ensure the **Uterus Air** tube (blue connector) is positioned above the **Blood Uterus** tube (red connector).

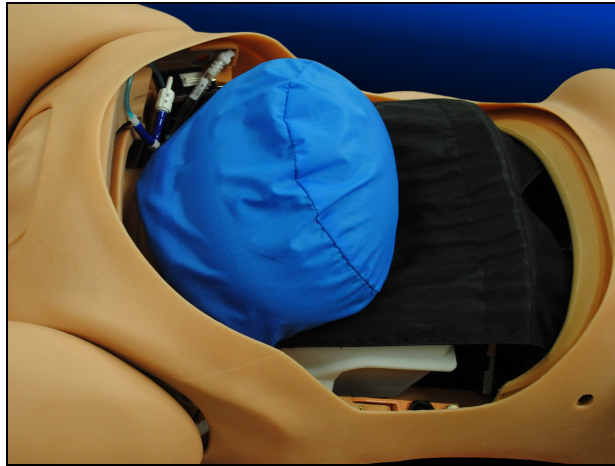


Blood Out port

The Lower Baffle Ports

Configuring the Manikin

5. Place the boggy/contracted uterus in the abdominal cavity over the placenta pouch. Ensure the bag is pulled snug with any slack tucked under the uterus.



The Boggy/Contracted Uterus Installed

6. Connect the **Uterus Air** tube (blue connector) to the **blue** Contract port on the baffle.



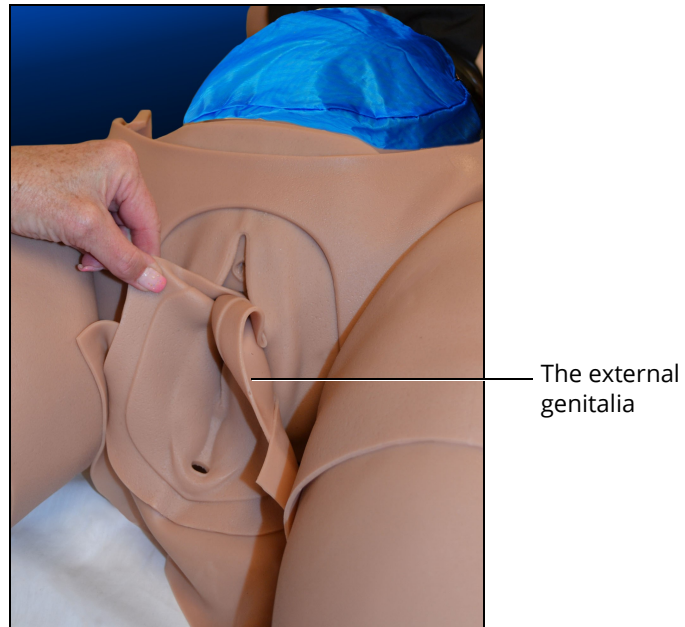
Blue **Contract** port

The Baffle Ports

Note: The orange valve on the blue uterus tube does not have a connection site. The valve remains open to release air during contraction. Ensure the two arrows on the orange valve remain aligned together.

7. Lightly lubricate the birth canal and the manikin's external genitalia using the cottonseed oil provided.
8. Lubricate the boggy/contracted uterus external genitalia.

9. Gather the boggy/contracted uterus external genitalia fully inside the manikin's torso and push the skin through the birth canal.



The Boggy/Contracted Uterus with External Genitalia

10. Tuck in the labia and position the uterus genitalia smoothly over the standard birth canal.
11. Tuck the edge skin of the uterus under the torso skin around the genitalia opening.
12. Push the external genitalia flap under the buttocks and attach it to the rectal plug.

Note: CAE recommends placing the manikin in McRoberts position to perform this procedure.

13. Install the Backplate without the Cervix Retention Plate.

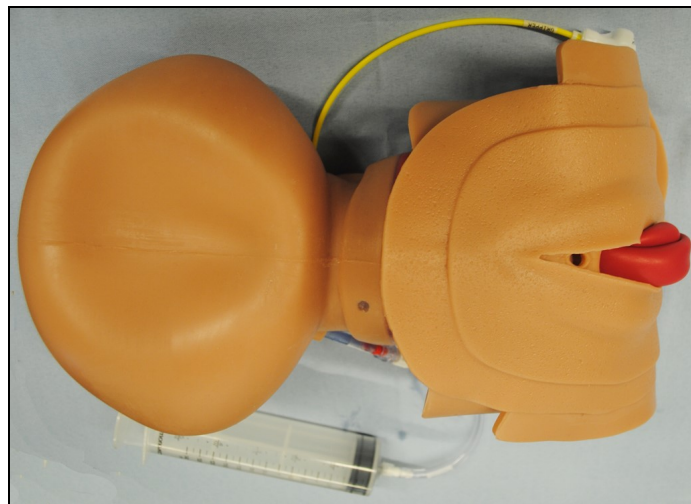
Note: Ensure the arrows on the top of the plate point towards the manikin's feet.

Install the Postpartum Invertible Uterus

Note: The postpartum invertible uterus is soft and has a reversion lock collar in the cervical area (unlike the Boggy/Contracted uterus).

The invertible uterus is placed inside the abdominal cavity over the placenta pouch on the blood tank and has two connections:

- A manual pneumatic connection to inflate the uterus and help with inversion (syringe attachment)
- A reversion lock collar pneumatic line connection that prevents reversion when desired (yellow Gripper line)



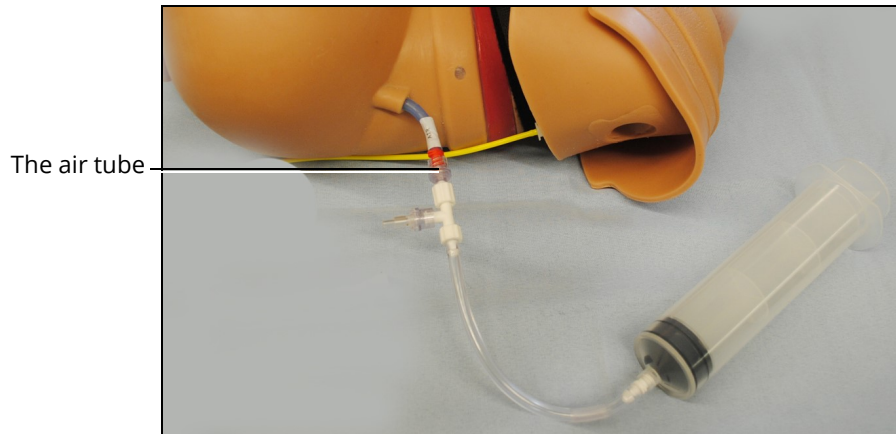
The Invertible Uterus

Note: For ease of installation, it is recommended that the uterus be inverted prior to installing in the manikin. However, the uterus may be inverted after installing in the manikin.

To configure and install the invertible uterus:

1. Connect the provided 140 mL syringe to the air tube on the uterus.

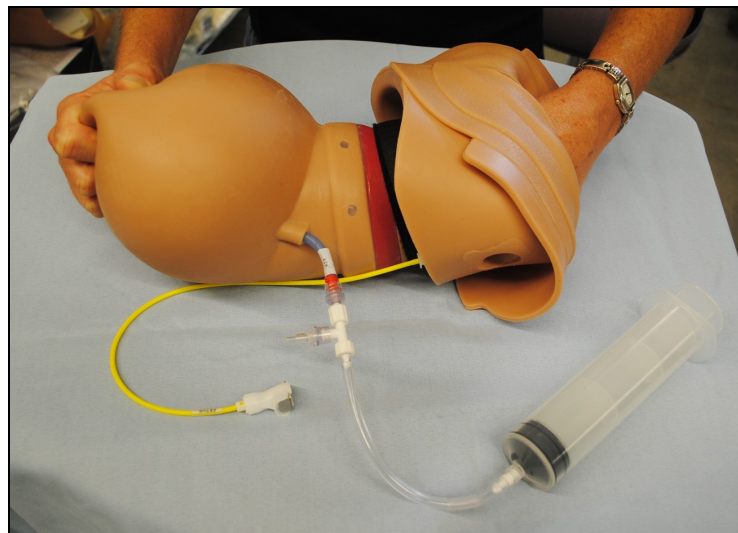
Note: Leave the syringe attached during preparation and installation.



The Syringe Air Tube Connection

2. Depress and pull the syringe plunger until uterus inflates to a rounded shape (approximately 10 times).
3. Lubricate the inside of the vaginal canal with cottonseed oil.
4. Use one hand to gently squeeze the uterus. Use the other hand to reach in the vaginal canal and grab the internal liner (squeezing the uterus creates air pressure to help pull out the liner).

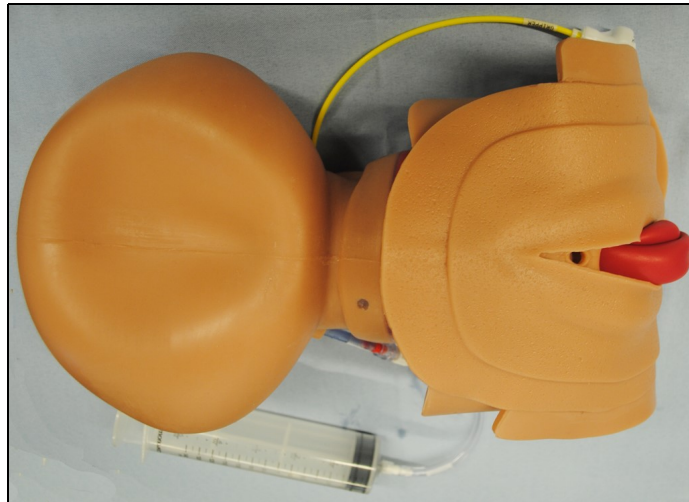
TIP: A second person holding the uterus may be helpful.



The Invertible Uterus

Configuring the Manikin

5. Pull out the liner to invert the uterus. Be sure not to extend more than two inches outside the labia.



The Invertible Uterus

6. Ensure the birthing mechanism on the manikin is at the highest position and the rotation ring is removed from the manikin's torso.
7. Ensure the blood tank is installed with the placenta pouch placed on top of the blood tank.
8. Place the invertible uterus in the abdominal cavity, over the placenta pouch on the blood tank, and into the vaginal opening.
9. Lock the uterus in place with the static cervix backplate.



The Invertible Uterus installed in Manikin

10. Lightly lubricate the birth canal and labia using the cottonseed oil provided.
11. Lubricate the uterus external genitalia.

