Gaumard®
Simulators for Health Care Education

PEDIATRIC HAL® S2225

User Guide

Table of Contents

Warning icon: Very important information that must be heeded so that the simulator is not damaged.

Caution icon: Important information to be aware of and proceed with caution.

Note icon: Additional information and/or tips for usage of the simulator.

Pediatric HAL® S2225 Simulator is an interactive educational system developed to assist a certified instructor. It is not a substitute for a comprehensive understanding of the subject matter and not intended for clinical decision making.

1. Introduction

1.1 SPECIFICATIONS

Pediatric HAL® S2225

- Weight: 34.6 lbs (15.7 kg). with legs attached.
  NOTE: Fluid reservoirs are empty.
- Length: 45 inches (114.3 cm) with legs attached
- Hemothorax Blood Reservoir: 30 mL (Max.: 40mL)
  Bladder Reservoir: 30 mL (Max.: 40mL)
  Tears Reservoir: 20 mL (Max.: 25 mL)
  Tibial I/O: 40 mL (Max.: 50 mL)
  Glucose Finger: 1/2 mL
- Wired connectivity: Gaumard USB Communication Module (RJ45)
- Wireless connectivity: Gaumard USB Com. Module RF IEEE 802.15.4
- Bluetooth connectivity
- Battery Charger:
  Input: 100-240V~ 0.8 A, 50-60 Hz
  Ouput: 9V, 3.0 A

1.2 CARE AND MAINTENANCE

Damage caused by misuse is not covered by your warranty. It is critical to understand and comply with the following guidelines.

The lubricants and other accessories provided are for use with the accompanying patient simulator only. The lubricants and other accessories are not suitable for human use or medical treatment/diagnosis and should never be used for such purposes.

Never assemble or disassemble the simulator while it is turned ON. Failure to comply to this warning may result in electrical damage to the simulator.

General

- Avoid contact of rings, nails, and sharp objects to the simulator's skin. These objects can leave indents or small tears in the skin.
- Ball point pens, ink, and markers permanently stain the skin.
- Do not wrap this or any other Gaumard product in newsprint.
- Replacement parts and/or consumables are available from Gaumard Scientific or from your Distributor.

Operating Conditions

- Operating temperature: 50°-95° F (10°-35° C)
- Humidity: 5%-95% (non-condensing)

Storage Conditions

- Store the simulator in a cool, dry place. Extended storage above 85 degrees Fahrenheit (29 Celsius) will cause the simulator to soften and slowly warp.
- Humidity: 40%-60% (non-condensing)
- Do not store the simulator with a discharged battery. Re-charge the battery at the end of every simulation session.
- Recharge the battery at least once every 30 days even if the simulator is not in use, otherwise, permanent loss of capacity might occur because of self-discharge.
- Do not allow any objects to rest on the face or chest skin of the simulator while in storage for an extended period of time.
- Do not store the simulator face down. Pressure points on the face and chest skin may warp or damage the skin.
- Store the simulator laying flat. Do not store the simulator sitting up for an extended period of time.

To avoid damage to the simulator, please store and ship it in the clear poly bag provided.

Procedures

- Do not attempt to intubate without lubricating the airway adjunct with MINERAL OIL lubricant. Do not use silicone oil as a lubricant. Failure to lubricate the device will make intubation very difficult and is likely to result in damage to the simulator's airway.
- Mouth to mouth resuscitation without a barrier device is not recommended. It will contaminate the airway.
- Treat the simulator with the same precautions that would be used with a real patient.
- Only use Gaumard's provided simulated blood. Any other simulated blood containing sugar or any additive may cause blockage and/or interruption of the fluid system.

General Cleaning

- The simulator should be cleaned with a cloth dampened with diluted liquid dish washing soap.
- Remove all traces of any lubricant.
- A secondary cleaning with a cloth dampened with 70% isopropyl alcohol can be performed if required
- Allow to dry completely
- Do not clean with harsh abrasives.
- Do not use povidone iodine on the simulator.
- The simulator is "splash-proof" but not water-proof. Do not submerge or allow water or other liquids to enter the interior of the simulator.
- A lint roller or masking tape may be used to remove lint or small particles from the skin of the simulator.
- Always purge with clean distilled water and then drain the reservoirs at the end of the simulation day. Doing so will retard the formation of mold and prevent clogging of the system.

ECG and Electrical Therapy

- Only deliver electrical therapy when the simulator is fully assembled, dry, and undamaged.
- Defibrillation is only allowed on the sternum and apex sites or the anterior and posterior sites. Remember to always use the Adapters for Non-Snap DEF Electrodes in these locations.
- **NEVER** deliver a shock to ECG electrode sites. Doing so will result in internal damage to the simulator. This is considered improper use and is **NOT** covered by the simulator's warranty. The system will require repair at a Gaumard facility.
- Make sure the defibrillation pads to be used on the simulator are in good condition.
- It is a good practice to remove gel residues after every use. Failure to do so will leave behind a film of electrode gel that hardens causing arcing and pitting.
- To aid removal of ECG gel, sprinkle baby powder on the residual ECG gel to dry it up and remove it gently with the pad of your finger.
- Medical products, such as electrodes, may use powerful adhesives that can be difficult to remove. A gentle, degreasing cleanser may be needed.
- Should dark traces appear on the conductive sites due to gel residue or previous arcing, use a pencil eraser to remove the traces and then clean with alcohol.
- Do not re-use the gel-adhesive pads. Do not leave them on for next day use.
- Use hard paddles or wet-gel pads.
- Avoid using solid-gel pads since they present higher risk of burning the simulator's skin.
- Gel pads have a shelf-life. Confirm they are not expired to avoid arcing.
- Be sure the simulator is not in contact with any electrically conductive surfaces.
- Use the simulator only in a well-ventilated area, free of all flammable gases.
- NEVER attempt to service or modify any of the electrical connections, especially those between conductive skin sites and the internal electronics.
- Discontinue use if any wires are found exposed with damaged insulation.

IV Arm

- The use of needles larger than 22 to 23 gauge will reduce the lifetime of the lower arms' skin and veins
- Only use Gaumard's simulated blood provided with the package. If a simulated blood is used that contains sugar and/or other additives, it may cause a blockage and/or interruption of the vascular system.
- Always purge with clean water, then drain the venous system at the end of each day of simulation. Doing so will retard the formation of mold and prevent clogging of the system.
- We recommend flushing the veins with a 70:30 solution of clean water to isopropyl alcohol (IPA) at least once per month to prolong the life of the vasculature system.
- For more information regarding the replacement of veins and other consumable items, please contact technical support.

Real CO_2 Exhalation

- Due to shipping regulations, CO_2 cartridges are not included with the system. The required 16g threaded CO_2 3/8”-24UNF-2A cartridges can be purchased at most bicycle or hardware stores.

Review the safety and warning checklist below before using the CO_2 feature. Failiure to comply with the warnings listed below and those included with the original cartridge packaging may result in serious personal injury.

- Always follow the manufacturer's safety and warning information included with the CO_2 cartridge package.
- Never point a CO_2 cartridge at yourself or others.
- Do not use damaged CO_2 cartridges.
- Do not puncture the cartridge CO_2 seal manually.
- Do not expose the CO_2 cartridges to high temperatures as indicated on the product's packaging.
- Install threaded cartridges only (3/8”-24UNF-2A). Do not attempt to install a cartridge that does not meet the specifications in this document.
- Do not over tighten the cartridge into the simulator's cartridge harness.
- Do not remove the CO_2 cartridge if the simulator is not fully operational.

1.3 TERMINOLOGY

Facilitator/User

The person conducting the simulation; an instructor or lab staff member.

Clinical State

A collection of vital signs details that demonstrates a patient's progress or decline during a session.

Profile

A unique software configuration, including custom clinical states, scenarios, and options. Each profile acts as a separate program so changes made to one profile have no effect on the others.

Provider

A person participating in the simulation as a healthcare provider.

Scenario

A saved sequence of physiological states like a play list. Scenarios provide a level of automation that unburdens the facilitator and allows standardized presentation of symptoms.

Scenario Item

A clinical state item that is part of a scenario. Scenario Items may also represent a fixed delay period such as "Wait" or a pause such as "Wait Indefinitely."

UNI 3

The software application used to control the simulator and evaluate care providers.

1.4 DEVICE SIZES

Invasive Procedure	Recommended Device Size	Helpful Hints
Tear Reservoir	Capacity of 20 mL	Only fill when reservoir indicator is low
Intubation Blade Size	MAC 2 or MIL 2	-
LMA	Size 2	Lubricate using mineral oil
Oral Intubation	5.5 ETT no cuff, and/ or 5.0 ETT with cuff	Lubricate using mineral oil, but ensure no fluids are introduced into the airway.
Nasal Intubation	10 Fr Catheter	Lubricate using mineral oil
Nasogastric Tube	10 Fr Catheter	Lubricate using mineral oil
Tracheostomy	4.5 mm OD	Lubricate using mineral oil
IV Arm System	22 gauge needle or smaller	-
Urinary Catheter	12 Fr catheter	Lubricate using mineral oil. Reservoir Size, 30 mL.
Hemothorax Insertion Site	20-24 gauge chest tube	Fill port located over the right shoulder for hemothorax reservoir which holds 30mL. Superficial blood return after incision at hemothorax site.
Needle Decompression	16-18 gauge needle	Only insert needle on the left pneumothorax site. Replace the pneumothorax insert every time the procedure is practiced.

2. Initial Setup

2.1 UNBOXING

A 1-day in-service (on-site unboxing and training) may be purchased for Advanced Pediatric HAL where a Gaumard Field Service technician will perform the unboxing, assembly, and training of the simulator.

Save ALL boxes and shipping materials Pediatric HAL is shipped with in the event he may need to be sent in for repair.

Contact your Gaumard Sales Representative or Gaumard Customer Service about purchasing a 1-day in-service for your Advanced Pediatric HAL.

- Remove the simulator from the case carefully with the assistance of at least two persons.
- Avoid lifting the simulator by the arms as it could damage the shoulder joints.
- Rest the simulator on a patient bed or table capable of supporting the weight of a real patient.
- It is recommended that Pediatric HAL's head rest flat on the bed or on a thin pillow.

2.2 PACKAGE CONTENTS

Item Name	Item Size	Item Count
Pediatric HAL Shorts	-	1
Left & Right Lower Legs	-	1
Mineral Oil Lubricant	-	1
Glucose Solution	4 oz	3
Spare I/O Bone Inserts	-	7
RJ45 Cable	-	1
Blood Pressure Cuff	-	1
Item Name-Accessories Box 1	**Item Size**	**Item Count**
Bladder Fluid Dispenser	30mL	1
IV Filling Kit	5mL	1
Bleeding Finger Filling Kit	3mL	1
Hemothorax Filling Kit	30mL	1
Tear Filling Kit	20mL	1
Artificial Blood Concentrate	-	1
Item Name- Accessories Box 2		**Item Count**
Male Genitalia		1
Female Genitalia		1
Cricothyroid Inserts		10
Surgical Airway Skins		10
Hemothorax Inserts		2
Pneumothorax Inserts		2
Spare Bleeding Finger		2
Antecubital Vein Replacements		2
Medical Tape		2
Adapter for Non-Snap ECG electrodes		4
Adapter for Non-Snap DEF electrodes		4
Blood Pressure Tube Adapter		2
Item Name		**Item Count**
Wireless Tablet PC		1
Headset for Streaming Voice		1
Bump Case for Tablet PC		1
RF Communications Module		1
S2225 Pediatric HAL User Guide		1
Automatic Physiological Control		1

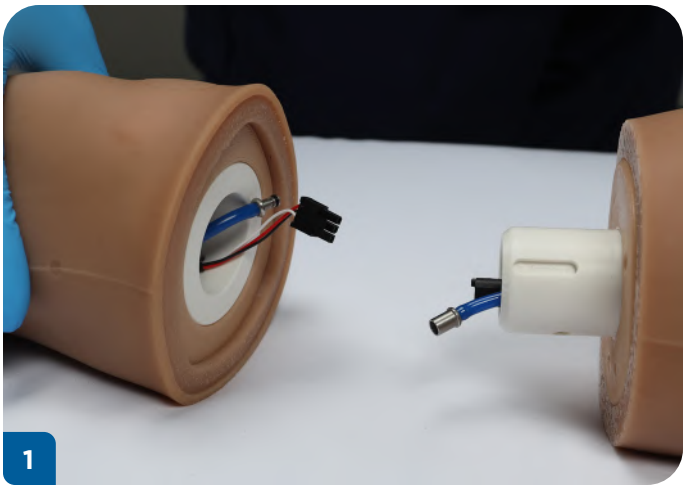
2.3 SIMULATOR ASSEMBLY

Attaching Lower Leg Assemblies

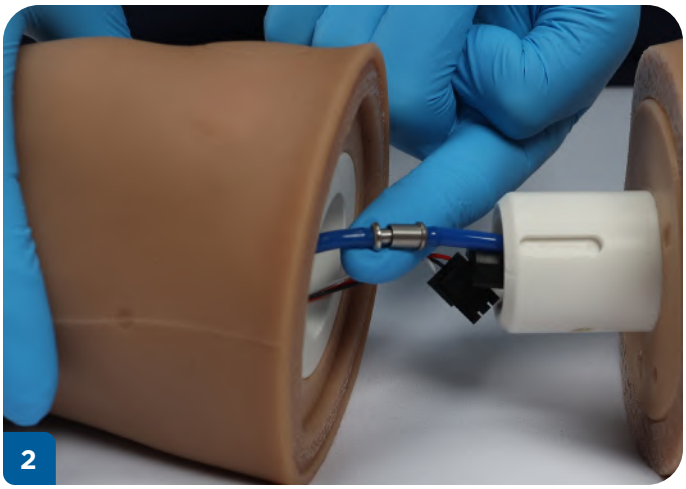
Pediatric HAL S2225 must be turned off when attaching the lower leg assemblies. Failure to comply with this warning may result in electrical damage to the simulator.