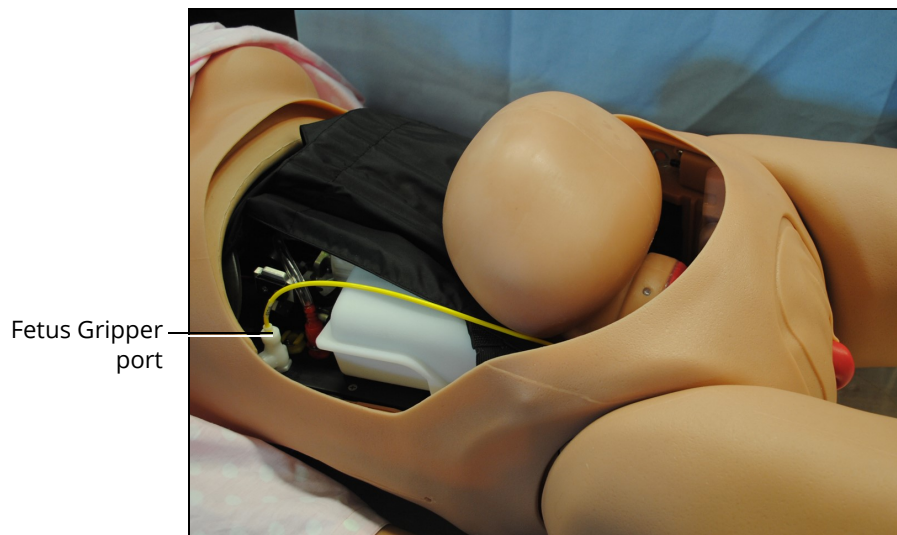
12. Gather the invertible uterus external genitalia fully inside the manikin's torso and push the skin through the birth canal until the genitalia is completely on the outside.
13. Tuck in the labia and position the uterus external genitalia smoothly over the standard birth canal.
14. Tuck the edge skin of the uterus external genitalia under the torso skin around the genitalia opening.



The Invertible Uterus with External Genitalia

Configuring the Manikin

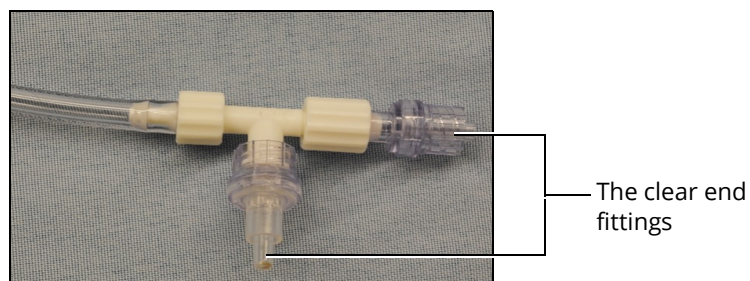
15. Connect the reversion lock collar pneumatic line (yellow Gripper line) to the manikin Fetus Gripper port.



The Invertible Uterus Installed In Manikin

16. Remove the syringe allowing uterus to slowly deflate. Empty any air from the inverted portion and ensure correct positioning.

Note: The clear end fittings must remain attached to the syringe tubing.



The Syringe

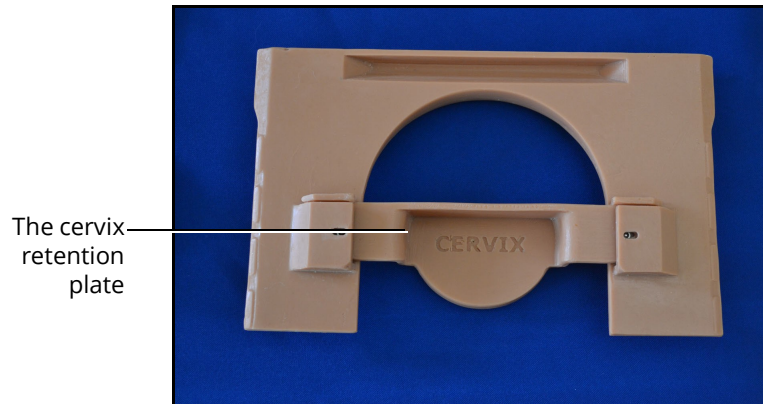
17. Install the prepartum abdomen.

Postpartum Backplate Installation

To install the backplate for a postpartum SCE configuration:

Note: Ensure the blood tank and either the boggy/contracted uterus with bag or the invertible uterus are installed prior to performing the backplate installation.

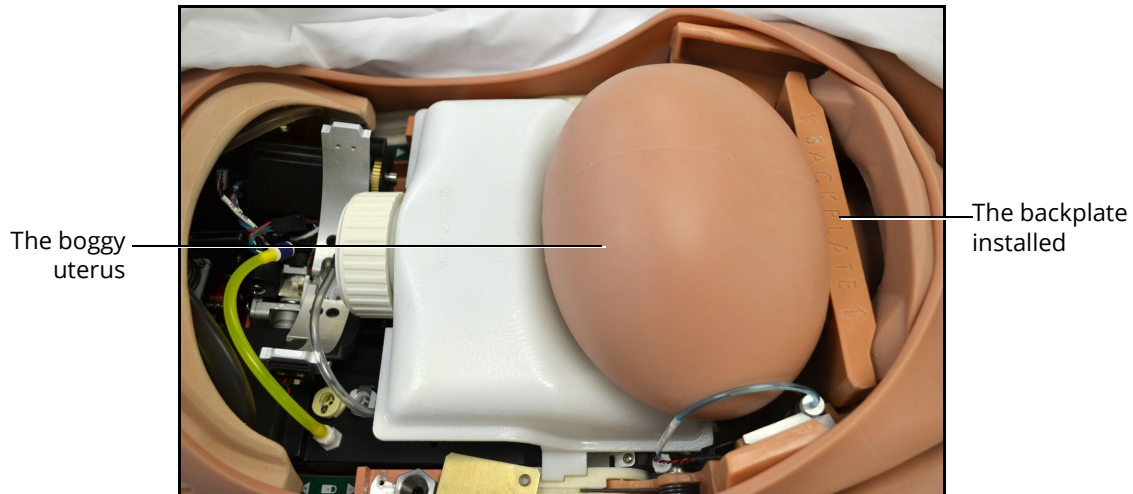
1. Remove the cervix retention plate located in the center of the backplate by lifting and sliding the retention plate out of the backplate.



The Backplate

2. Install the backplate without the cervix retention plate over the uterus to hold it in place.

Note: Ensure the arrows on the top of the plate point towards the manikin's feet.



The Manikin's Torso

Configuring the Manikin

Note: The boggy/contracted uterus bag should be installed and used with the boggy/postpartum uterus at all times.



The Boggy/Contracted Uterus Installed With Bag

The backplate is now installed for a postpartum SCE.

Lucina Features

CAE Lucina is a wireless patient simulator that allows clinicians and healthcare professionals to practice prepartum and postpartum assessment, labor and delivery, emergency care and transport all within one wireless patient simulator. With modeled and validated physiology that is integrated with the fetal physiology, Lucina responds automatically to obstetric maneuvers and clinical interventions and offers the most complete training in shoulder dystocia management and supports mechanical ventilation. With the addition of the Female Patient Module, Lucina easily transforms into a non-gravid patient for practice of emergency scenarios.

Maternal Manikin

The Lucina maternal manikin displays the physical characteristics of a fully-grown adult (pregnant or non-pregnant) patient. Fully operational in the supine position, as well as on all fours, the manikin can be placed on standard operating room tables, hospital beds, transport stretchers, on the ground or even in a vehicle (in the case of a simulated accident). Lucina offers simulation-based education to train healthcare providers and to help develop critical decision-making and patient-care skills in a risk-free environment.

Physiological and Pharmacological Features

Lucina presents patient reactions based on complex neurological, cardiovascular, gastrointestinal, genitourinary, respiratory, and pharmacological models. The manikin allows for the physical assessment of various clinical signs (i.e., baby, heart, lung and breath sounds, palpable pulses, chest excursion, airway patency, etc.) that are dynamically coupled with the mathematical models of human physiology and pharmacology.

Articulation

The Lucina maternal manikin is wireless, tetherless, and offers realistic articulation for range of motion exercises in the hips, knees, ankles, shoulders, elbows, neck. Lucina also has cervical motion for the practice of patient stabilization.

Articulation Features
2 Articulated arms
2 IV arms that allow for bilateral IV placement at two sites: antecubital fossa and dorsum of the hand
Articulated mandible that allows for jaw thrust when the lower jaw is grasped in a clinically appropriate manner
Articulated fetal body neck and traction sensing (with lateral neck movement), shoulders, elbows, hips, and knees

Neurologic System

Lucina is equipped with a number of features specifically targeted to support training for neurological care. For more information, see the *Using Lucina* section of this user guide.

Neurological System Features
The blink mode, light reactivity, pupil diameter and blink speed of the eyes can be controlled from the software.
SymEyes display patient symptoms and conditions, including jaundice, hemorrhage, keyhole pupil, cataracts, and bloodshot or droopy eyes. Blinking, panning and reactive eyes with multiple settings.
The manikin can simulate seizures with rhythmic movement of the arms and rapid blinking fraction.
Intracranial pressure value can be set and displayed.
Body and blood temperature can be set using software controlled temperature parameters.
By default, neuromuscular blockade is modeled based on patient physiology and can be overridden by manually selecting a value in the software.

Respiratory System

The simulator represents a realistic Respiratory System to achieve an extremely accurate simulation of respiration. This system is tightly integrated with the Cardiovascular System.

Respiratory System Features
The patient's lungs simulate consumption of oxygen and the production of carbon dioxide in accordance with the principles of uptake and distribution.
Alveolar and arterial gas concentrations are dynamically coupled with spontaneous or mechanical ventilation.
The airway accommodates the use of standard clinical devices such as LMAs, nasopharyngeal and oropharyngeal airways, nasal cannula, nasal packing, and endotracheal tube placement.
Upper airway sounds allow for auscultation of normal and abnormal lung sounds on the anterior and posterior torso.
The lungs are realistically modeled with respect to the range of tidal volumes and functional residual capacity.
Lung and chest wall compliance are modeled with independent control of the left and right lungs.
The simulated patient exhales air, exhibiting synchronized chest movement.
Ventilation results in the appropriate concentrations of alveolar and arterial carbon dioxide. Presence or absence of exhaled carbon dioxide can be monitored using a color-metric indicator.
Spontaneous and mechanical modes of ventilation are supported.
Symmetric and asymmetric lung ventilation are automatically supported in response to bilateral and unilateral compliance and resistance changes, proper or incorrect intubation, and pathophysiological states such as tension pneumothorax. This capability can be accomplished automatically without intervention of the instructor.

Respiratory System Features

The simulated patient generates both normal and abnormal breath sounds, bilateral and unilateral, which are appropriately synchronized with the respective phases of respiration. Breath sounds are audible over the apex of each lung with the use of standard stethoscope.

In the case of esophageal intubation, breath sounds, and chest excursion output are automatically absent, but the stomach distends with positive pressure ventilation attempts.

Manual bag-valve-mask (BVM) ventilation demonstrates chest rise and fall.

Allows for right and/or left mainstem intubation with detection.

Simulated pulse oximetry is fully supported. The reported oxyhemoglobin saturation correlates correctly and dynamically with the alveolar oxygen concentration, the patient's intrapulmonary shunt fraction and the temperature and pH of the arterial blood. The saturation value can be displayed on the Instructor Workstation.

Allows for direct laryngoscopy, oral and nasal tracheal intubation and use of speciality airway devices. Detects right mainstem intubation.

Seesaw respiratory patterns of breathing are demonstrated on the manikin.

Esophageal intubation is fully supported, in which case breath sounds and chest excursion are absent and gastric distension occurs.

Bronchial occlusion, when enabled, guarantees that no ventilation is possible, creating a "cannot ventilate" crisis scenario.

Arterial and venous blood gases are continuously calculated and displayed when selected for the Patient Status Display.

Cardiovascular System

Similar to the Respiratory System, the Cardiovascular System accurately simulates a wide variety of hemodynamic conditions and responses..

Cardiovascular System Features

3- or 4-Lead ECG waveforms can be viewed on a standard monitor and/or on the Patient Status Display. Normal and abnormal cardiac rhythms are linked to patient physiology (i.e. blood pressure, cardiac output).

The 12-lead dynamic ECG display is available in the software.

The simulated patient generates heart sounds, including a range of pathological ones that are synchronized to the QRS complex of the ECG and are audible with the standard stethoscope.

Pacing, cardioversion and defibrillation are supported with manual and automatic medical devices.

Normal and abnormal circulation (i.e. hypovolemia, hypervolemia, and right/left heart failure) can be adjusted in the software.

The simulated patient can be defibrillated or cardioverted using the simulated functions via the Maestro software. The instructor is able to adjust the levels at which the shock is delivered.

A standard blood pressure cuff and sphygmomanometer can be used to assess blood pressure by palpation or by auscultating Korotkoff sounds.

Lucina Features

Cardiovascular System Features
Carotid, brachial, radial and dorsalis pulses can be palpated bilaterally and are synchronous with the cardiac cycle. A pulse deficit automatically occurs if the systolic arterial blood pressure falls below specified thresholds. The intensity of the pulse reflects current physiology or can be set to absent, weak, normal, or bounding.
2 IV arms that allow for bilateral IV placement at two sites: antecubital fossa and dorsum of the hand
Performing CPR on the manikin provides realistic chest compression analysis including depth and resistance. Software metrics detect hand placement, rate and depth of compressions, chest recoil, ventilation volume and rate.
Ventricle contractility including tamponade volume and chest compression efficacy can be adjusted in the software.
Resistance factors including aortic and mitral valve, pulmonary, venous and systemic can be adjusted in the software.
Invasive Hemodynamic monitoring is supported with various hemodynamic physiological indicators that are registered and can be monitored.
Myocardial Ischemia can be replicated. Myocardial oxygen supply and demand automatically influence the cardiac rhythm yielding response to hypoxemia.
A transthoracic cardiac pacemaker can be used. Pacing results in appropriate physiological changes in blood pressure and cardiac output.

Genitourinary System

The genitourinary system is designed for excretion of urine upon catheterization. Urinary catheterization (without fluids) may be performed on the manikin. For more information on changing the genitalia, see the *Using Lucina* section of this user guide.

Medication Administration

The Lucina manikin features Medication Administration capabilities for practicing clinical and emergency care skills.

Medication Administration
Bilateral IV access sites at the dorsal metacarpal, cephalic, basilic, median antebrachial and median cubital locations.
Supports pharmacological interventions through pre-programmed software controlled drug administration with pharmacokinetic and pharmacodynamic parameters that are established for more than 50 intravenous medications.
Epidural infusion
Suppository

Maternal Features

Lucina comes equipped with maternal features. The manikin allows for the clinical and physiological assessment of the various stages of pregnancy, delivery and post-delivery including obstetrical, prepartum, intrapartum and postpartum.

Obstetrical

Lucina comes equipped with the following obstetrical features.

Obstetrical Features
Integrated maternal-fetal physiological modeling
Realistic and consistent birth canal and vulva/perineum support with accurate fetal descent and rotation
Multiple birthing positions: lithotomy, sitting and all fours
Rectal suppository administration

Prepartum

Lucina comes equipped with the following prepartum features.

Prepartum Features
Vaginal examinations can be performed for evaluation of the cervix, fetal station, and position
Static cervixes represent various stages of dilation from closed to 5 cm, and effacement from 0 - 90%
Leopold's Maneuvers can be performed
Epidural port with infusion and aspiration

Intrapartum

Lucina comes equipped with the following prepartum features.

Intrapartum Features
Realistic palpable uterine contractions
Controllable rate and duration of contractions
Trendelenburg position with detection
Left lateral tilt with detection
Vertex and breech delivery
McRoberts Maneuver with observable pelvic tilt
Suprapubic pressure support and detection with palpable symphysis pubis
Supports delivery of posterior arm during shoulder dystocia

Lucina Features

Intrapartum Features
Zavenelli maneuver with detection
C-section team training support
Rotation of anterior and posterior shoulder is detected in resolving shoulder dystocia (Rubin II and Woods' Screw Maneuvers)
Forceps application
Vacuum extraction without fetal cap
Episiotomy
Intact/fragmented placenta with realistic color, texture and flexibility

Postpartum

Lucina comes equipped with the following postpartum features.

Postpartum Features
Postpartum hemorrhaging, including Class III hemorrhage
Contracted and boggy uterus
Bimanual compression and uterine massage
Uterine blood released upon massage
Inverted postpartum uterus
Uterine reversion (optional uterine inversion module)
Intrauterine balloon insertion

Simulated Clinical Experiences

The Lucina simulator is a manual-driven, script-controlled system designed to simulate a patient's physiological condition, clinical signs, symptoms, and responses to certain clinical interventions. Simulated Clinical Experiences, or SCEs, are process tools that enable the faculty/educator to execute a learning strategy using simulation. Each process tool provides an extensive overview and outline of the learning exercise and requires minimal additional faculty development time for use. Each SCE is comprised of a patient and the scenario.

Lucina includes eleven preconfigured SCEs, or clinical simulations, that cover a range of events and crises

- A Normal Delivery
- A Vaginal Breech Delivery
- An Instrumental Vaginal Delivery - Anterior
- An Instrumental Vaginal Delivery - Posterior
- Eclampsia
- Fetal Central Nervous System Depression by Narcotics given to the Mother
- Fetal Tachycardia due to Maternal Pyrexia
- Major Postpartum Hemorrhage due to Uterine Atony
- Maternal Cardiopulmonary Arrest
- Shoulder Dystocia
- Umbilical Cord Prolapse

Each SCE includes the information below:

- Background information and patient history
- Synopsis
- Learning objectives
- Learning performance measures
- Equipment and supplies suggested for the simulation
- Facilitator notes
- Debriefing points
- Teaching Q&A
- References

Scenarios

Each scenario is a set of simulator commands that instruct or cause the simulator to react or respond in a specific manner. Scenarios are used to determine the initial and subsequent physiological states as well as the different conditions that arise during the simulation exercise. Each scenario also includes documentation to support its use.

By utilizing the SCE Designer feature of the Maestro software, users can copy and modify the preconfigured scenarios or create custom scenarios from scratch to meet specific educational objectives.

Instructors may also modify events within a given scenario in real-time to increase or decrease event severity and shorten or prolong the duration of an event at any time during a simulation exercise.

For instructions on modifying scenarios and creating new scenarios, refer to the *Maestro for Lucina User Guide*.

System Controls

Lucina is designed to allow the instructor to focus attention on learner actions and reactions by providing a flexible set of tools that adjust to the instructor's needs.

Application Software

CAE Maestro software is the application that provides the instructor a means to control all features of the simulator. Instructors can select SCEs as well as control the flow of the scenarios via the user interface. Various medication, cardiovascular, respiratory, fluid, and other parameters can be individually applied "on the fly" to enhance the course of a simulation exercise. A Patient Status Display and set of simulation log entries provide a real-time display of vital signs, blood gases, medications administered, and other events. This data can be exported into permanent storage or printed for future reference.

System Tools

An instructor workstation enables the instructor to control all aspects of the simulator. Instructors can select an SCE and control the flow of a simulation exercise while monitoring patient parameters, medications administered, and other interventions. Additionally, all patient parameters can be adjusted "on the fly" to enhance the teaching points of the simulation in progress. The software provides an intuitive, easy-to-learn, and easy-to-use operator/instructor interface.

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Using Lucina

Once the simulator is assembled, the Lucina manikin is ready for learners to practice and master new competencies, interventions, and skills during clinical scenarios.

To create a fully immersive simulation experience with advanced intervention capabilities and realtime data feedback, the Lucina simulator utilize instructor-led software with scenario programming capabilities.

For more information about features associated with each configuration of this simulator, see the *Configuring the Manikin* section of this user guide.

For recommended sizes for clinical supplies, see *Appendix A - Recommended Clinical Supply Sizes*.

Note: CAE recommends keeping the simulator plugged into a power source while it is in use to extend the longevity of the battery life. To optimize battery life, only remove the power plug during simulations where the patient will be moved or transferred as part of the scenario. For further information, refer to the *Storage* section of this user guide.

Cardiovascular System

The Lucina manikin includes cardiovascular features that allow learners to practice basic assessment and life support skill sets. With the Lucina manikin, learners can:

- Palpate pulses
- Place IV lines and catheters
- Auscultate realistic heart sounds
- Perform chest compressions
- Perform simulated defibrillation, cardioversion, and pacing or real defibrillation with a commercial defibrillator
- Perform ECG monitoring

Cardiovascular System Controls

With Lucina's Cardiovascular system, users can replicate the clinical signs associated with cardiac activity, including palpable pulses, heart sounds, and electrical activity.