Pediatric HAL S2225 is shipped with his lower legs disconnected. To attach his lower legs:

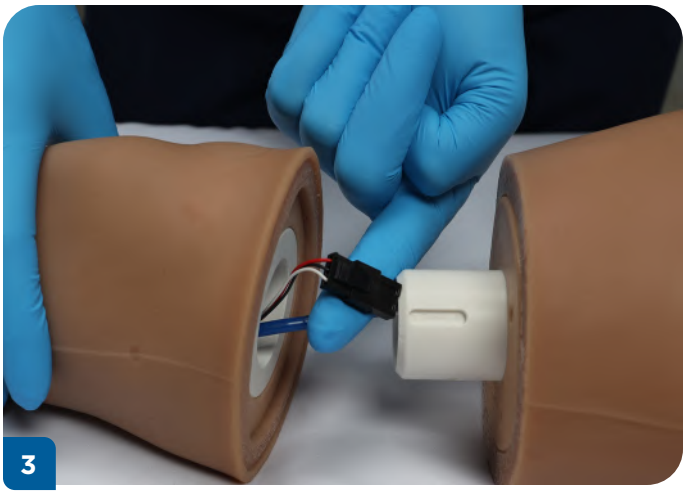
1. Align the lower legs with Pediatric HAL's corresponding upper thighs.



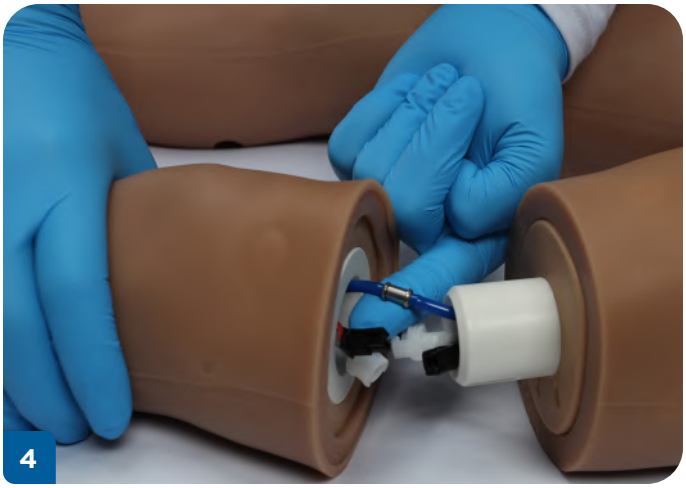
2. Connect the blue pulse line on the **RIGHT** leg.



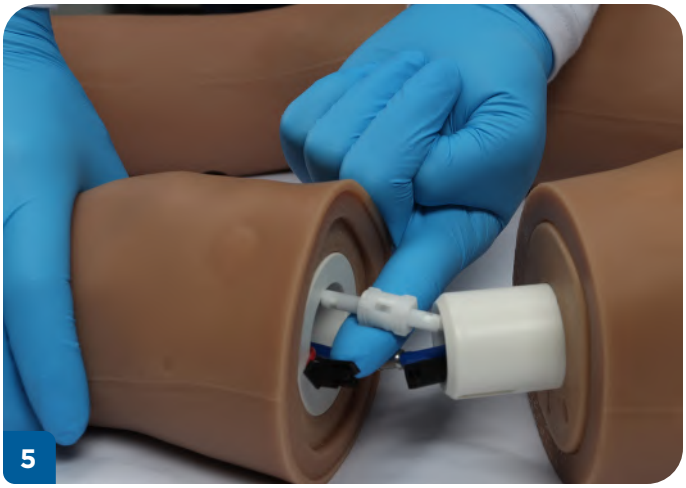
3. Connect the capillary refill cable on the **RIGHT** leg.



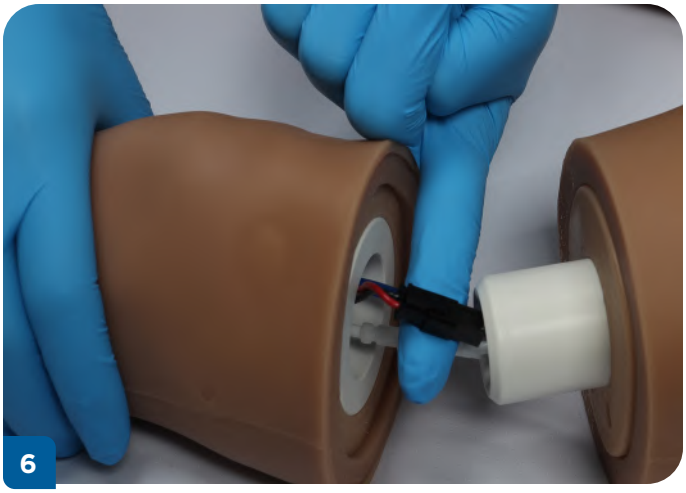
4. Connect the blue pedal pulse line on the **LEFT** leg.



5. Connect the white CO_2 line on the **LEFT** leg.



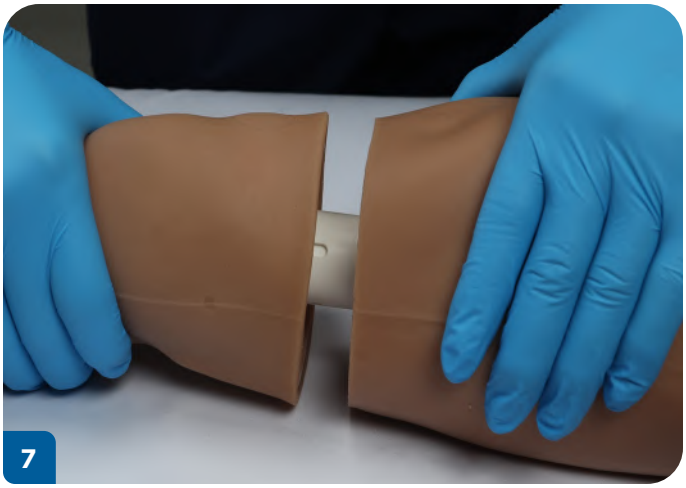
6. Connect the charger cable on the **LEFT** leg.



7. To attach the lower legs to the upper thighs, align the notch of the lower leg to the white post on the thigh.

The metal pin must align on the notch for the white post. When it is locked in placed, you may hear a slight click.

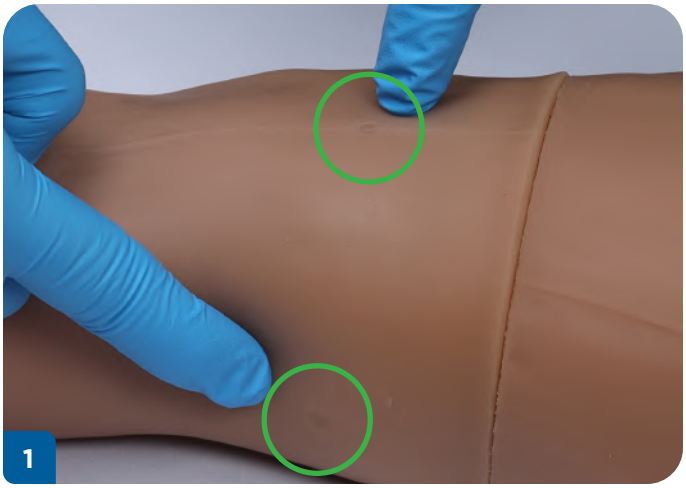
To ensure a nice fit when the lower legs connect to the upper thighs, make sure the lips of the skin at the top of the lower legs fill in the crease. Refer to the pictures below.



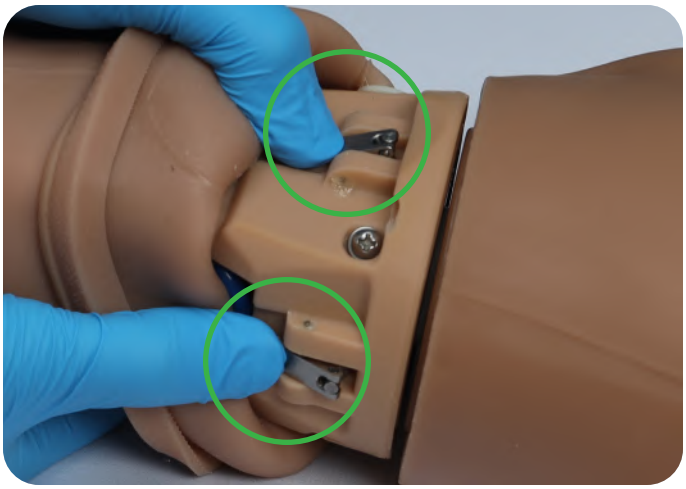
Disconnecting the legs

Pediatric HAL S2225 must be turned off when detaching the lower leg assemblies. Failure to comply with this warning may result in electrical damage to the simulator.

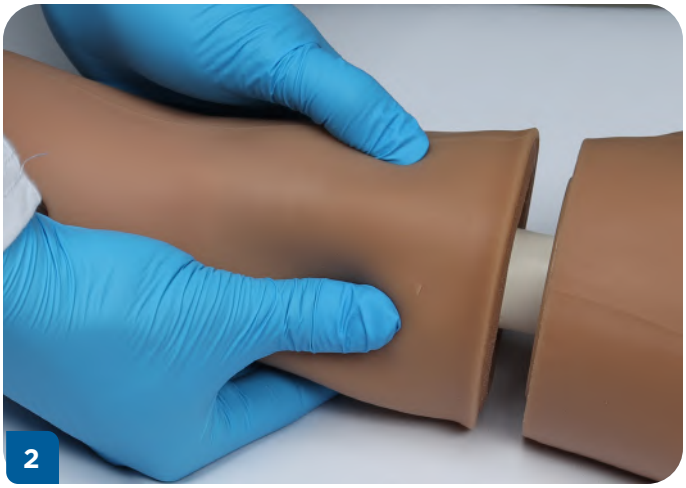
1. Behind the knees of the simulator, look for the small, circular dimples in the skin which identify the location of the latches in the leg.

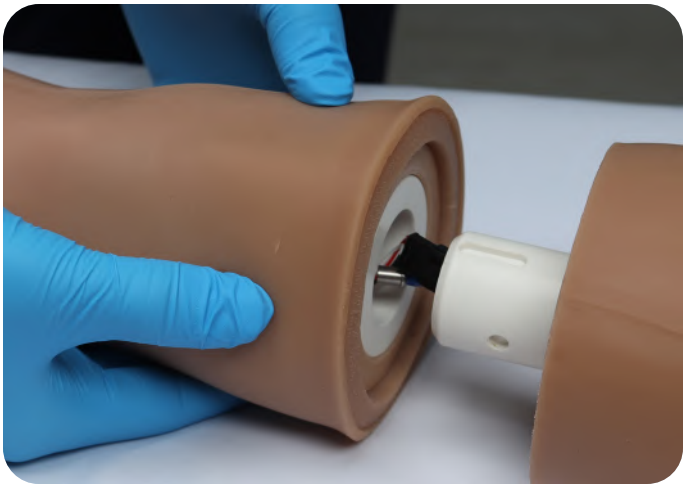


Alternatively, to make this easier you may roll down the lip of the lower leg skin to visually see where the latches are located.



2. Simulatenously, press down on both latches in the leg to disengage them and slide the lower leg down.





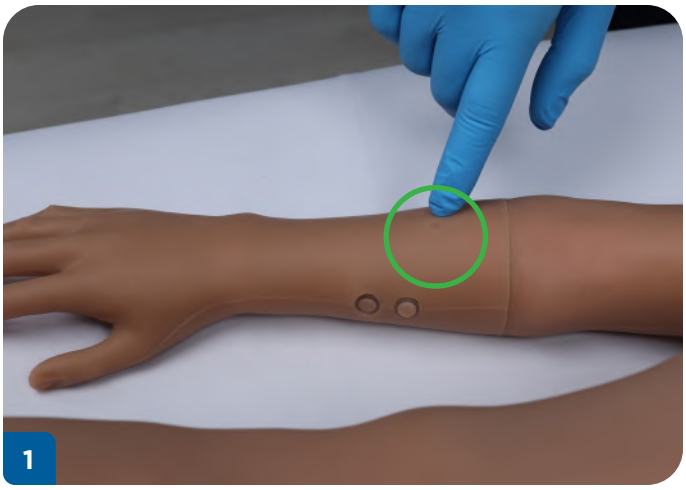
3. Once the lower legs are completely off, place the plastic packing knee knobs on the ends of the upper thighs.

Disconnecting the arms

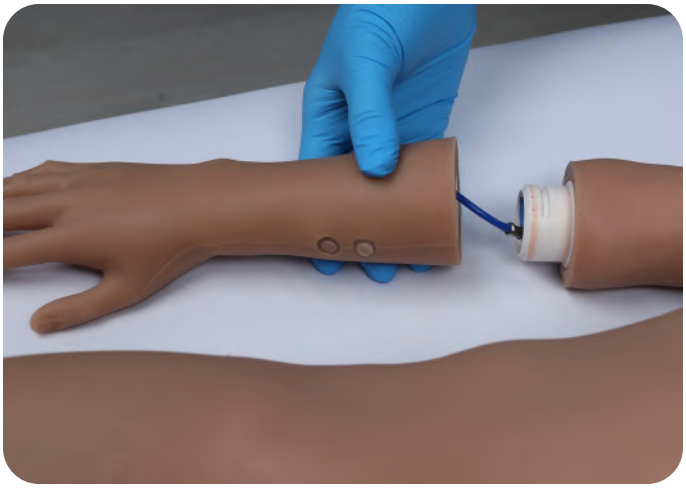
Pediatric HAL ships with his arms attached.

1. Locate the dimple on the simulator's lower arms to find the latch.

Pediatric HAL has one latch on each arm to attach the lower and upper arm. A small circular dimple in the skin marks the location of the latch.



2. Press down on that dimpled skin to disengage the first latch and pull the lower arm down.



3. Follow the same steps in this section to remove the other arm.

2.4 BATTERY

Battery Cycling

The battery is an integral part of your simulator and requires appropriate care to maintain efficiency and longevity.

Overcharging or leaving the battery idle for long periods of time will damage the battery and lower the amount of potential charge overtime.

To ensure maximum battery life, cycle the battery and avoid overcharging by adhering to the following warnings and guidelines.

Avoid Overcharging the Battery

Do not leave the simulator charging continuously for extended periods of time (i.e., several days). It is good practice to unplug the charger once the battery is charged.

- It is recommended to charge the simulator the day or night before a simulation to allow the battery time to fully charge.
- Unplug the simulator when in use unless while running a simulation the UNI software indicates a critically low battery. In these cases, it is advisable to plug in the simulator's battery charger to act as a power supply to finish the simulation. Once the simulation is completed, turn the simulator off and allow the simulator's battery to charge.

Avoid Battery Idleness

Do not leave the simulator idle for extended periods of time (i.e., months, years). The battery's capacity for charge will deteriorate if there is no cycling in the level of charge.

- If you plan to store away and not use the simulator for an extended period of time, it is recommended to fully charge the battery before storage. As part of routine maintenance, plan a time each month to cycle the battery and fully charge it before storing the simulator away again.