Cardiovascular System Controls			
Anatomy, Physiology and Clinical Signs	Clinical Interventions, Patient Monitoring and Scenarios.	Software Control	Manual Control
Heart Sounds	Normal and abnormal heart sounds are synchronized to the cardiac cycle and audible with a standard stethoscope. Heart sounds can be auscultated over the left and right upper sternal border, lower sternal border and apex.	None required; specific sounds can be selected. From the Run screen, tap Sounds and select Heart tab.	Utilize stethoscope.
Hemorrhage	Hemorrhaging can occur at multiple locations on the body due to severe injury and result in the rapid deterioration of a patient's status if not properly treated.	From the Run screen, tap Fluids and enable Bleeding: Upper or Bleeding: Lower parameters.	See <i>Hemorrhage Setup</i> in <i>Setup</i> section.
4-Lead ECG	ECG waveforms can be viewed on a standard monitor and/or on the Patient Monitor. Normal and abnormal cardiac rhythms are linked to patient physiology (e.g. blood pressure, cardiac output).	None required; specific rhythms can be selected.	ECG monitor may be utilized.
Myocardial Ischemia	Myocardial oxygen supply and demand automatically influence the cardiac rhythm, yielding response to hypoxemia.	None required, but adjustable.	None required.
Palpable Pulses	Pulses can be palpated bilaterally and are synchronous with the cardiac cycle. A pulse deficit automatically occurs if the systolic arterial blood pressure falls below specified thresholds.	None required, but adjustable. VIEW: From the Run screen, tap Pulse and tap on the pulse location desired to change intensity and/or pulse deficit.	None required.

Cardiovascular System Controls			
Anatomy, Physiology and Clinical Signs	Clinical Interventions, Patient Monitoring and Scenarios.	Software Control	Manual Control
Non-Invasive Blood Pressure Measurement	Systemic blood pressure can be measured using the return-to-flow technique. Korotkoff sounds can also be auscultated.	Volume of Korotkoff sounds can be adjusted by tapping Sounds on the Run screen and then the Korotkoff tab.	Use of modified blood pressure cuff with T-adapter. Connect T-adapter to NIBP connection .

Pulses

Eight pulse locations are activated, through sensors, by touch:

- Carotid (2)
- Brachial (2)
- Radial (2)
- Dorsalis Pedis (2)

Pulses are controlled (enabled, disabled, and deficits) from the Maestro software. All pulses, unless altered by an SCE, are enabled by default. Pulse palpation is recorded in the Events Log. For more information, see the *Maestro for Lucina User Guide*.

IV Cannulation

When the veins are punctured, clinically appropriate flashback occurs. To enable flashback, the IV system must be primed prior to use. Ensure the cap is on the IV Drain port prior to priming or using the IV system to avoid any fluid overflow.

The vein tubing must be replaced after a certain number of punctures to avoid any fluid leakage within the simulator arms. Leakage will occur when the IV system is primed.

Replace vein tubing after:

- A single puncture from a 14 gauge cannula or needle
- Three punctures with a 16 gauge cannula or needle
- 10 punctures from a 18 gauge or 20 gauge cannula or needle

Note: A 14 gauge needle can be used in the forearm veins only. Do not use a 14 gauge cannula or needle on the antecubital or dorsal veins.

IMPORTANT: After each use of the IV system, the system must be cleaned. The IV system must be empty prior to priming or using the IV system. For more information on cleaning the IV system, see *Cleaning the IV System* in the *Care and Maintenance* section.

ECG

On Lucina, a 4-lead ECG signal is emitted from the appropriate positions for display on a standard monitor.

Note: The ECG posts are supplied with the accessories kit and need to be installed at the locations indicated.

Blood Pressure

Lucina support systolic and diastolic readings can be obtained and manipulated through the software.

Systolic and Diastolic Blood Pressure

To manually adjust the systolic and/or diastolic blood pressure:

1. From the Cardiovascular panel, select the parameter of desired blood pressure.
2. Set the pressure by moving the blue slider left or right, or by typing in a value.
3. Select **Accept** to exit and save the changes. The switch is now orange, indicating a change has been made.
4. If using CAE Physiology (optional), return to the programmed physiologic model by selecting the switch and turning the Override switch to Modeled.

Non-Invasive Blood Pressure Measurement

Blood pressure can be taken manually on either arm. Non-invasive blood pressure (NIBP) monitoring techniques can be used by attaching a standard cuff modified with a T-fitting and adapters.

For information on attaching the NIBP arm and modifying the blood pressure cuff, see the *Setup* section in this user guide.

To get a blood pressure reading:

1. Connect the extension from the T-fitting on the blood pressure cuff adapter to either of the NIBP ports on Lucina's torso.
2. Ensure the electronics tether from the NIBP arm is connected to the arm connector on Lucina's torso.
3. Connect the T-fitting extension to the hose.
4. Take the non-invasive blood pressure reading using the return-to-flow technique or by monitoring Korotkoff sounds.

Defibrillation

The manikin can receive simulated electrical therapy through the software.

Simulated Defibrillation

For instructions on administering defibrillation through the software, refer to the *Maestro for Lucina User Guide*.

Commercial Defibrillation

The manikin can safely absorb the energy from commercial defibrillators.

Safety Precautions

Biphasic defibrillators can be used with either paddles or hands-free connectors. Standard defibrillation energy levels should be used for positive learning reinforcement and to avoid negative training transfer.

Use of a defibrillator for training purposes represents an operational hazard equivalent to use of a defibrillator on a real patient. Consequently, ALL SAFETY PRECAUTIONS for the use of defibrillators MUST BE FOLLOWED as if the simulator were a patient. Consult the specific defibrillator's user manual for further information.

The following safety precautions and simulator information should be observed:

- **CAUTION:** This equipment is not suitable for use in locations where children may be present.
- Defibrillation should be performed on the defibrillation electrodes only. If defibrillation is performed over any ECG electrode, high voltage may be present on the remaining connectors during the shock. This may also damage ECG circuitry.
- To prevent overheating, DO NOT provide more than three (3) defibrillator discharges
- (maximum 200 joules with a biphasic defibrillator) in a sequence. DO NOT exceed an average of two (2) defibrillator discharges per minute during the training session.
- Avoid a large number of consecutive discharges. For example, 20 or 25 discharges without any recovery interval may damage the system.
- DO NOT let the simulator come in contact with electrically conductive surfaces or objects during defibrillation. A flame-supporting atmosphere, for example, with a high content of oxygen, should be avoided during defibrillation.
- Keep the simulator's chest dry. Special attention should be taken when using the urinary system.
- To prevent pitting of the chest skin electrode, do NOT apply conductive gel or conductive defibrillation pads intended for patient use.
- DO NOT use cables or connectors having visible damage.
- DO NOT spill fluids over any component inside the simulator torso. This could damage the system and may also present a possible hazard for the operator.
- When using a manual defibrillator, the ECG can be monitored via the defibrillator paddles. Coarse ventricular fibrillation and high-rate ventricular tachycardia cardiac rhythms are recognized as "shockable" rhythms on AEDs.
- With each defibrillation, Lucina automatically records the amount of energy discharged and the time defibrillation was performed. The simulated patient response to defibrillation is

determined by the scenario script or instructor intervention. Thus, cardioversion is not automatically determined by the physiological models.

- The minimum charge recognized by the circuitry within the simulator is 20 joules.
- For paddle placement on the chest, the simulator has two anterior defibrillation disks, which can be unscrewed, leaving threaded connections, if required.

Cardioversion

The cardioversion procedure will vary depending upon the brand of defibrillator that is being used. However, the setup steps for the defibrillator will be the same as that described in *Appendix B*. Refer to defibrillator manufacturer's user guide for proper use.

Pacing

Pacing can be achieved by selecting the appropriate intervention in the Treatments palette in the Maestro software.

Connect the ECG leads to the posts on the manikin. This provides ECG signals for leads I – III. The learner may choose to shock either synchronously or asynchronously to the ECG rhythm. The Pacing Capture Threshold can be modified in the Maestro software. The default threshold is set at 50 mA.

When the current exceeds the Pacing Capture Threshold set in Maestro, the learner begins to see the effect of pacing on the ECG and Maestro logs the current being provided.

A standard transthoracic cardiac pacemaker can be connected to the simulator using the anterior contacts. The simulator automatically detects and responds to pacing signals (from 20 mA to 200 mA, in increments of 10).

For more information, see the *Maestro for Lucina User Guide*.

Respiratory System

Lucina manikin includes respiratory features that allow learners to practice assessment and life support skill sets. With the manikin, learners can:

- Manage difficult airways
- Perform intubation and procedural suctioning
- Recognize and resolve right mainstem intubation

Respiratory System Controls

Lucina uses both physical and mathematical models to achieve an extremely accurate simulation of respiration. Lucina's chest rises and falls, mimicking inspiration and expiration. Lucina's lungs also react realistically to intubation as well as to pathophysiologic states.

Respiratory System Controls			
Anatomy, Physiology and Clinical Signs	Clinical Interventions, Patient Monitoring and Scenarios	Software Control	Manual Control
Pneumothorax or Hemothorax	Increase in intrapleural volume, leading to asymmetrical breathing.	None required, but adjustable. VIEW: Respiratory CONTROL: Intrapleural Volume (Left or Right)	None required.
Chest Excursion	Synchronized with manual ventilation. Excursion depth proportional to tidal volume.	None.	
Lung Sounds	Normal and abnormal lung sounds are independently synchronized with ventilation of the right and left lungs. Lung sounds can be auscultated over anterior anatomic locations.	None required, but adjustable. VIEW: Sounds	None required.
Arterial Blood Gases	PaO ₂ , PaCO ₂ and pH are continuously calculated, and the Patient Status Display can be configured to show them.	None required, but adjustable.	None required.
Venous Blood Gases	PvO ₂ and PvCO ₂ are continuously calculated, and the Patient Status Display can be configured to show them.	None required, but adjustable.	None required.
Laryngospasm	Closes the patient's vocal cords and prevents both ventilation and intubation.	From the Run Screen, tap Respiratory and adjust Laryngospasm toggle. VIEW: Respiratory CONTROL: ON/OFF	None required.

Laryngospasm

The Lucina simulator comes with software-controlled laryngospasm feature to increase the difficulty of intubation and has two settings: Not Swollen and Swollen.

To activate the laryngospasm feature:

1. Enable Laryngospasms in the Maestro software. Tap the **Respiratory** icon on the SCE run screen.
2. Slide the Laryngospasm parameter toggle to the **ON** position.

To resolve the laryngospasm feature, slide the Laryngospasm parameter toggle to the **OFF** position.

Neurologic System

The clinical features that can be controlled from the Neurologic view are:

- Blood temperature
- Body temperature
- Convulsions
- Intracranial pressure
- Neuromuscular blockade

For more information, see the *Maestro for Lucina User Guide*.

Neurologic System Controls

The clinical features for the Neurologic system are controlled manually, with the software, or both.

Neurologic System Controls			
Anatomy, Physiology and Clinical Signs	Clinical Interventions, Patient Monitoring and Scenarios.	Software Control	Manual Control
Neuromuscular Blockade	Neuromuscular blockade can be activated to prevent a patient's muscle movement.	Tap Neuro and tap Neuromuscular Blockade .	Tap Override to adjust settings manually.
Intracranial Pressure	The intracranial pressure of a patient can be an indicator of the patient's condition.	Tap Neuro and tap ICP to adjust.	None.
Eyes	Eyes can be used as an indicator of a patient's condition and/or consciousness during an assessment.	Tap Eyes on Run screen and tap desired status.	None.

Neurologic System Controls			
Anatomy, Physiology and Clinical Signs	Clinical Interventions, Patient Monitoring and Scenarios.	Software Control	Manual Control
Convulsions	Simulated convulsions can be activated at the facilitator's discretion.	Tap Neuro and find Convulsions in menu; use ON/OFF toggle.	None required.
Temperature: Body	Myocardial oxygen supply and demand automatically influence the cardiac rhythm, yielding response to hypoxemia.	Tap Neuro and tap Temperature: Body to adjust.	None required.
Temperature: Blood	Changes in arterial temperature may alter the position of the standard oxyhemoglobin dissociation curve (shift). As temperature increases or pH decreases, more oxygen is released from hemoglobin and thus the patient's saturation decreases .	Tap Neuro and tap Temperature: Blood to adjust.	None required.

Vaginal Bleeding

Note: Vaginal bleeding can only be performed when the manikin is laying down flat in a supine position.

Blood loss is continuously reported to the physiological models. The models respond to the reported blood loss with the appropriate cardiovascular and respiratory system changes to heart rate, blood pressure, and respiratory parameters.

The vaginal bleeding reservoir holds up to 1.8 liters of fluid, allowing for simulation of the Class III postpartum hemorrhage.

The amount of vaginal bleeding can be set from the **Vaginal Bleeding Severity** menu in the software. Options include: **None, Mild, Moderate, Severe** and **Profuse**.

Note: When the blood pressure diminishes, the effective blood flow diminishes as well. If the patient's physiological condition cannot support the desired blood flow, a lower blood flow than requested will occur.

If any fluid gets under the skin during a vaginal bleed, follow these cleaning instructions immediately to prevent damage to the simulator:

1. Ensure the abdomen is installed on the torso whenever the manikin is positioned upright.
2. Elevate the torso.
3. Lean the manikin forward.
4. Unzip the torso skin zipper.
5. Open the skin on the back to expose the area under the buttock.

6. Clean the area where fluid is located.
7. Reattach the skin and return the manikin to supine position.
8. Clean any remaining liquid in the front of the vaginal opening.

For instructions on making the simulated blood mixture, filling the blood tank, connecting the blood tank to the simulator, and installing the postpartum uterus, see the *Configuring the Manikin* section of this user guide.

Hematology Model

The physiological model calculates hematocrit values (i.e. percentage of total blood hemoglobin) dynamically and continuously, taking into account blood and fluid losses, as well as the intravenous infusion of fluids such as whole blood, packed red blood cells, colloids and crystalloids.

Instructors can create patients with both normal and pathophysiological hematocrit levels. In addition, learners discover how administering various fluids affects hematocrit, the oxygen-carrying capacity of blood, and the resulting patient response.

The following important assumptions have been made in the design of the Hematology Model:

- Blood is comprised of two components: red blood cells and plasma
- Plasma is comprised of two components: colloid and crystalloid. The term colloid is used to describe substances that generate a clinically significant colloid osmotic pressure - for example, fresh frozen plasma, albumin and hetastarch. The term "crystalloid" is used to describe salt solutions for infusion - for example, normal saline, dextrose in water and Ringer's Lactate.
- The mixing of blood and its various constituents is instantaneous and homogeneous. In other words, one liter of crystalloid administered intravenously equilibrates immediately and homogeneously throughout the entire circulation.
- This Hematology Model does not distinguish between the differing clinical effects of colloids and crystalloids. For example, osmotic pressures and capillary leakage rates are not taken into account. Likewise, fluid kinetics and fluid distribution within the circulation and interstitial and intracellular spaces are also not modeled.

In the Hematology Model, the following model variables, definitions and relationships have been established:

- **Red Blood Cell Volume:** The volume of red blood cells within the circulation
- **Plasma Volume:** The volume of plasma within the circulation
- **Total Blood Volume:** The volume of blood (i.e. Red Blood Cell Volume + Plasma Volume) within the circulation
- **Blood Volume Loss:** The amount or rate of decrease in the total blood volume. A given amount or rate of blood loss proportionally decreases both the Red Blood Cell Volume and the Plasma Volume according to the current hematocrit.
- **Plasma Volume Loss:** The amount or rate of decrease in the plasma volume. A given amount or rate of plasma loss decreases the plasma volume without changing the red blood cell volume.

Plasma Volume Loss refers collectively and generically to all plasma fluid losses, including evaporative, transcellular (e.g. ascites, pleural effusion), bowel and third space losses.

- **Hematocrit:** The ratio of Red Blood Cell Volume to Total Blood Volume, expressed as a percentage

Genitourinary System

Lucina is configured with female genitalia which allows for the insertion of a urinary catheter. The genitourinary system also provides for the excretion of urine.

The simulator allows for the insertion of a 16 Fr urinary catheter and excretion of urine.

The genitourinary (GU) system must be primed prior to use. See the *Setup* section of this guide.

IMPORTANT: Use only clear distilled water or distilled water tinted with food coloring, or distilled water mixed with white vinegar (50/50) inside the manikin. Administration of any other type of fluid is NOT supported and may damage the system.

Be sure to clean the system before storing the manikin. For more information, see the *Care and Maintenance* section.

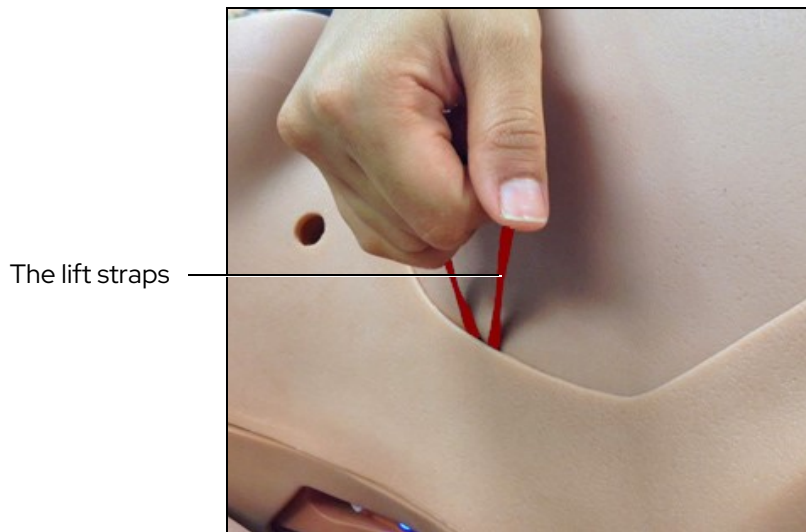
Priming the Genitourinary System

Prior to catheterizing the simulator, the genitourinary (GU) system must be primed.

To prime the GU system:

1. Fill a syringe with distilled water (and clinically appropriate food coloring if desired).
2. Connect the syringe to the GU filling tool.
3. Plug the GU filling tool into the **Urinary** port (colored yellow) located on the torso baffle inside the manikin.
4. Slowly push in the distilled water until fluid drains into the overflow reservoir on the GU filling tool (approximately 70 mL +/- 10 mL).
5. Disconnect the GU filling tool from the **Urinary** port.
6. Store the GU filling tool in a secure location.
7. Use only the lift straps attached to the abdomen (tucked under skin) to lift and remove the abdomen from the manikin's torso.

Note: The speaker cable will be connected to the manikin torso and may be removed for easier access.



The Abdomen Removal

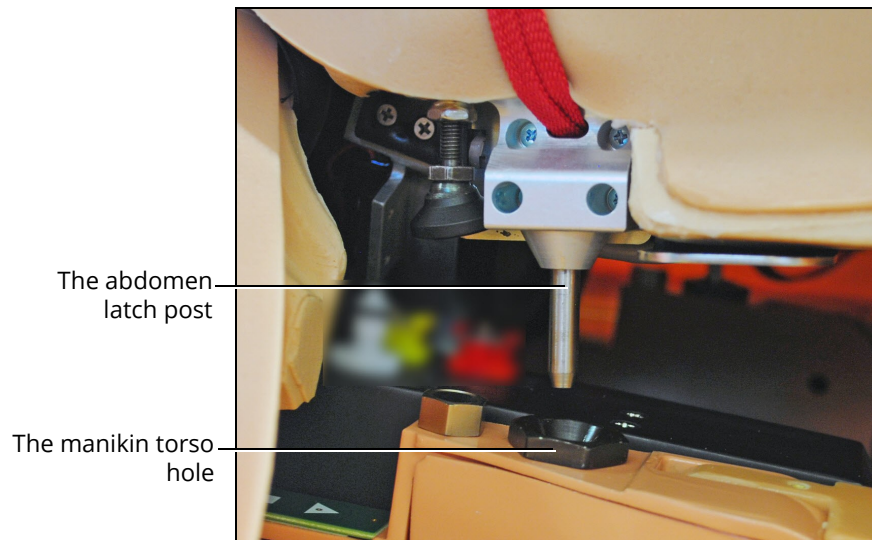
8. Fill a syringe with distilled water (and clinically appropriate food coloring if desired).
9. Connect the syringe to the GU filling tool.
10. Plug the GU filling tool into the **Urinary** port (colored yellow) located on the torso baffle inside the manikin.



The Urinary Port

11. Slowly push in the distilled water until fluid drains into the overflow reservoir on the GU filling tool (approximately 70 mL +/- 10 mL).
12. Disconnect the GU filling tool from the **Urinary** port.
13. Store the GU filling tool in a secure location for future use.
14. Ensure the speaker cable is plugged into the corresponding connection inside the manikin's torso.

15. Latch the abdomen shell into the manikin's torso and ensure the speaker cable is not pinched or constricted.



The Abdomen Placement

Important Notes:

- Ensure the abdomen is properly installed and latched during all simulations.
- Do not remove or modify the black port plugs.

Inserting a Urinary Catheter

After the GU system has been primed, catheterize the simulator using a standard 16 Fr urinary catheter lubricated with cottonseed oil spray.

When the catheter is inserted, simulated urine begins to flow until the internal bladder is empty.

Note: The urinary catheter needs to be inserted approximately 4 1/2" to achieve urine flow.

Medication Administration

The administration of medication using various routes of administration can be simulated through the software, or by the physical administration of simulated medication.

Administration via Software

Certain medication administration can be simulated using the instructor software. For more information on administering medication in the software only, see the *Maestro for Lucina User Guide*.

Intravenous Medication

Learners can administer medications via IV cannulation. For more information on these intravenous medication administration techniques, see the *Cardiovascular* section of this user guide.