Cycling the Battery

1. Obtain the correct battery charger for the simulator and plug the wall adapter end into a voltage source.
2. With the simulator turned off, plug the charger into the charging port on the simulator.
3. Leave the simulator plugged into the charger until the Bluetooth LED light on the simulator establishes a solid blue light (no longer pulsating).
4. Disconnect the simulator from the charger.
5. The simulator is ready to be used for simulation.
6. Use the simulator's battery charge until depleted.
7. Repeat this process as needed.

If preparing the simulator for storage, arrange for a time every month to "cycle the battery" of the simulator. Then, store the simulator with a fully charged battery until the next scheduled usage.

Never store your simulator with a depleted battery for an extended period.

2.5 BATTERY SETUP

The Advanced Pediatric HAL 5 year has an average battery runtime of approximately 4 hours, with a maximum potential of 5 hours. Total battery runtime is dependent upon changes such as breathing rate, volumes, and seizures of the simulator. The battery charge will be displayed on the software panel after the connection with the simulator is established.

Do not store the simulator with a discharged battery. Recharge the battery at the end of every day of simulation. If the simulator will not be used for an extended period, re-charge the battery at least once every 30 days. Doing so will prevent damaging the battery due to discharging.

Charging the Battery

Pediatric HAL's battery can only be recharged using the Pediatric HAL Charger while the simulator is off or on standby.

Turn the simulator off and connect the battery charger to recharge the battery.

1. Close the **UNI** software to turn the simulator off.

2. Connect the charger to the simulator's charging port located in the left heel.

2

3. Allow the simulator to charge for 2-3 hours (or until the **Capillary Refill** site on the right knee stops flashing and is a solid light) indicating the simulator is ready for use.

Do not store the simulator with a discharged battery. Recharge the battery at the end of every day of simulation.

2.6 INITIALIZING SIMULATOR

Communication via Bluetooth

Bluetooth is Pediatric HAL's primary method of communication:

1. After reading the manufacturer's care and caution information, press the power button to turn on the Tablet PC.

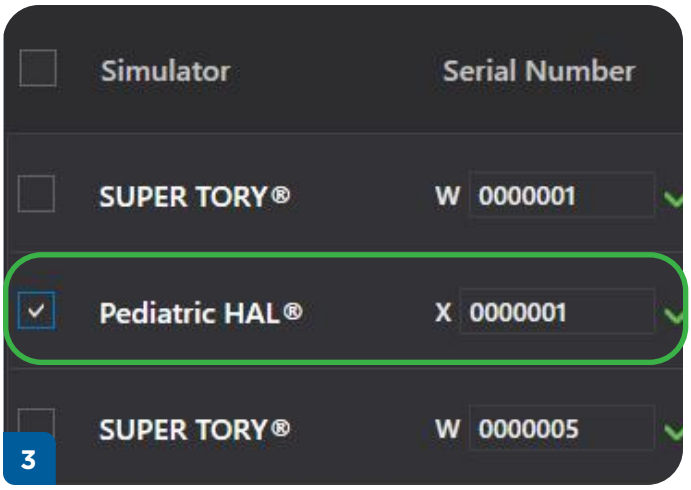
As seen in the photo, if the RF Module is plugged into the PC tablet, disconnect it before attempting a bluetooth connection.

Ensure that Pediatric HAL is laying on a flat surface during the startup process so that his auto calibration is optimal.

2. Gently press on the **RIGHT knee** where the **Capillary Refill Time** (CRT) sensor is located on Pediatric HAL.

The simulator will search for its bluetooth correspondence once the Capillary Refill Time sensor begins to blink.

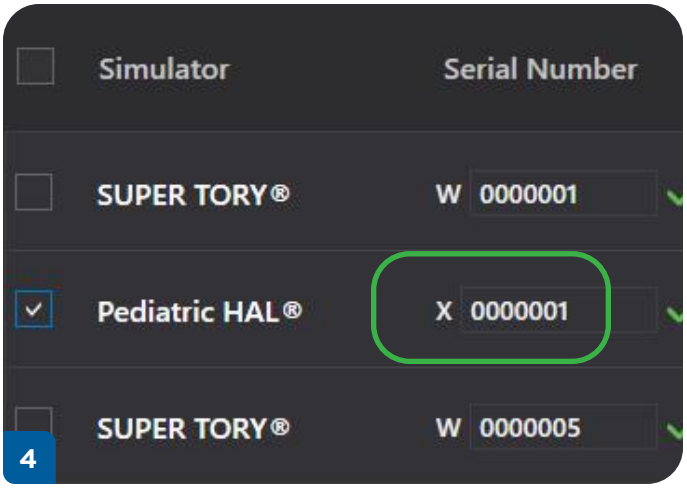
3. The UNI software is preloaded on the tablet which is used to initialize the simulator and control vital signs. Double click the **UNI 3** icon on the tablet's home screen to start.



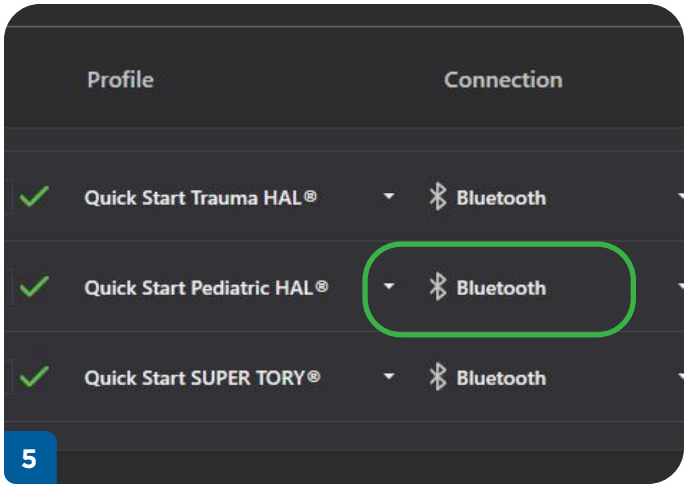
4. Click on the default **Serial Number** text box to edit. Type in the numerical serial number of the simulator and click **Connect**.

When selecting the appropriate profile, be sure that the correct serial number from your simulator is entered into the profile and click **Connect**. The serial number will be located on Pediatric HAL once his lower back is unzipped.

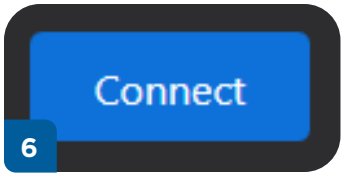
An additional location to find Pediatric HAL's serial number is available inside the right arm. Detach the right arm and on the inner white post is a sticker with his serial number (for assistance in removing his right arm, refer to the ""Disconnecting the arms" on page 19 section).



5. Select **Bluetooth** under the **Connection** drop-down.



6. Click **Connect** at the bottom. Pediatric HAL will establish communication within one minute.



Communication via RF Module

1. After reading the manufacturer's care and caution information, press the power button to turn on the Tablet PC.

Ensure that Pediatric HAL is laying on a flat surface during the startup process so that his auto calibration is optimal.

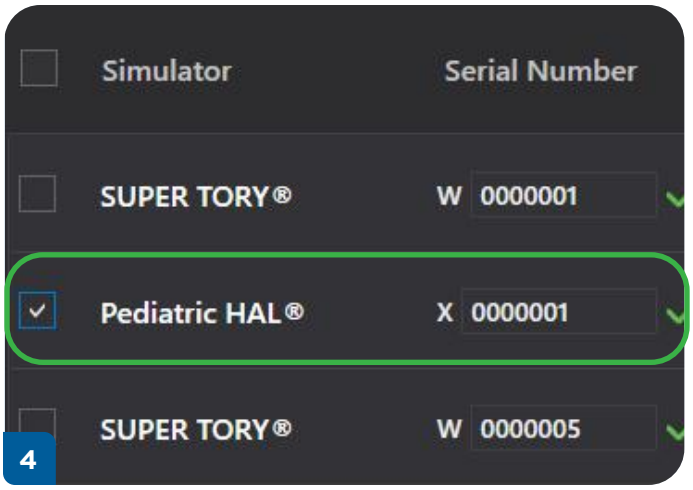
2. Connect the simulator's USB RF Module to the tablet PC. The control tablet transmits the startup and control commands to the simulator through the USB RF module.

3. The UNI software is preloaded on the tablet which is used to initialize the simulator and control vital signs. Double click the **UNI 3** icon on the tablet's home screen to start.

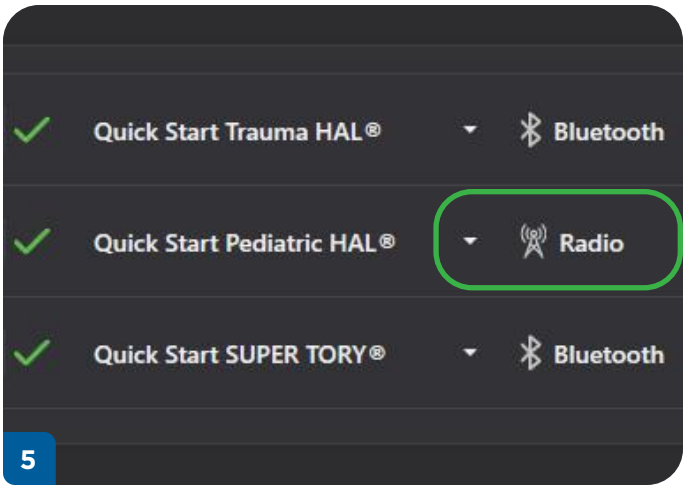
4. The simulator selection menu will appear. Select the corresponding simulator: **PEDIATRIC HAL**, and enter the corresponding serial number.

When selecting the appropriate profile, be sure that the correct serial number from your simulator is entered into the profile and click **Connect**. The serial number will be located on Pediatric HAL once his lower back is unzipped.

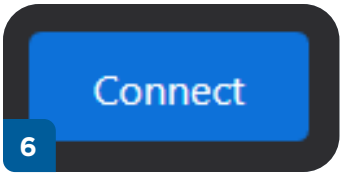
An additional location to find Pediatric HAL's serial number is available inside the right arm. Detach the right arm and on the inner white post is a sticker with his serial number. For assistance in removing his right arm, refer to the "Disconnecting the arms" on page 19.



5. Select **Radio** under the **Connection** drop-down.



6. Click **Connect** at the bottom. Pediatric HAL will establish communication within one minute.



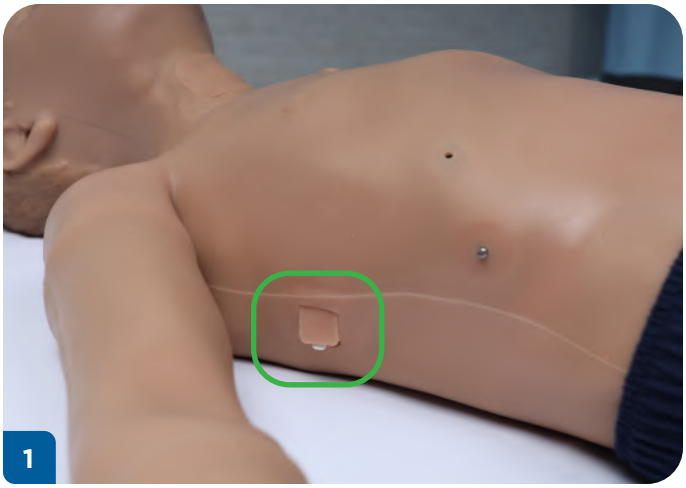
Communication via Wired RF Module

Pediatric HAL is also able to be connected by way of an ethernet connected RF module.

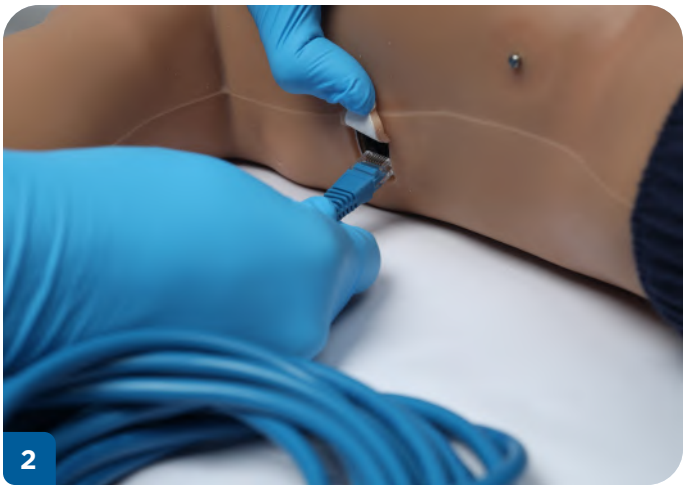
The RF module as seen in the image has an ethernet port.

1. Locate the ethernet port under Pediatric HAL's right shoulder.

To turn off the simulator, close the **UNI** software.



2. Lift the flap and connect one side of the ethernet cable to Pediatric HAL's ethernet port.

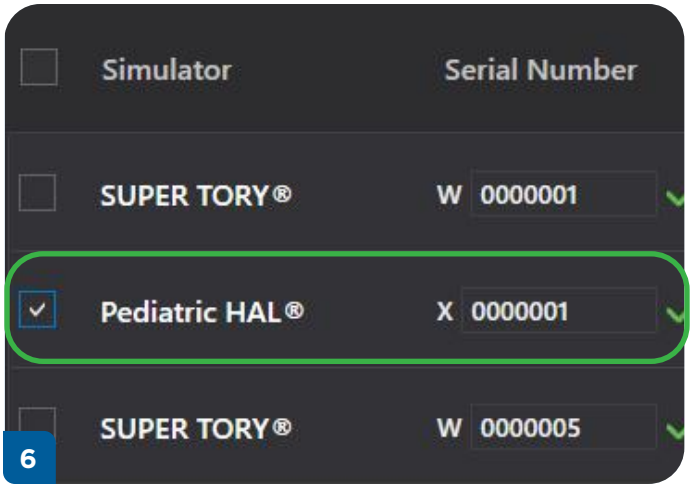


3. Plug the other end of the ethernet cable into the ethernet port on the RF module. Pediatric HAL will establish connection within the minute.