Administering Intrauterine Balloon

The simulator allows for the insertion of an intrauterine balloon used to manage postpartum hemorrhage.

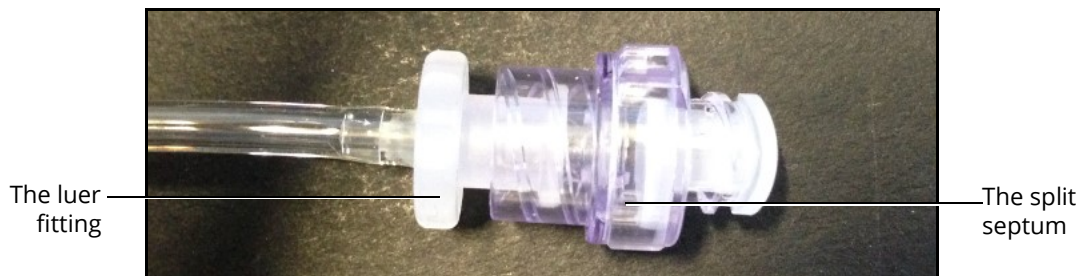
To insert and fill the intrauterine balloon:

1. Configure manikin with the postpartum boggy/contracted uterus.
2. Lubricate the end of the balloon with cottonseed oil and insert into the uterus.
3. Fill intrauterine balloon with 500 ml distilled water, per manufacturer's recommendations.

To remove the intrauterine balloon, remove the 500 ml water from the balloon and remove the catheter from the uterus.

Administering an Epidural

Fluid can be administered to the manikin through a permanent epidural port located at the back of the manikin.



The Epidural Port

An epidural cannula can be inserted through the luer access split septum attached to the epidural port located on the back of the maternal manikin.

Prior to administering an epidural, the epidural system must be empty. To empty the epidural system, remove the split septum fitting from the epidural port located on the back of the maternal manikin.



The Epidural Port

Connect a syringe to the Luer fitting. Withdraw the syringe until no air or water is present.

IMPORTANT: Use only clear distilled water, distilled water tinted with food coloring, or distilled water mixed with white vinegar (50/50) inside the manikin. Administration of any other type of fluid is NOT supported and may damage the system.

The epidural system must be primed prior to use if cerebrospinal fluid aspiration is desired.

Priming the Epidural Site

If cerebrospinal fluid aspiration is desired, the epidural site must be primed before use.

To prime the epidural system:

1. Ensure the epidural system is empty prior to priming (as described in *Administering an Epidural*).
2. Fill a 50 ml syringe with distilled water.
3. Connect the filled syringe to the epidural port and slowly depress the syringe until no water remains in the syringe.
4. Reconnect the Luer access split septum to the epidural port.

The epidural reservoir holds a maximum of 60 ml of fluid. This reservoir is not pressurized and if it is not filled completely, air may be aspirated back with fluid.

Once the epidural port is primed, fluid can be aspirated from the epidural port.

IMPORTANT: *Clean the epidural system before storing the manikin.*

For detailed instructions on cleaning the epidural system, please see *Cleaning the Epidural System* in the *Care and Maintenance* section.

Administering Suppositories

Up to five small, aspirin-sized suppositories can be administered via the simulator's rectum.

After the skills session, the suppositories must be removed and the rectum cleaned. For instructions, see the *Care and Maintenance* section of this guide.

Sounds

A variety of simulated sounds are available to enhance realism. Sounds are controlled through the instructor software.

Heart and Lung Sounds

Heart sounds are synchronized with the cardiac cycle and lung sounds are independently synchronized with ventilation of the left and right lungs. Sounds can be adjusted by tapping the Sounds button on the Run screen in Maestro. When the Sounds panel appears, select one of the tabs: Heart and Lungs. Adjust all areas or isolate by changing the sound type per region, if applicable. Select the sounds from the Type drop-down menu. See the *Maestro for Lucina User Guide* for complete details.

Baby Sounds

Baby sounds can be adjusted by tapping the **Sounds** button on the Run screen. When the Sounds panel appears, tap the **Baby** tab. Adjust the overall volume of the baby sounds by using the Volume slider. The following tables include the types of sounds available in the **Type** drop-down menu.

Neonate Cry drop-down menu includes:

Neonate Cry
None
Weak
Strong
Auto

Fetal Heart drop-down menu includes:

Fetal Heart
None
Breech, Left Side
Cephalic, Left Side
Cephalic, Mid
Cephalic, Right Side
Breech, Right Side

Speech

A variety of programmable vocal sounds are available. To select a sound from the Vocal Sounds Speech drop-down menu, tap the **Speech** button on the Run screen. Select one of the sounds from the **Vocal Speech Sound** drop-down menu. Sounds are emitted immediately and play continuously when selected from the drop-down menu. To stop playing a selected vocal sound, select **None** from the list.

Note: There may be a delay of up to 5 seconds for the sound clip to complete after selecting **None**.

The **Speech Sounds** buttons contain predefined phrases presented in a female or male voice depending on the gender associated with the scenario. A patient must be running for the Speech Sounds to work properly.

For more information on simulating custom speech, see the *Microphones* section.

Microphones

In addition to the pre-programmed speech, any response can be transmitted through the speakers using the VoIP headset.

To connect the microphone headset with 3.5 mm cable, plug the cable into the headphone port on the laptop.

For more information on adjusting the VoIP "Intercom" settings in the software, see the *Using the Intercom* section in the *Maestro for Lucina User Guide*.

Care and Maintenance

Maintaining the simulator requires careful treatment of the electronic and mechanical components. At all times, make sure all components are properly handled, maintained, and stored.

Note: Do not attempt to open or repair any simulator components without authorization of CAE Customer Support. Doing so may void the warranty. Many hardware components of the simulator and instructor workstation are not user-serviceable. Contact CAE Customer Support with any hardware maintenance concerns.

General Simulator Care

- Avoid the use of writing instruments and sharp objects near the patient simulator to prevent tears or unattractive markings in or on the skin.
- A mild detergent and warm water will remove most marks and stains. Gently rub the soiled area with a soft cloth. DO NOT use ABRASIVE soaps or pads.
- Lubricate airway adjuncts and urinary catheters with cottonseed oil spray prior to insertion. DO NOT use water-based lubricant.
- Prior to using moulage of any kind, and to make cleansing the simulator's skin easier, lightly apply petroleum jelly to the simulator's skin, followed by a light amount of talcum powder (unscented baby powder).
- If the bleeding, genitourinary or IV sites have been used, remove the fluid as described in the breakdown procedure. Failure to drain and clean the systems may cause problems with the system.
- If the IM injection site(s) have been used, remove the fluid from the sponge inside the injection site pad as described in the breakdown procedure.
- Prior to any simulation, CAE suggests applying a light coat of lubricant (cotton seed oil) to the hip skin between the torso and thighs to help prevent rubbing or pinching. Wipe any excess oil to prevent dripping.

Caring for Electronic Equipment

- Do not use any of the computer components associated with this system for any other use.
- Do not connect the computer components to any network of any kind.
- Install any CAE Healthcare software updates as soon as they become available.

Breakdown

To keep the simulator in good condition, proper breakdown, cleaning and storage are essential.

The breakdown steps are detailed below:

Break down the Lucina Simulator	
1	Clean the Manikin and Fetus
2	Drain and Clean the Fluid Systems
3	Power Off the Instructor Workstation
4	Power Off the Manikin
5	Power Off the Fetus

Step 1: Clean the Manikin and Fetus

To clean the simulator, use a soft cloth and warm water with a mild detergent to wipe off any moulage materials and fluids on the manikin's and fetus' skin. Gently rub the soiled area with a soft cloth to remove most marks and stains. DO NOT use solvents or abrasive pads.

Each of the following should be carefully cleaned between each use:

- Maternal airway
- Birth canals
- Cervices
- Abdomen
- Fetus

Inspect the manikin for damage or puncture marks. If damage exists, contact CAE Healthcare Customer Service immediately for a repair. Prompt repair prevents expansion of the damaged area.

Step 2: Drain and Clean the Fluid Systems

If internal fluid systems were used during simulation (i.e. vaginal bleeding, hemorrhaging, IV fluids, epidural, genitourinary fluids), the fluid must be drained from the simulator and the fluid systems used must be cleaned. The following instructions will explain how to drain and clean the fluid systems and blood tank.

Cleaning the IV System

The internal systems of the manikin must be cleaned after each simulation session. Only the systems that were used need to be cleaned.

To clean the IV system:

1. Connect an empty 140 mL syringe to the **IV DRAIN** port located on the left side of the simulator's torso.



Battery Compartment and Ports

2. Slowly withdraw air from the port until a vacuum is formed. If only clear fluid was injected into the IV system during use, the cleaning procedure is complete.

IMPORTANT: If colored fluid was injected in the IV system, complete the *Priming the IV System* instructions in the *Using Lucina* section of this user guide with clear fluids and complete the *Cleaning the IV system* instructions for a second time.

Cleaning the Bleeding System

After every session in which simulated blood was used, clean the bleeding system by flushing with distilled water. Follow the steps below to flush the system.

IMPORTANT! Once a month, also flush the bleeding system with isopropyl alcohol to minimize mineral and algae build up.

Note: The manikin must be configured for a postpartum SCE prior to cleaning the bleeding system, with the blood tank and boggy/contracted (postpartum) uterus installed.

1. Make sure the tank has been drained of any simulated blood.
2. Rinse the trauma fill tank thoroughly of any simulated blood.
3. Fill with a minimum of one quart (approximately 1 liter) of either:
 - Water, for regular flushing after each use, or
 - Isopropyl alcohol, for monthly flushing.
4. Connect the trauma fill tank to the manikin. The blue tube connects to the **BLOOD FILL** port and yellow tube connects to the **BLOOD VENT** port.
5. Pressurize the trauma fill tank using the hand pump. Wait until there is flow into the reclaim bottle.

Care and Maintenance

6. Place absorbent pads under the buttocks and the vaginal opening.
7. From the Instructor Workstation, tap on the **System Administration** icon in the upper-right corner of the screen.
8. Tap on the **Maintenance** tab.
9. Tap the **Flush System** button.
10. Run until the fluids run clear from the simulator and click the **Finished** button.
11. Disconnect the trauma fill tank from the manikin and depressurize.
12. Disconnect the **Uterus** air tube from the **blue** Contract port on the baffle.



The **blue** Contract port

The Baffle Ports

13. Disconnect the **Blood Uterus** tube from the red Blood Out port on the lower baffle.



The **Blood Out** port

The Lower Baffle Ports

14. Ensure all fluid is removed from within the vaginal canal.
15. Wipe the external area particularly the buttocks and under the skin surrounding the vaginal opening. The food color will stain more readily if left on for an extended period.
16. Remove the uterus by folding the labia and perineum flaps closed together and pushing the external genitalia up through the birth canal into the manikin's torso.
17. Hold the labia and perineum closed and slowly lift the uterus out from inside the abdomen.
18. Ensure that no left over fluid spills inside the abdomen.

IMPORTANT: If any fluid gets inside the manikin, follow these cleaning instructions immediately to prevent damage to the simulator:

- a. Ensure the abdomen is installed on the torso whenever the manikin is positioned upright.
- b. Elevate the torso.
- c. Lean the manikin forward.
- d. Unzip the torso skin zipper.
- e. Open the skin on the back to expose the area under the buttocks.
- f. Clean the area where fluid is located.
- g. Reattach the skin and return the manikin to supine position.
- h. Clean any remaining liquid in the front of the vaginal opening.

Draining the Blood Tank

To drain the blood tank:

1. Empty the trauma fill tank and connect the blue line to the manikin **BLOOD FILL** port. Do not connect the yellow line.
2. Ensure the yellow pressure relief knob on the trauma fill tank is open so that the tank is able to vent during the subsequent process.
3. Disconnect the uterus bleed port (clear tubing) from the manikin.
4. From the Instructor Workstation, tap on the **System Administration** icon in the upper-right corner of the software screen.
5. Click on **Maintenance** tab.
6. Click the **Flush System** button.

The fluid from the manikin's blood tank should start flowing back into the trauma fill tank.

7. Observe the blood tank output line. When air bubbles have stopped moving, the tank is empty.
8. Click the **Finished** button.
9. Disconnect the trauma fill tank from the manikin.

Care and Maintenance

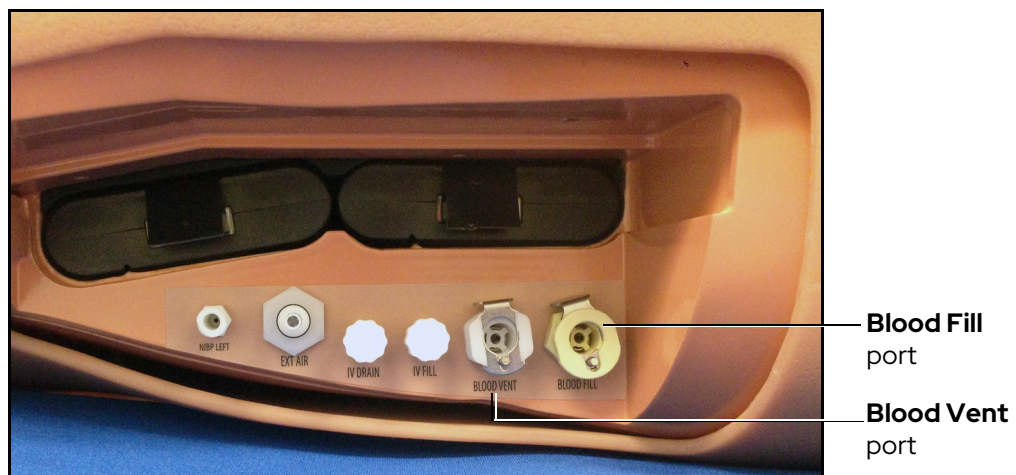
10. Empty the trauma fill tank.
11. Rinse thoroughly and allow the tank to dry.

Draining the Bleeding System

IMPORTANT: The cap on the blood tank should never be removed.

To drain the bleeding system:

1. Disconnect the blood tank from the manikin.
2. Empty the trauma fill tank and overflow bottle.
3. Connect the blue line to the manikin **BLOOD FILL** port and the yellow line to the **BLOOD VENT** port.



Battery Compartment and Ports

4. Ensure the yellow pressure relief knob on the trauma fill tank is closed and pressurize the tank.
5. When enough pressure has built up (about 25 to 35 strokes), there will be a sharp release and any remaining liquid will be flushed in the overflow bottle.
6. Release pressure in the trauma fill tank by turning the yellow knob.
7. Disconnect tank and empty and clean the overflow bottle.

Cleaning the Epidural System

To clean the epidural system:

1. Remove the split septum adapter from the epidural port and connect an empty 50 mL syringe to the luer fitting.
2. Withdraw fluid/air until a vacuum is formed.

If only clear fluid was injected into the epidural system the cleaning procedure is complete.

If color fluid was injected into the epidural system:

- a. Fill a syringe with 50 mL clear distilled water.
 - b. Connect the syringe to the epidural port and slowly push clear distilled water into the epidural port.
 - c. Slowly withdraw the syringe until no water or air comes out.
 - d. Disconnect the syringe from the port and discard the water.
3. Place the split septum adapter back on the Luer fitting.

Cleaning the Genitourinary System

To clean the genitourinary system:

Use only the lift straps attached to the abdomen (tucked under skin) to lift and remove the abdomen from the manikin's torso.

Note: The speaker cable will be connected to the manikin torso and may be removed for easier access.

For more information on abdomen removal, refer to the *Genitourinary System* section of this user guide.

1. Connect the syringe to the GU filling tool.
2. Plug the GU filling tool into the Urinary port (colored yellow) located on the torso baffle inside the manikin.
3. Ensure a urinary catheter is inserted and place the exposed end of the catheter in a basin to catch the fluid.
4. If distilled water tinted with food coloring was used, fill the syringe with 50 mL clear distilled water and flush the water through the GU filling tool connected to the Urinary port located on the torso baffle inside the manikin. Continue flushing until the waste water is completely clear.
5. Fill the syringe with air and slowly push air through the GU filling tool connected to the Urinary port until no more water drains into the basin.
6. Disconnect the GU filling tool from the Urinary port and remove the urinary catheter.
7. Ensure the speaker cable is plugged into the corresponding connection inside the manikin's torso.
8. Latch the abdomen shell into the manikin's torso and ensure the speaker cable is not pinched or constricted.

IMPORTANT: Ensure the abdomen is properly installed and latched during all simulations.

Cleaning the Rectum

To clean the rectum:

1. Remove the rectal plug from back of lower torso.
2. Fill a syringe with distilled water and push water through the anus.
3. Repeat as necessary until suppositories are extracted (if applicable).
4. Insert the rectal plug back in place.

Draining Condensation from the Simulator

As part of a regular preventive maintenance schedule, condensation should be drained from the simulator.

Depending on environmental conditions, moisture may condense inside the compressed air lines and tanks within the simulator. It is recommended that this fluid be drained every 40 hours of operation. In outside, high humidity conditions, the system should be drained more frequently.

Step 3: Shut Down the Software

To shut down the Maestro software:

1. Stop the SCE or simulation by clicking on the white back arrow in the upper left corner of the run screen.
2. Tap **Stop and Exit** button.
3. Tap **X** in the upper-right corner to exit the software.

To shut down the Patient Monitor software, tap **X** in the upper-right corner to exit the software.

To shut down the CTG software, tap **X** in the upper-right corner to exit the software.

Step 4: Power Off the Simulator

To power off the simulator, press the power button on the right-side of the simulator's torso for two seconds.

It will take a moment to cycle down and the indicator light will turn off when the simulator is completely shut down.

Step 5: Power Off the Fetus

To power off the fetus, press the power button on the back side of the fetus.

The fetus powers off.

Maintenance

Simple care and maintenance will ensure Lucina stays in good working condition. Many problems are caused by inadequate or improper maintenance. Check all parts and components each time the simulator is used. Failure to follow these guidelines can lead to damage not covered by warranty.

Airway Inspection

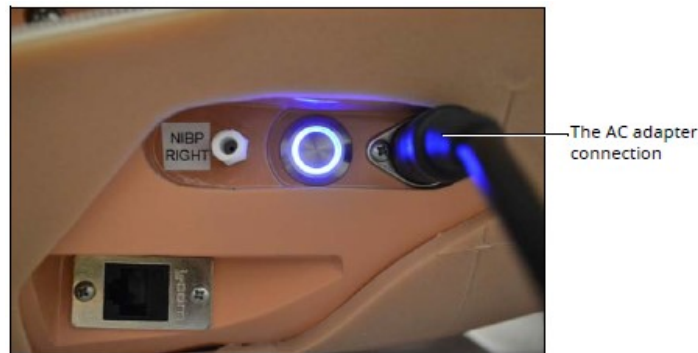
Lucina is equipped with an anatomically accurate airway that supports the practice of difficult airway management techniques. In the process of performing these techniques improperly or aggressively, the upper airway can be damaged.

Because damage can occur, occasional visual inspection of the airway is recommended. Using the light of a laryngoscope blade or a flashlight, visually examine the airway. While tears in the upper airway resulting from intubation may be obvious, needle holes in the lower trachea resulting from techniques such as transtracheal jet ventilation may not be readily apparent.

If damage to the airway is found, small cuts or tears may be repairable with silicone adhesive. However, for permanent repair of damaged simulators, contact CAE Customer Service.

Recharging the Battery

Charge the simulator batteries by plugging the AC adapter into the port on the right side of the torso.



The AC Adapter Connection

Three battery indicator lights on the left side of the manikin show the status:

- **All three lights are illuminated and steady:** Fully charged.
- **Two lights are illuminated and steady:** Less than 50% power remaining.
- **One light is illuminated and steady:** Less than 20% power remaining.
- **One light is illuminated and blinking:** Less than 15% power remaining.
- **Lights are illuminating in sequence from left to right:** Batteries are charging.

Note: The batteries charge at a slower rate if the simulator is powered on while charging.

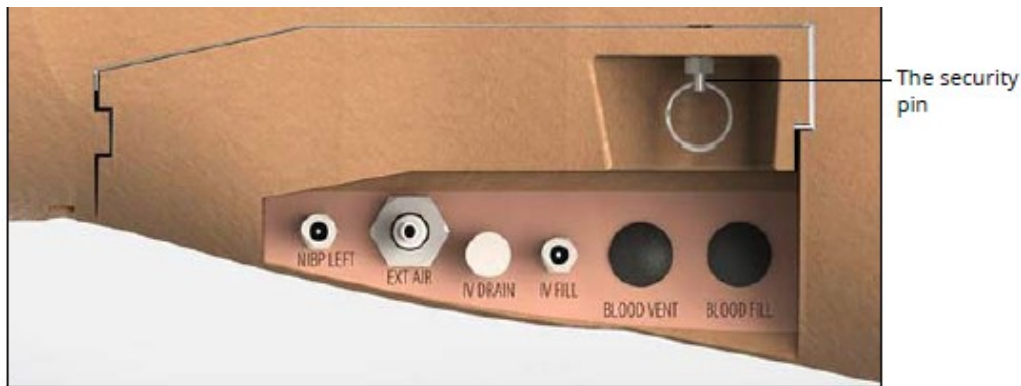
WARNING: If the simulator is still in use, make sure that the AC adapter is plugged into the simulator and a working power source prior to removing both batteries.