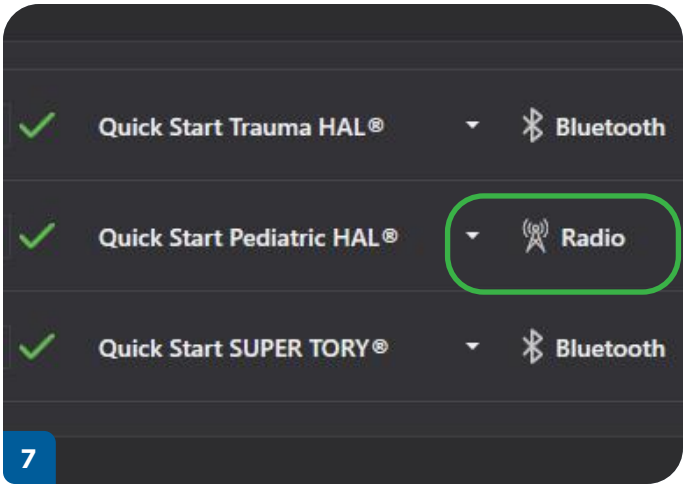
4. Connect the simulator's USB RF Module to the tablet PC. The control tablet transmits the startup and control commands to the simulator through the USB RF module.

5. The UNI software is preloaded on the tablet which is used to initialize the simulator and control vital signs. Double click the **UNI 3** icon on the tablet's home screen to start.

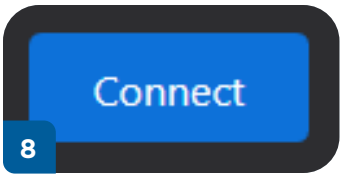
6. On the simulator selection menu will appear. Select the corresponding simulator: **PEDIATRIC HAL**,



7. Select **Radio** under the Connection drop-down.



8. Click **Connect** at the bottom. Pediatric HAL will establish communication within one minute.



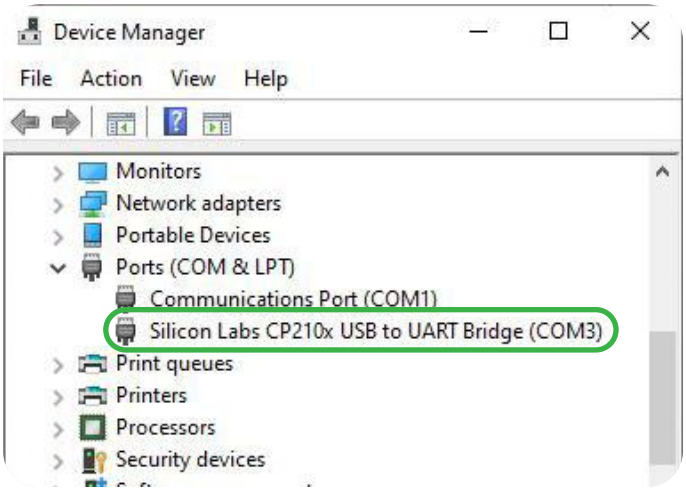
Communication via TCP/IP Connection

Pediatric HAL has the ability to set up their RF Communications Module and UNI connection remotely from their Bedside Virtual Monitor. This type of connection is only available for simulators that comes tandard with a Virtual Monitor or when the option for a Virtual Monitor is purchased.

To initialize your simulator via TCP/IP:

1. Gather the RF Communications Module, Bedside Virtual Monitor, and control tablet/PC.

2. Plug the RF Communications Module into an available USB port on the Bedside Virtual Monitor.



3. Ensure that the RF Module Drivers are downloaded on the Bedside Birtual Monitor.

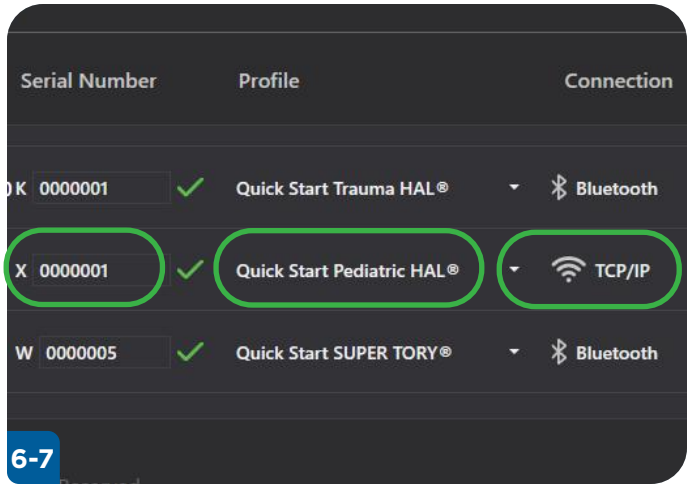
If the RF Drivers are not installed, go to: https://www.gaumard.com/gaumard-software to download and install them.

4. Verify that the Bedside Virtual Monitor and the UNI tablet/PC are connected to the same Wi-Fi network.

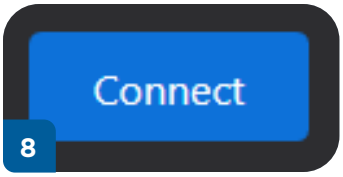
5. The UNI software is preloaded on the tablet which is used to initialize the simulator and control vital signs. Double click the **UNI 3** icon on the tablet's home screen to start.

6. On the simulator selection menu will appear. Select the corresponding simulator: **PEDIATRIC HAL**,

7. Select **TCP/IP** under the Connection drop-down.



8. Click **Connect** at the bottom. Pediatric HAL will establish communication within one minute.

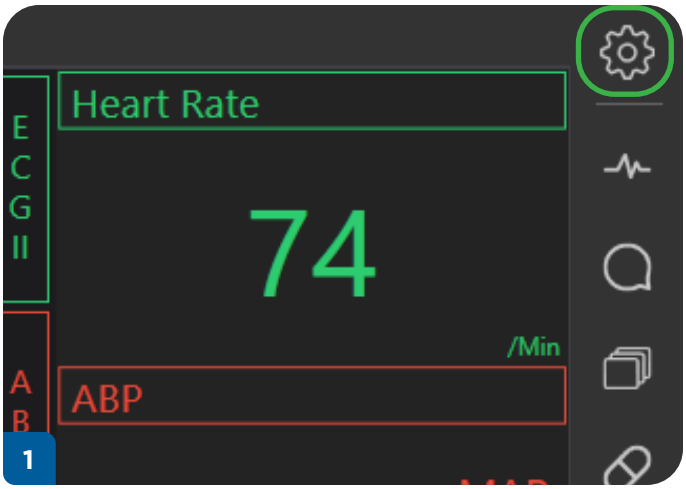


Connecting UNI 3 and Gaumard Vitals

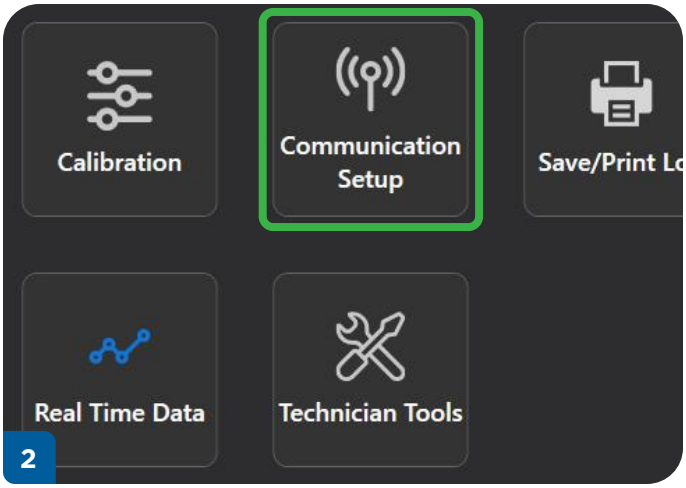
After selecting TCP/IP as the Connection and UNI 3 launches, in order to complete the TCP/IP connection, UNI 3 and and Gaumard Vitals need to be connected.

To connect UNI 3 and Gaumard Vitals:

1. In UNI 3, click **Settings** in the upper right corner.



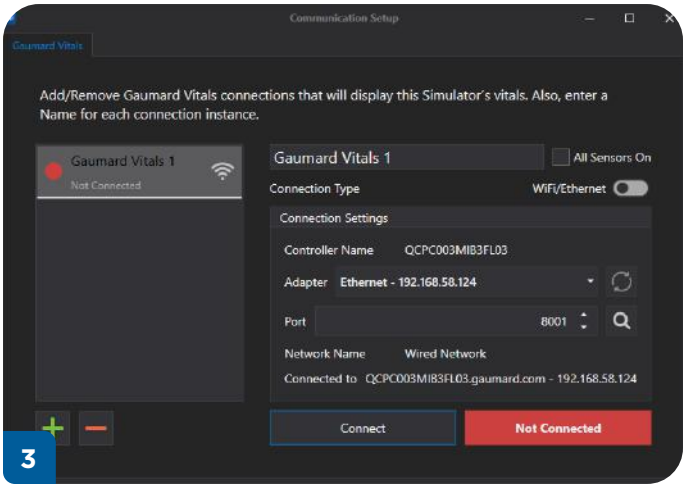
2. In the **Curent Simulator** section, click Communication Setup.



3. On the **Communication Setup** window, take note of the **Adapter** and **Port** numbers.

The selected **Adapter** needs to be the **Ethernet** option. In this example, the resulting Ethernet IP address is 192.168.58.124. This IP address number is what will be plugged into the **Communication Setup** on Gaumard Vitals so the software can communicate with each other.

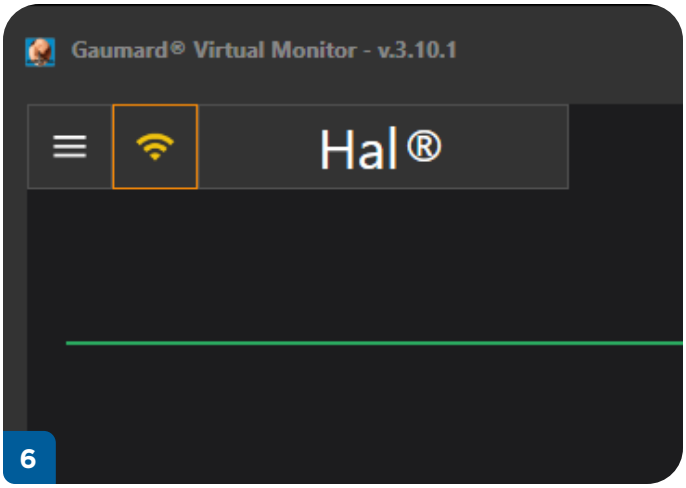
The **Port** number would only need to be manually changed if attempting to connect multiple Bedside Virtual Monitors to this instance of UNI 3. In this example, the only **Port** number is 8001. This number will also be plugged into the **Communication Setup** on Gaumard Vitals to complete the software setup.



4. Leave the UNI tablet/PC and move over to the Bedside Virtual Monitor.

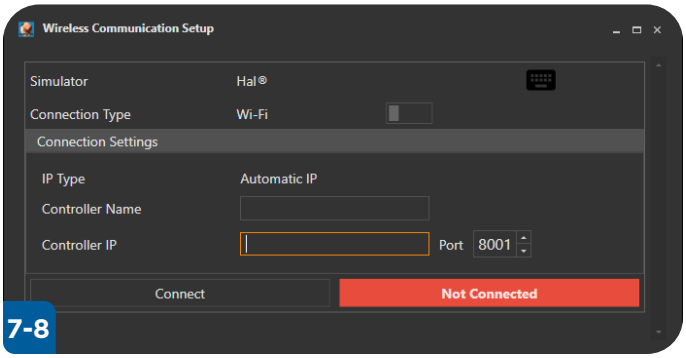
5. Double click on the Gaumard Vitals icon that is installed on the homescreen of the Bedside Virtual Monitor.

6. Click on the **Communication Signal** in the upper left of Gaumard Vitals..

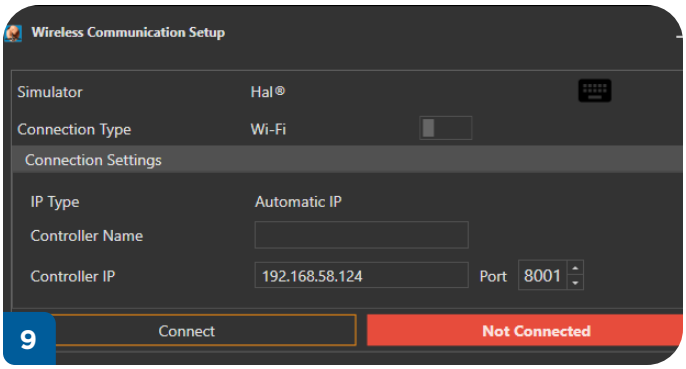


7. Enter into the **Controller IP**, the IP from the **Adapter** field on UNI 3 (step 3).

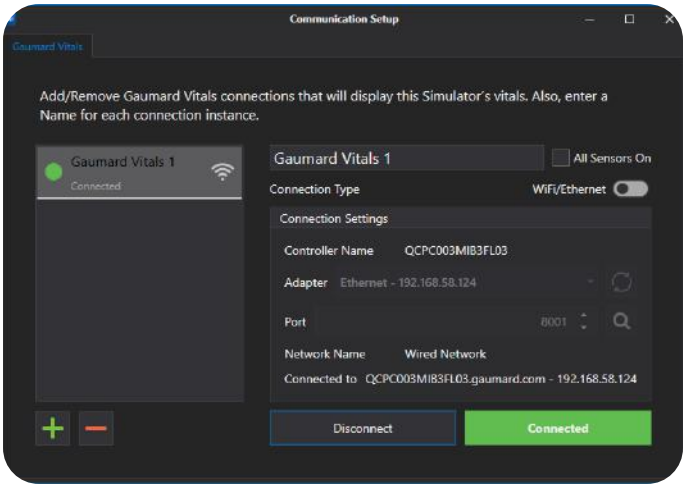
8. Check that the **Port** numbers are the same on UNI and Gaumard Vitals.

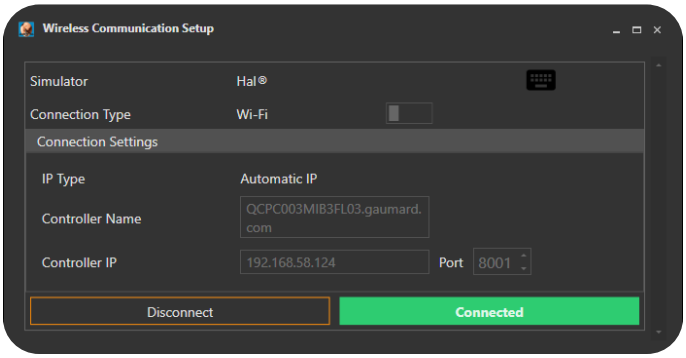


9. Click **Connect** on the **Communication Setup** windows on UNI 3 and Gaumard Vitals.



After clicking **Connect**, both the **Communication Setup** windows on UNI 3 and Gaumard Vitals will attempt to complete the connection. When successful, the indicator on the bottom left will turn green and state **Connected**.

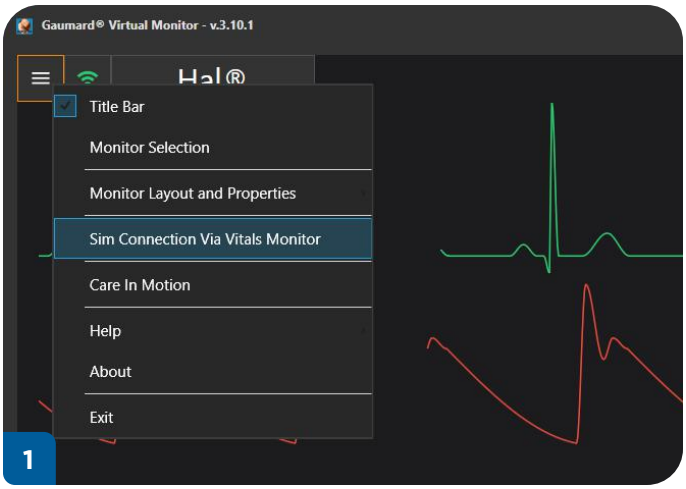




Completing the TCP/IP Connection

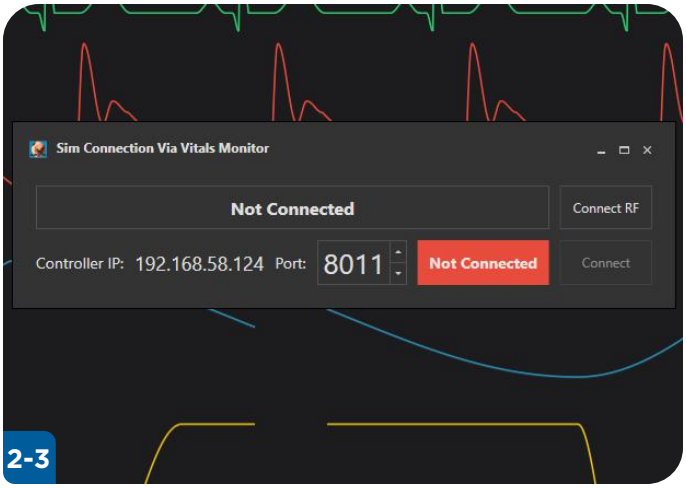
After establishing UNI 3 and Gaumard Vitals connection, to finish up the TCP/IP communication:

1. Click on the **Menu** in the upper left corner of Gaumard Vitals and select **Sim Connection Via Vitals Monitor**.

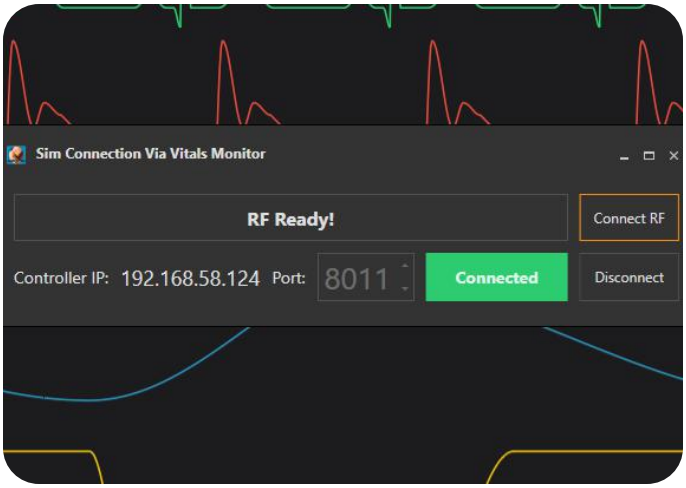


2. Click Connect RF, The Sim Connection Via Vitals Monitor will search and connect to the available RF.

3. Once the RF is ready, click Connect on the bottom right of the Sim Connection Via Vitals Monitor window.



The UNI 3 and Gaumard Vitals are now connected via TCP/IP and the simulator is ON.



2.7 SIMULATOR STARTUP

Ensure that Pediatric HAL is laying on a flat surface during the startup process, so that the auto-calibration process is completed optimally.

While the simulator is turning on, Pediatric HAL will flash red around his face.

Allow 30 seconds for Pediatric HAL to auto-calibrate. During this time, please do not touch or maneuver the simulator.

The simulator is ready for use once the calibration lights turn off. Upon start up or shut down of the simulator there may be a mechanical sound emitting from the pumps located in the legs. This sound is normal and does not cause adverse effects.

3. Working with Pediatric HAL

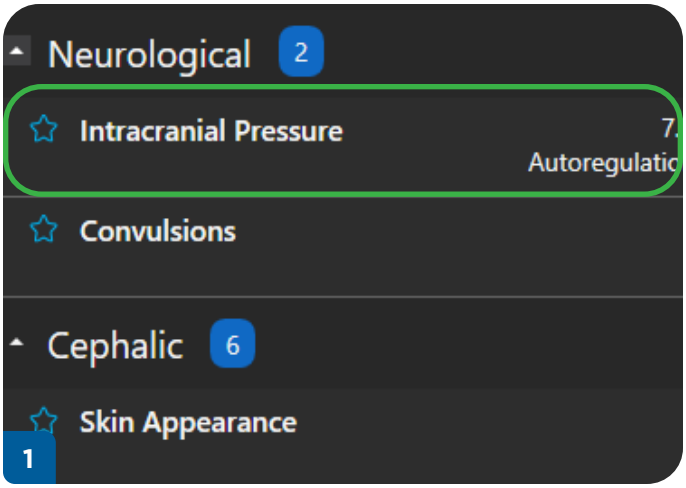
3.1 NEUROLOGICAL

3.1.1. Intracranial Pressure

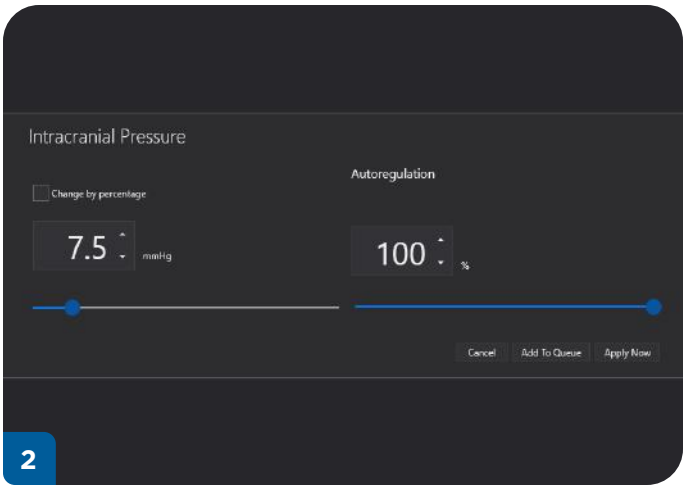
Pediatric HAL has the ability to simulate intacranial pressure. After an injury to the brain, a patient may become swollen with blood and brain tissue. As the skull will not stretch like skin, it may become full and pressure will increase on the brain tissue. As such, **UNI** and **Gaumard Vitals** will recognize this simulation virtually with numerical vitals.

1. Under **Neurological**, click **Intracranial Pressure**.

Intracranial Pressure is a strictly virtual vital sign.



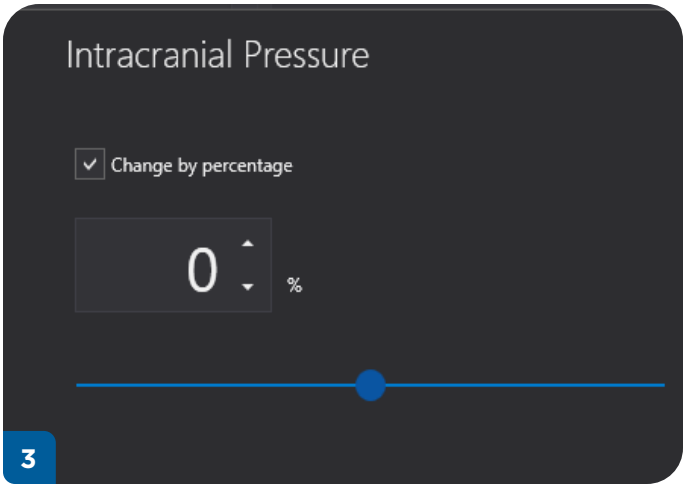
2. Use the slider bar to adjust the values of pressure and autoregulation.



3. Check on **Change by percentage** to affect the intacranial pressure by percentage as opposed to mmHg.

The value in units of mmHg will display the numeric value of ICP and Autoregulation % will affect the intensity of the ICP waveform.

4. Click **Apply Now** or **Add to Queue** once selections are made.

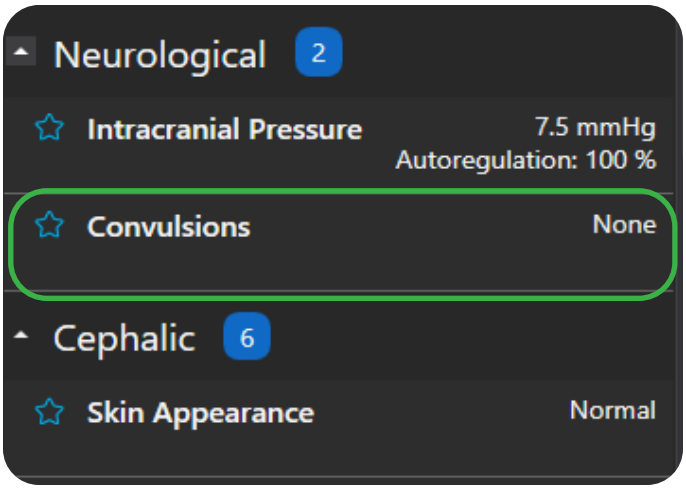


3.1.2. Convulsions

Pediatric HAL is capable of convulsing to simulate mild or severe seizures. These convulsions include different levels of intense seizing. If lying in a bed, place a back board underneath Pediatric HAL to make the seizing more apparent or place him on a sturdy, hard surface like a table or the floor.

To use the software to enable the seizure behavior:

1. Under **Neurological**, click **Convulsions** vital to access intensity options. Choose the desired intensity.

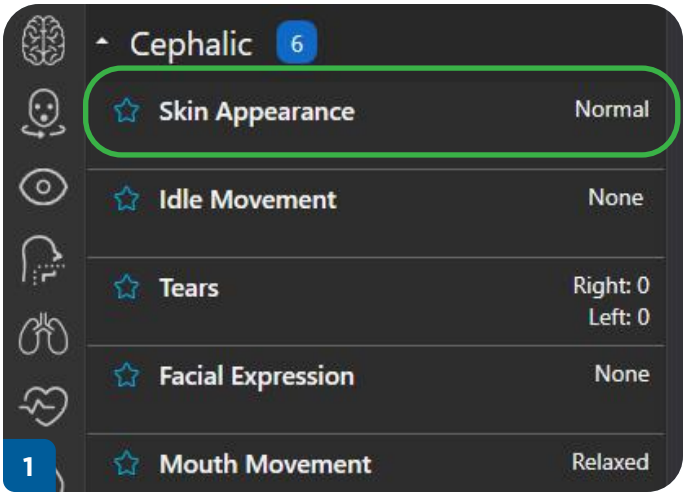


3.2 CEPHALIC

3.2.1. Skin Appearance

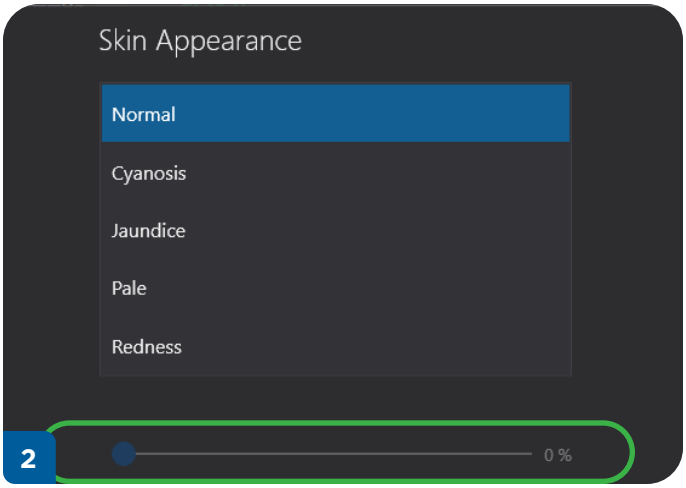
Pediatric HAL can perform various skin appearances for the goal of adding realism to the simulation.

1. Within **Cephalic**, click **Skin Appearance**.

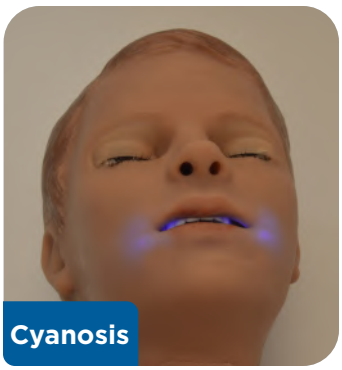


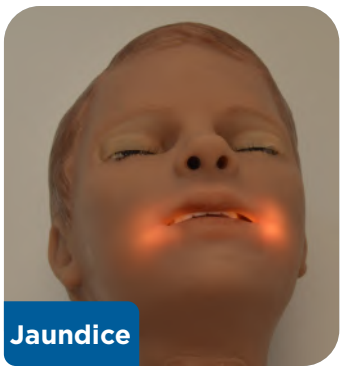
2. Select any of the 5 skin appearance options.

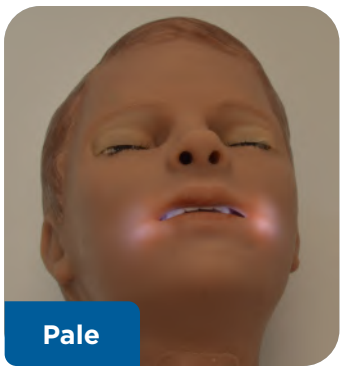
3. Use the **Intensity** slider to increase or decrease to the desired intensity. The higher the percentage, the higher the intensity, and vice versa.

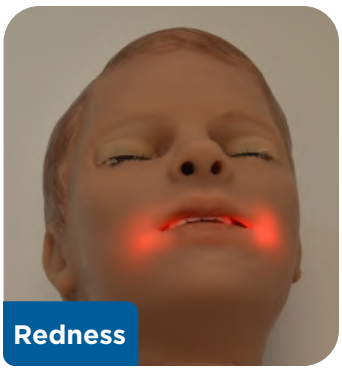


Normal is Pediatric HAL's default appearance. Cyanosis, Jaundice, Pale, and Redness will activate HAL's LEDs with a programmed color (the color can be adjusted through calibration).