Care and Maintenance

Alternatively, an external battery charger can be purchased and the batteries removed from the simulator and charged separately.

To charge the simulator batteries using the external battery charger:

1. Locate the battery compartment cover on the left side of the manikin's torso.
2. Pull down the security pin and pull the cover away from the torso to access the batteries.



The Battery Compartment and Ports with Cover

3. Remove the batteries from the simulator by pulling on the tabs and lifting the batteries out of the battery compartment

Note: Ensure the battery tab is accessible and not tucked into the battery compartment.

4. Plug the external charger into a power source.
5. Insert the batteries into the external charger. The batteries require approximately four hours to fully charge.

Note: Batteries will lose charge over time when left in a stored, unused simulator. When storing the simulator for an extended amount of time, remove the batteries from the simulator.

Bios (Real Time Clock) AA Battery Replacement

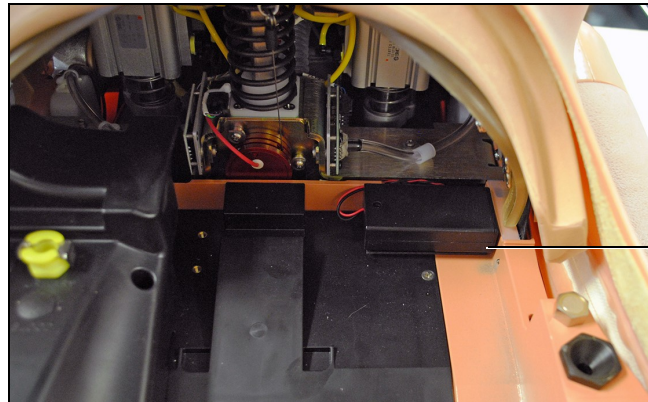
AA batteries are used to maintain the simulator bios. When the bios AA batteries expire, the simulator software will NOT be available and the batteries will need to be replaced. Follow these instructions to replace the bios AA batteries.

IMPORTANT: *The bios AA batteries do not recharge within the manikin and must be replaced every 24 months. Replace with the specified battery type only.*

To replace the bios AA batteries:

1. Remove the abdomen and locate the bios AA battery compartment (under the rib cage).

TIP: Move the rotation ring down, for access to the battery compartment.

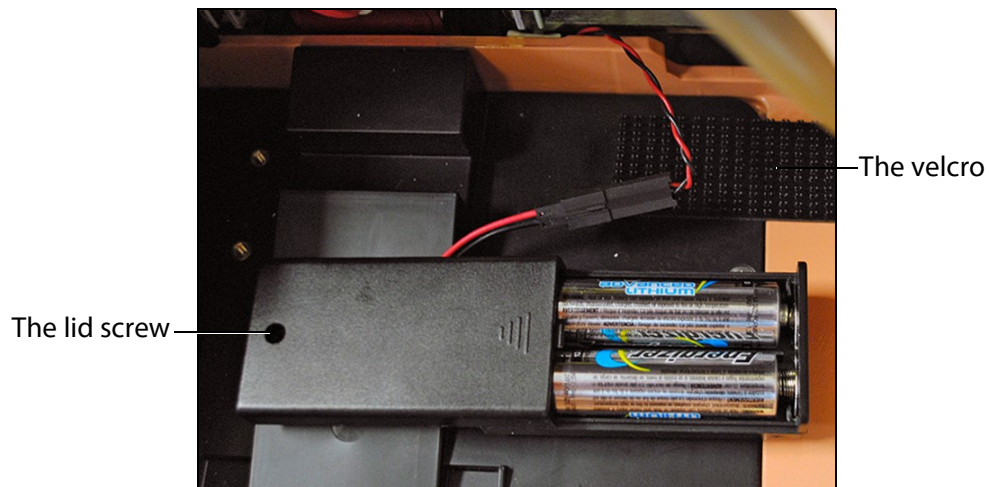


The Simulator Abdomen and Chest Cavity

TIP: The battery compartment is attached with velcro; carefully remove the battery compartment for easier access to the cover.

IMPORTANT: Do not disconnect, kink, or pinch the electrical wire when replacing the batteries.

2. Remove the lid screw and slide the cover open.



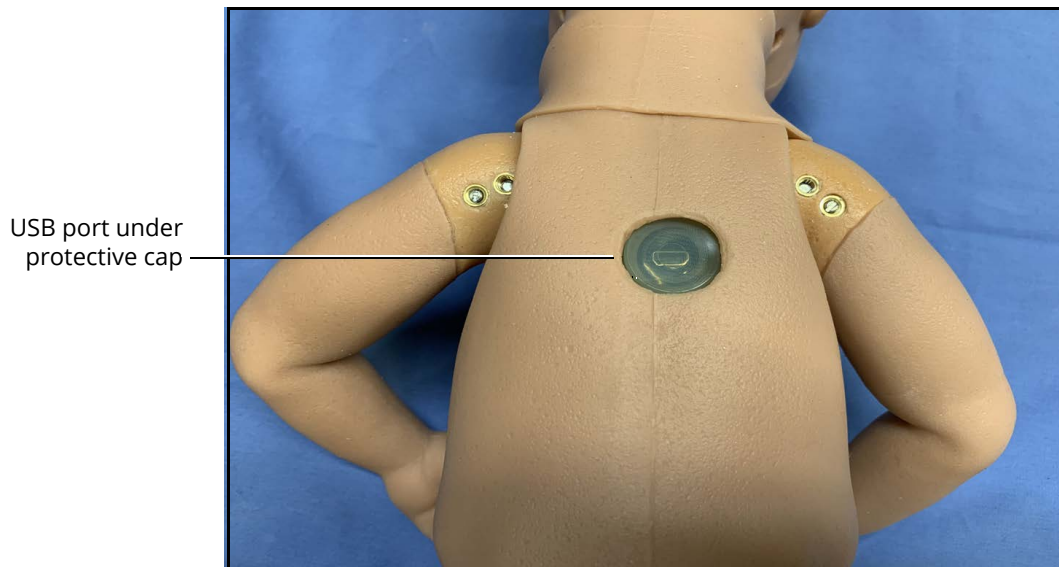
The Bios Battery Compartment

3. Replace both AA batteries with new (unused) batteries according to these specifications: Energizer, Ultimate Lithium, L91, AA, 1.5v
4. Carefully close the lid, replace the screw and tighten.
5. Securely reattach the battery compartment to the velcro.

Charge the Fetus Battery

To charge the fetus battery using the USB charger:

1. Connect the USB charger cord (provided by CAE) to the port on the back of the fetus.



The Back of the Fetus

Note: The USB port is covered by a transparent protective cap. To remove it for charging, gently pry it off by the tab on the edge of the cap. The cap remains attached to the port by a band.

2. Connect the other end of the USB charger cord to a USB power source.

Note: A USB AC power adapter may be used to plug the USB cord into a power outlet.

The battery requires approximately 4 to 6 hours to fully charge. The battery charges at a slower rate when the fetus is powered on during charging.

3. Replace the protective cap onto the USB port. Do not use the fetus for any purpose with the cap off. The cap should be off only when charging.

Storage

IMPORTANT: Do not attempt to open or repair any simulator components. Doing so may void the warranty. If damage exists, contact CAE Customer Service immediately for a repair. Prompt repair prevents expansion of the damaged area.

Prior to storing the product:

- Make certain all fluids have been flushed and drained from the manikin.
- Charge the manikin batteries.

Store all equipment and the manikin:

- Indoors
- In a dry location
- Protected from dust
- Away from direct sunlight
- Within the temperature ranges listed in the *Specifications* section of this user guide

Refer to the following short-term and long-term storage instructions for additional details.

Short-Term Storage

Follow these guidelines for short-term storage (less than two months):

- Charge the computer and manikin to 100% to increase shelf life.
- Store the manikin on a work table and cover with a sheet.
- Store the manikin and battery in a cool location to extend the life and capacity of the battery.

Long-Term Storage

Follow these guidelines for long-term storage (more than two months):

Always charge the battery before storage. Storing the battery discharged for months will likely destroy the battery. Since the simulator consumes a small amount of power even when turned off, it is best to charge the battery to 100% before storing the simulator for a month or two. Longer than that, it would be wise to disconnect the battery. Follow the *Battery Safety Information* detailed in this User Guide. Disconnect the batteries from the manikin to avoid overly drained batteries.

Store the manikin in the container the simulator arrived in and refer to the *Unpack and Repack Manual* (this document also was included when the simulator was shipped). Do not stand the container on its side with the manikin stored inside for long periods of time. The shipping container is approximately 2 feet (61cm) by 6 feet (183 cm).

Note: Prior to using the manikin again, ensure it reaches room temperature.

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Appendix A - Recommended Clinical Supplies

The following clinical supply sizes are recommended for use with maternal fetal simulator. Other sizes may cause damage to simulator and should not be used.

Recommended Clinical Supply Sizes	
Combitube	41 Fr
Endotracheal (ETT)	6.5 - 7.5 mm
i-gel Supraglottic Airway	#4
Intrauterine Balloon	24 Fr
IV Cannula	14 - 20 g
King Airway	#4
Laryngeal Mask Airway (LMA)	#4, #5
Nasal-pharyngeal Airway	28 Fr
Oropharyngeal Airway	90 mm
Urinary Catheter	16 Fr

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Healthcare

For more information about CAE products, contact your regional sales manager or the CAE distributor in your country, or visit caehealthcare.com.

Tel +1941-377-5562 or 866-233-6384

For customer support, please contact CAE.

Customer Support Headquarters - United States

Monday - Friday from 7:00 a.m. to 6:00 p.m. ET

Phone 1-866-462-7920

Email: srqcustomerservice@cae.com

Customer Support - Canada

Monday - Friday from 8:00 a.m. to 5:00 p.m. ET

Phone 1-877-223-6273

Email: can.service@cae.com

Customer Support - Europe, Middle East, and Africa

Monday - Friday from 8:00 a.m. to 5:00 p.m. CET

Phone +49 (0) 6131 4950354

Email: international.service@cae.com

Customer Support - United Kingdom and Ireland

Monday - Friday from 9:00 a.m. to 5:00 p.m. GMT

Phone +44 (0) 800-917-1851

Email: uk.service@cae.com

Customer Support - Latin America

Monday - Friday from 9:00 a.m. to 5:00 p.m. BRT/BRST

Phone +55 11 5069-1510

Email: la.service@cae.com

Customer Support - Asia Pacific

Monday - Friday from 8:00 a.m. to 5:00 p.m. CET

Phone +49 (0) 6131 4950354

Email: ap.service@cae.com