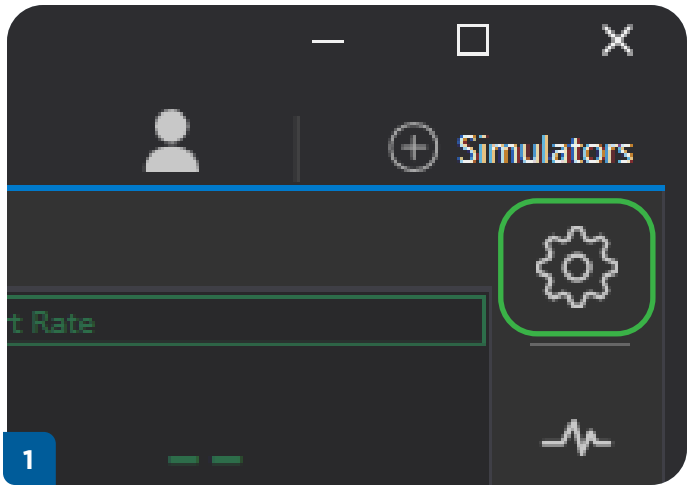




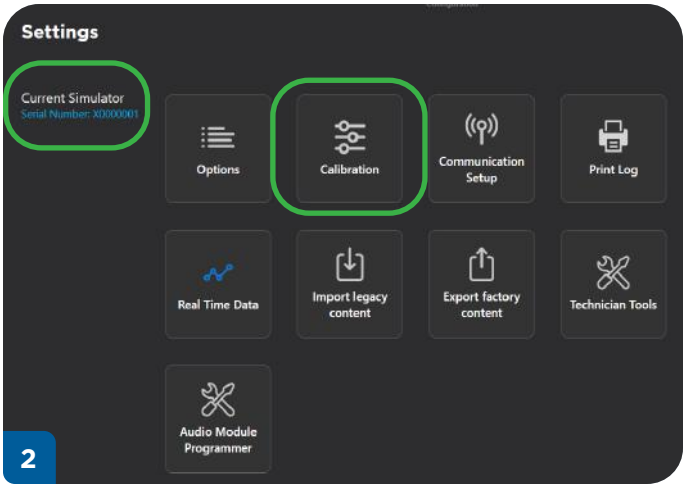
3.2.2. Skin Appearance Calibration

If HAL's default coloring for Cyanosis, Pale, Jaundice, and Redness are not to your liking they can be changed to better suit your simulation needs by performing a skin appearance calibration.

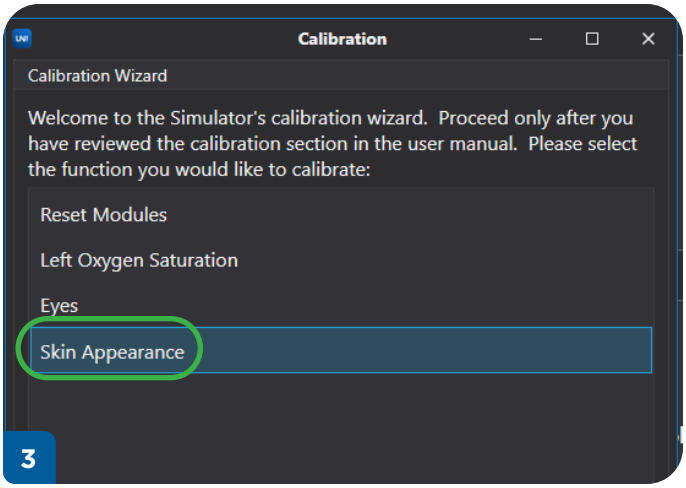
1. On UNI, click **Settings** on the upper-right hand corner.



2. Scroll down to locate the **Calibration** setup within the **Current Simulator** tab.



3. In the calibration window, click **Skin Appearance** and **Next**.



4. Under **Skin Appearance Calibration**, select the type of skin appearance that needs calibration.

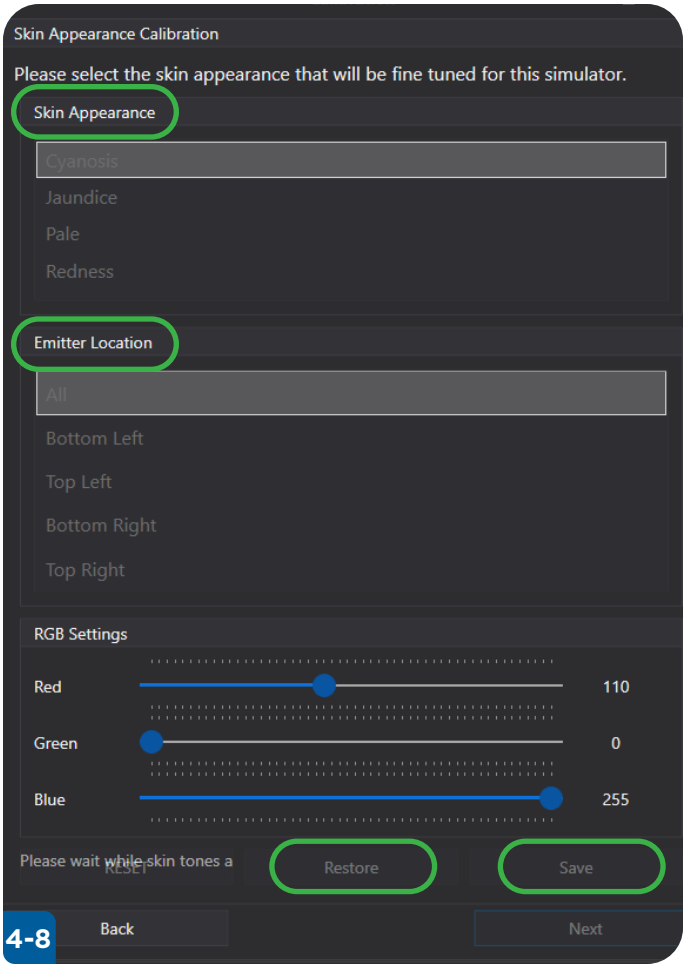
The skin appearance changes per appearance choice will remain upon restart of the UNI software. Restoring to factory settings will revert back any changes to a skin appearance.

5. Use the emitter location window to choose a specific LED light spot on the simulator.

6. Use the sliders to adjust the pigmentation.

7. Click **Save** to preserve the changes made or click **Restore** to reset back to factory settings.

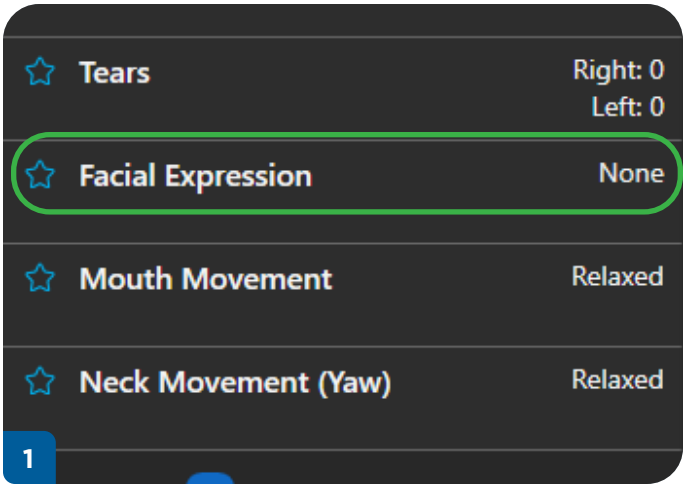
8. Click **Next** when done.



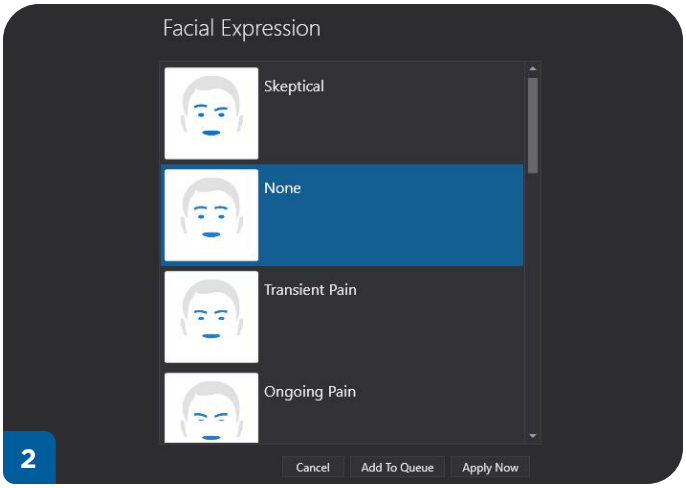
3.2.3. Facial Expressions

Pediatric HAL has the ability to portray different preprogrammed facial expressions from UNI such as transient pain, ongoing pain, angry, amazed, lethargic, and more.

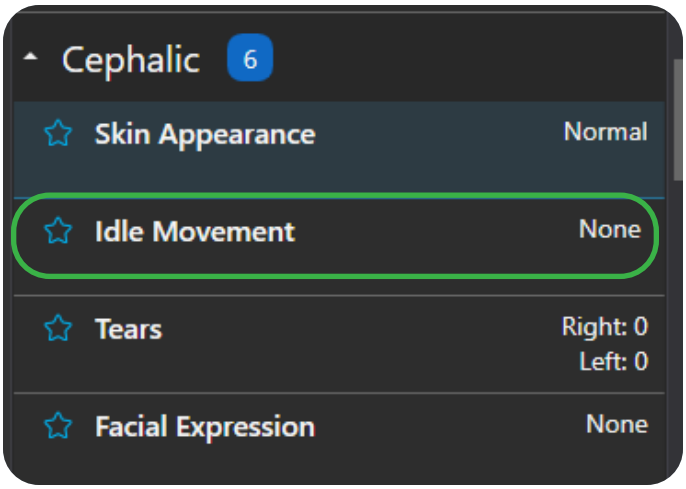
1. Within the **Cephalic** section, click **Facial Expression**.



2. Select on the desired facial expression and click **Apply Now**.

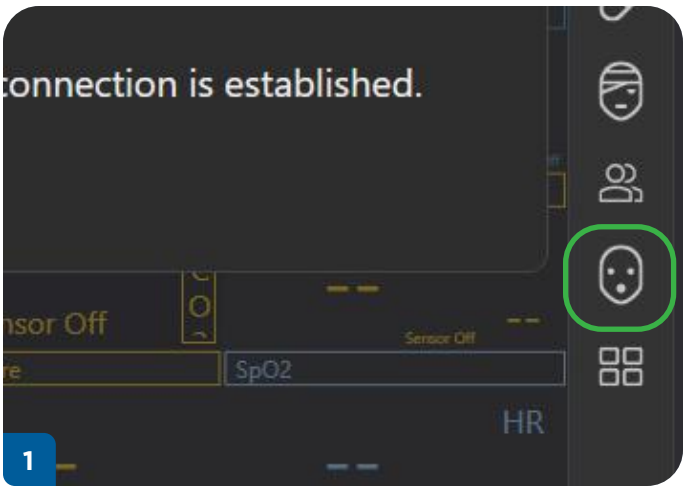


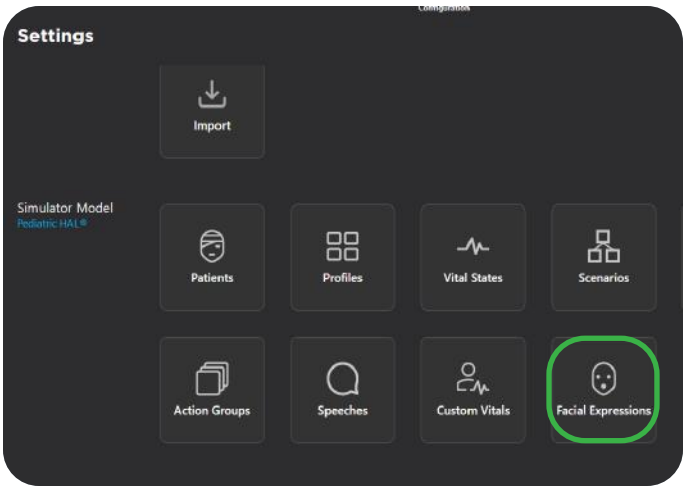
Within the **Cephalic** section, ensure that the Idle Movement function is set to **None**, so as to allow proper function of the desired facial expression.



3.2.4. Customizable Facial Expressions

1. Select the **Facial Eexpressions icon** on the far-right vertical toolbar in **UNI** OR from the **Facial Expressions** option in the **Settings** menu.

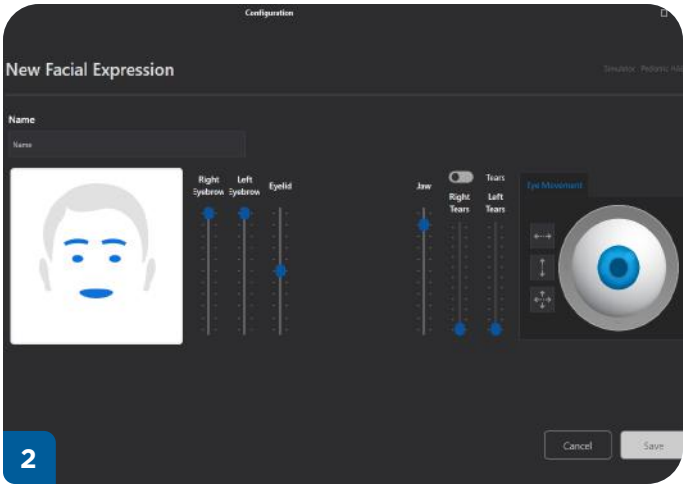




Either access to **New Facial Expressions** will prompt this new tab.

2. To save a custom facial gesture, give the custom facial gesture a name and click **Save**.

Once a custom facial gesture is created and saved, it will be available in the **Facial Expressions** vital in UNI.



3.2.5.Idle Movement (Emotional States)

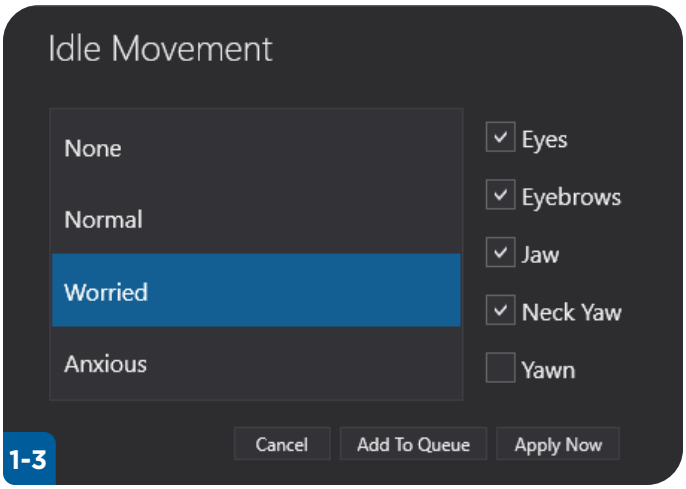
Pediatric HAL exhibits different preprogrammed emotional states such as none, normal, worried, or anxious by selecting **Idle Movement** in the UNI software.

To utilize the Idle Movement:

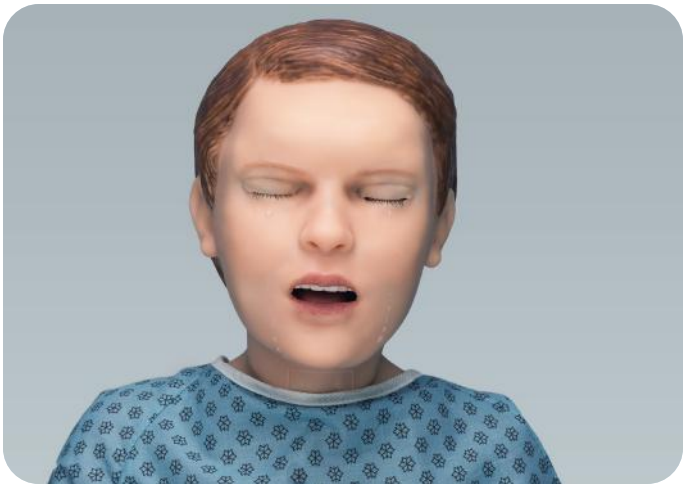
1. Select the **Idle Movement** vital within the **Cephalic** menu in UNI.

2. Select the emotional state for HAL to exhibit. Select each box with or without a check to prompt the movements for the eyes, eyebrows, jaw, neck, and yawn.

3. Once the customizations are made, click **Apply** or **Add To Queue** to make changes.



3.2.6. Crying and Tears

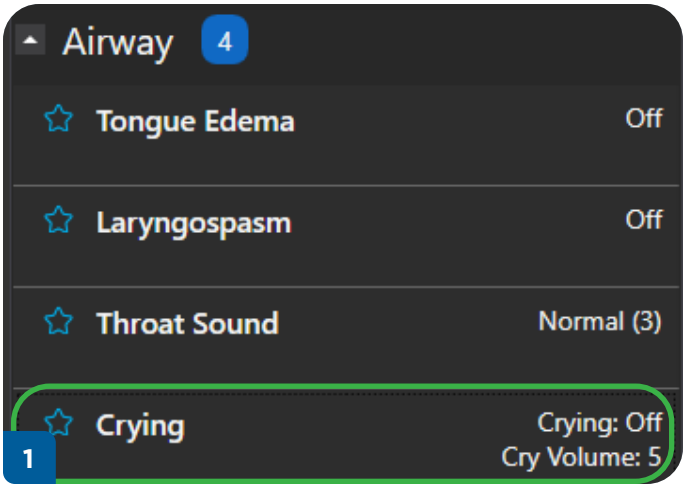


Pediatric HAL is capable of simulating the act of a crying patient with or without tears. To mimic a patient in pain, Pediatric HAL's tear reservoir can be filled manually with liquids to perform a crying response. Additionally, to activate the crying sounds and/or tears features, the facilitator will also need to manually turn on these features on UNI—using the **Apply** or **Add to Queue** functions—while the provider/user is in the simulation process.

3.2.7. Activating Crying

For the activation of tears, it is recommended to position Pediatric HAL in an upright, sitting posture.

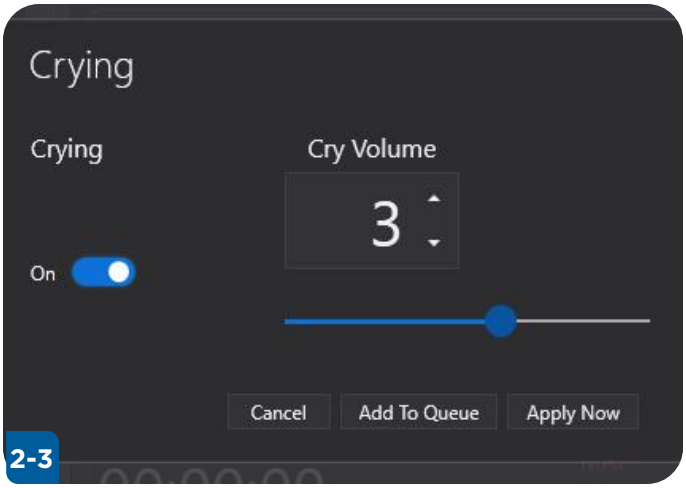
1. To activate crying, navigate to the **Airway** menu and select the **Crying** vital.



The jaw is synced to move along with crying when the feature is turned **ON**.

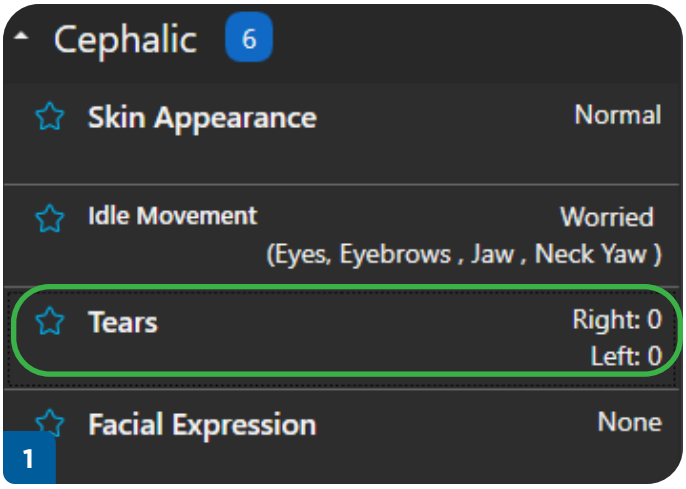
2. Toggle crying **ON** and apply.

3. To turn the volume of the crying down or up, move the slider left or right, respectively.



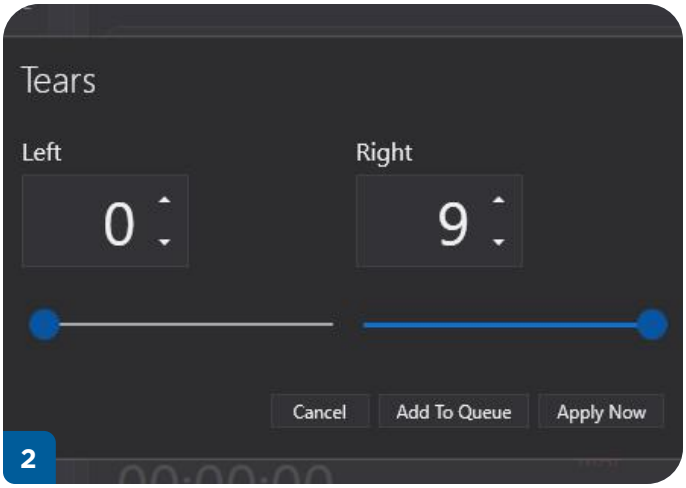
3.2.8. Activating Tears

1. To activate tears, navigate to the **Cephalic** menu and select the **Tears** vital.



2. Adjust the slide bar to control the volume of tears released.

Level **0** will not release any fluid while level **9** will release the most fluid.



3.2.9. Filling the Tear Reservoir

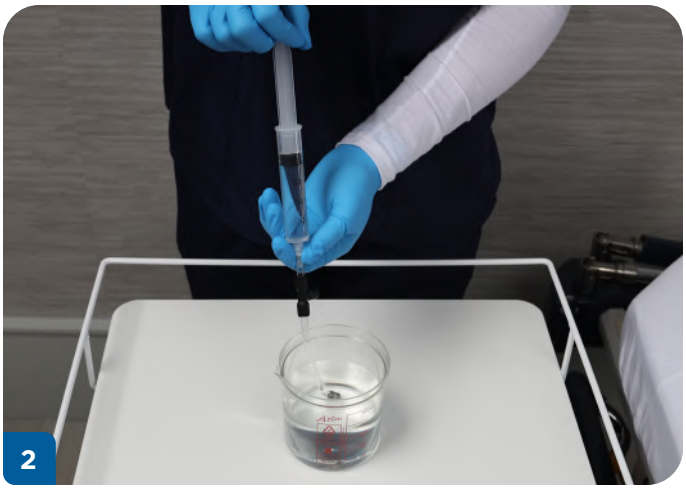
For the insertion of liquid in the tear reservoir, you may need these items from the **Tear Filling Kit**:

- Fill syringe
- Fill tube
- Bucket with clean water

1. Twist the fill tube onto the fill syringe to assemble the fill syringe.

2. Fill the tear syringe with 20mL fluid.

Be sure that the fill syringe does not have any air bubbles. It is not recommended to introduce air into the system.

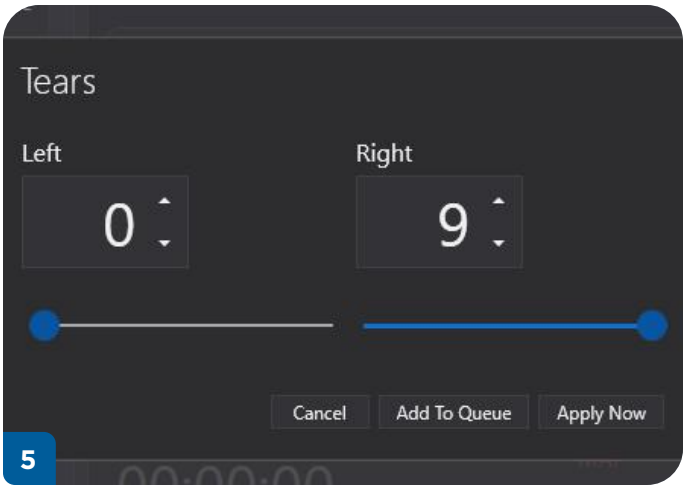


3. Insert the fill tube to the port in Pediatric HAL's right ear.

4. Inject the fluid into the port.

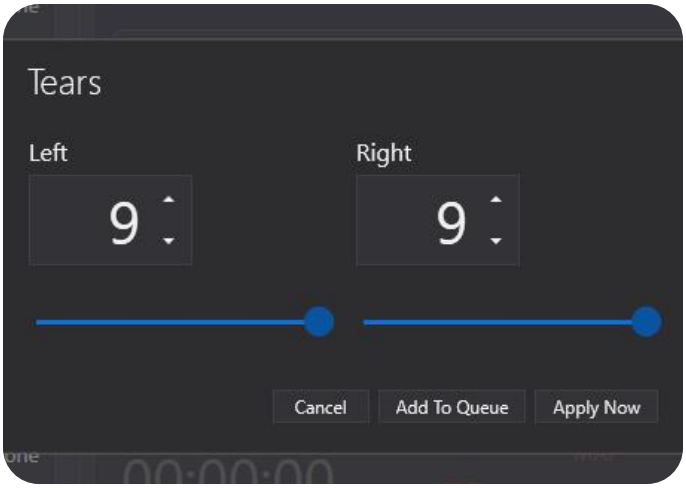
On the fill tube, one may notice a black valve. This is the pressure release valve. It's purpose is to leak the excess liquids that cannot fit within the reservoir once the reservoir is full. It is not a necessary component asthe tear reservoir filling procedure will function properly with or without the pressure release valve.

5. Select **Tears** in the **Cephalic** menu in UNI and adjust the right and left flow rate by moving the sliders right or left.



3.2.10. Draining the Tear Reservoir

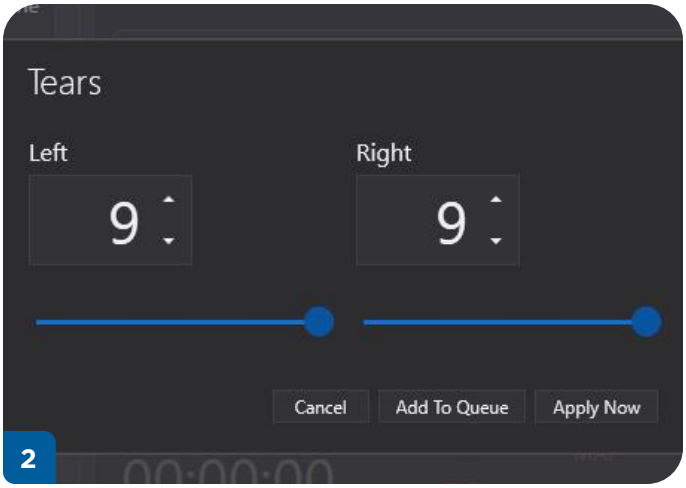
To drain the tear reservoir, turn the tear rate to **9** for each eye. Leave activated at this tear rate until the tears run dry.



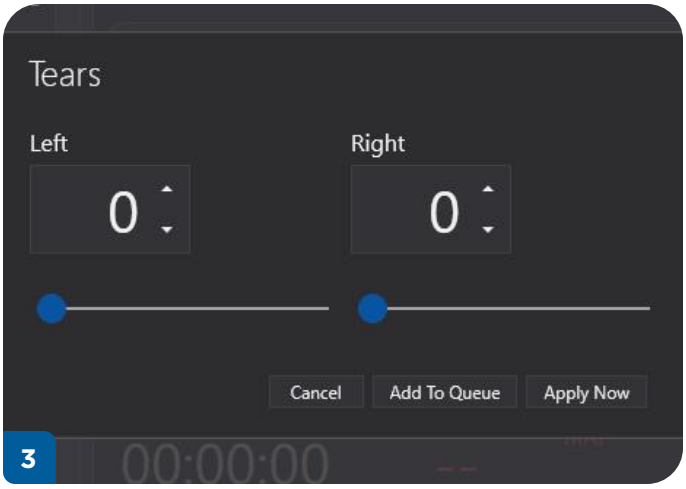
3.2.11. Flushing the Tear Reservoir

1. Fill the empty reservoir through the right ear with a 70:30 solution of water to isopropyl alcohol.

2. Activate **Tears** on both **Left** and **Right** to level **9** and let the solution flush out of the system until tears no longer appear.



3. Once the tears flush out and the process is complete, turn **Tears** back to **0**.

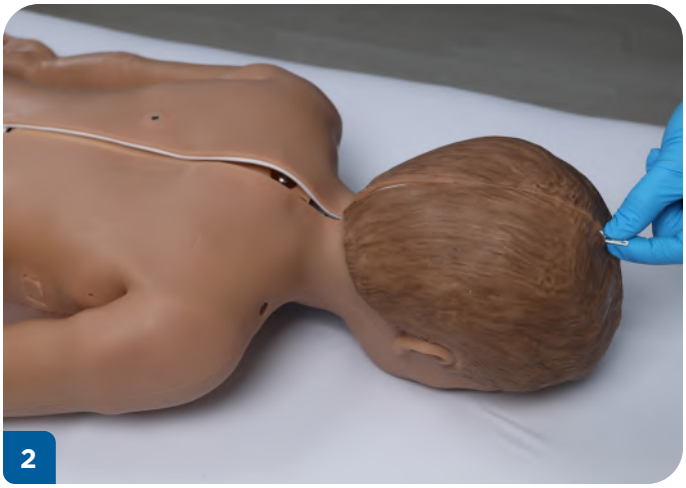


3.2.12. Extracting Fluids from Tear Reservoir

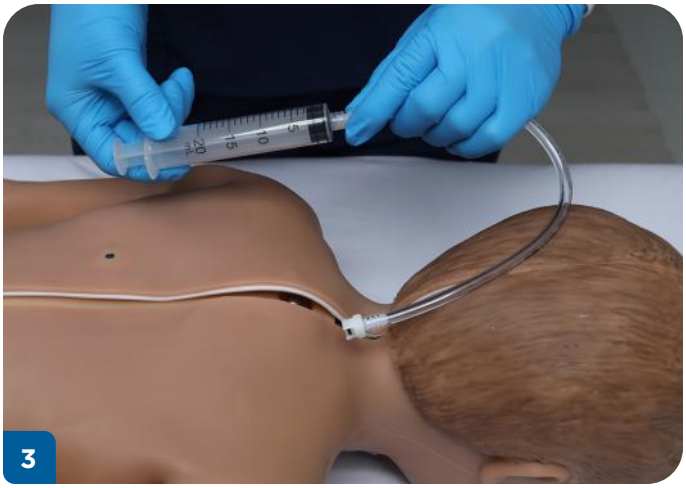
To extract the fluids manually from the drain port on the back of Pediatric HAL's head:

1. Carefully turn over Pediatric HAL to lay on his stomach.

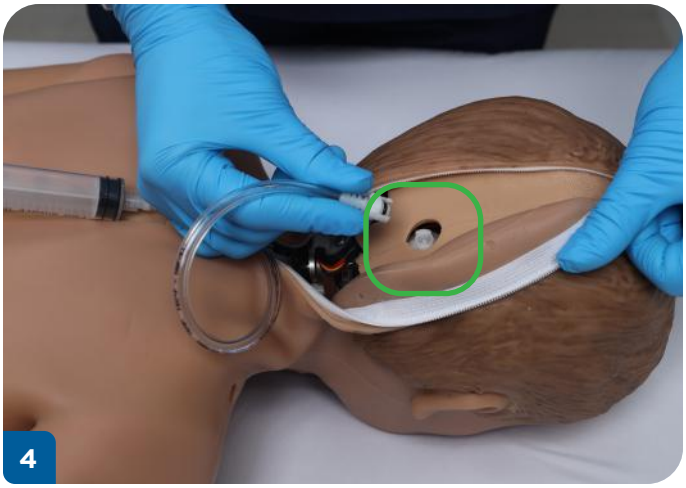
2. Unzip his back skin from his bosom to the top of his head.



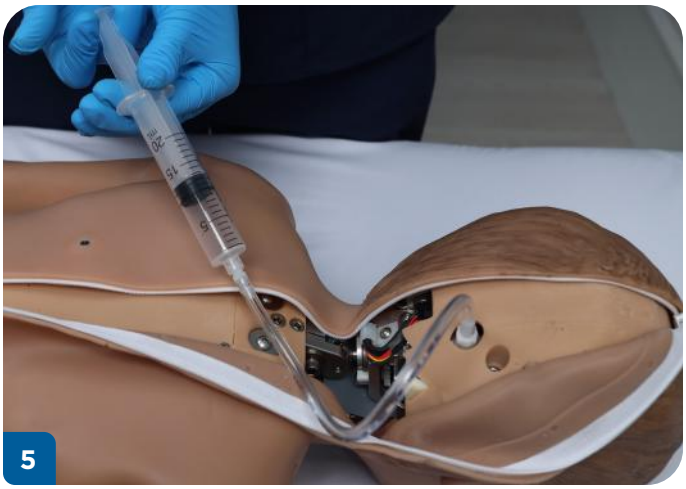
3. Twist the fill tube onto the fill syringe to assemble the fill syringe for drainage.



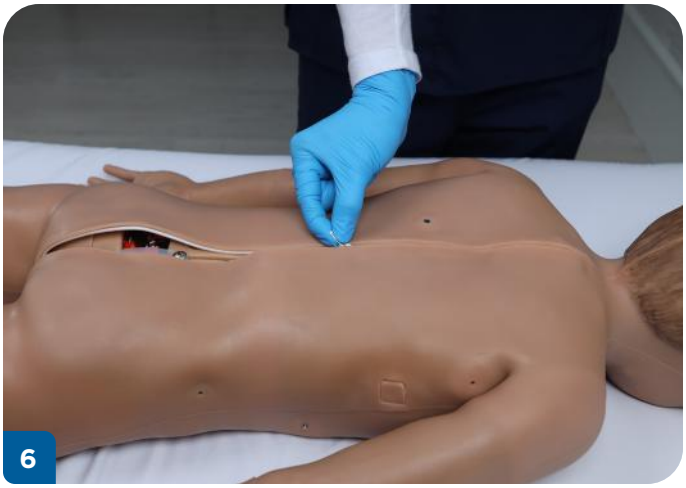
4. Insert the syringe into the drain port on the back of Pediatric HAL's head.



5. Use the syringe to extract the water from the reservoir until empty.

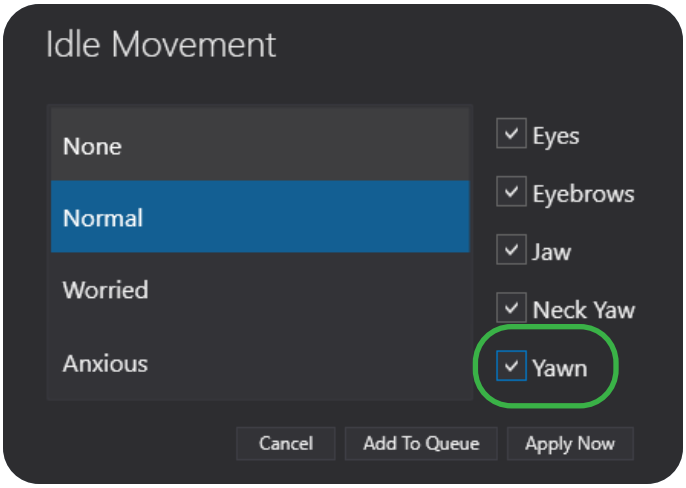


6. Unplug the syringe and zip back down Pediatric HAL's back skin.



3.2.13. Yawning

Activate yawning from the **Idle Movement** vital in the **Cephalic** menu by selecting a movement apart from **None**, and then clicking a checkmark over the **Yawn** feature.



Do not intubate while the simulator is yawning.

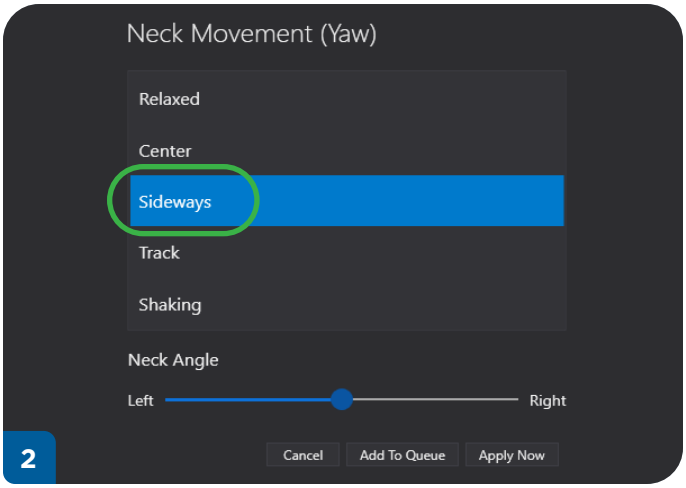
3.2.14. Neck Movement (Yaw)

Yaw refers to the cervical rotation—the turning of the head to the left or to the right—that Pediatric HAL's neck can perform. You can manually control Pediatric HAL's neck or enable visual or audio tracking (but not both at the same time), which will automatically turn Pediatric HAL's head towards either an object or sound. It is always recommended to set HAL's neck movement back to **Relaxed** when attempting intubation.

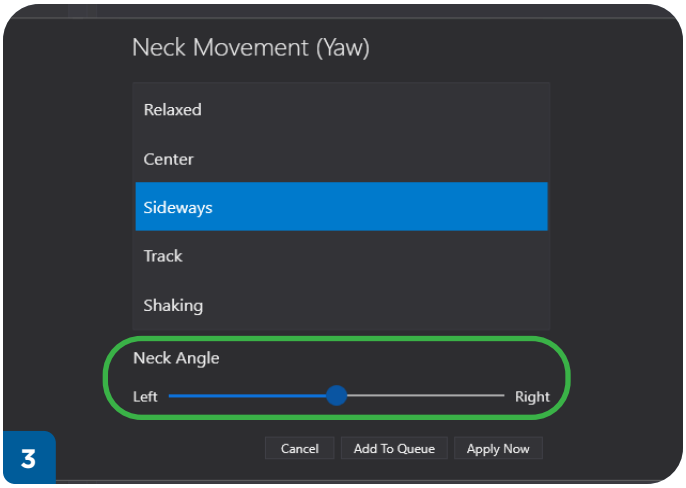
It is recommended to position Pediatric HAL in an upright, sitting posture so that his head and neck can freely move.

1. Select **Neck Movement (Yaw)** from the **Cephalic** menu.

2. To stimulate a stiff neck (torticollis), select **Sideways** with the slide bar adjusted to the middle.

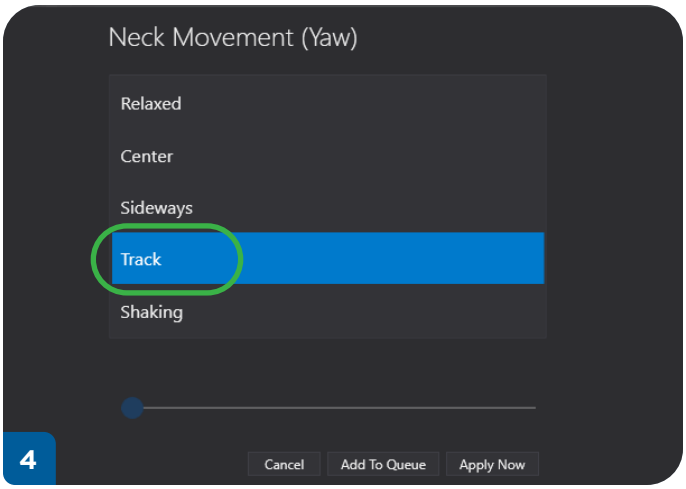


3. Use the slider at the bottom of the dialog box to move the **Neck Angle**; Pediatric Hal's head will subsequently be moved right or left to a specified angle of rotation.



4. Select **Track** and Pediatric HAL will begin to automatically move his head to an approaching object.

The object must be about 6 inches from Pediatric HAL's face.

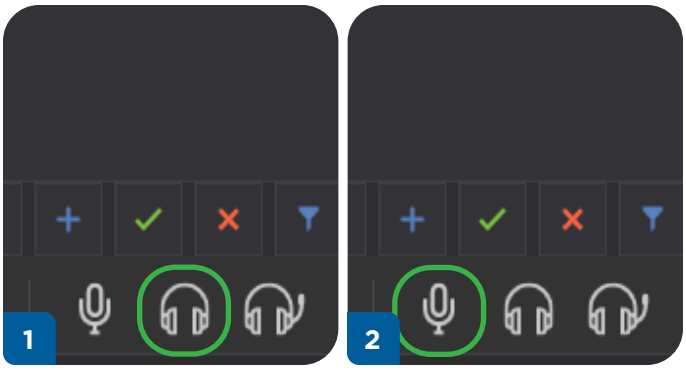


3.2.15. Speech

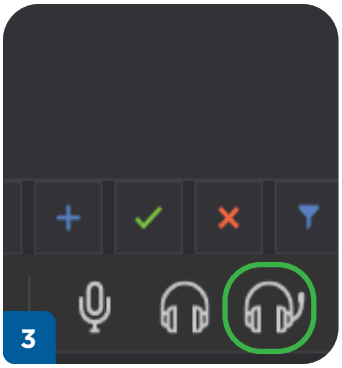
Be the voice of Pediatric HAL and listen to participants respond in real-time by connecting the provided headset to the tablet PC.

1. Select the **Audio: Listen** icon to listen, on the bottom-right hand corner of UNI.

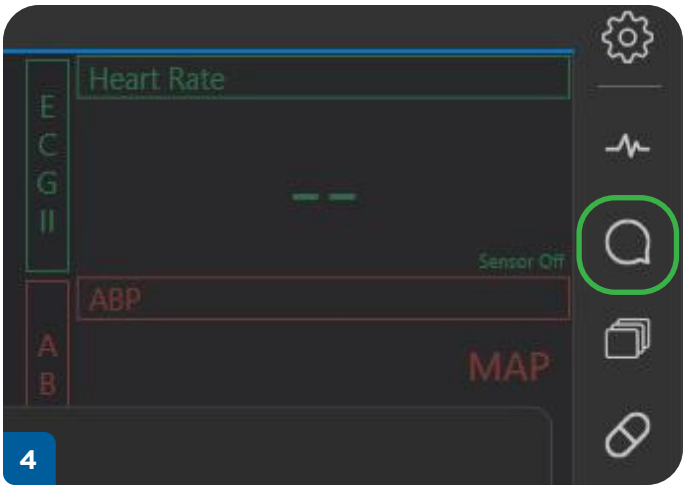
2. Switch to the **Audio: Talk** icon to speak as Pediatric HAL.



3. Click the **Audio: Full Duplex** icon to speak and listen simultaneously in real-time. Pediatric HAL's jaw moves as you talk through the microphone.

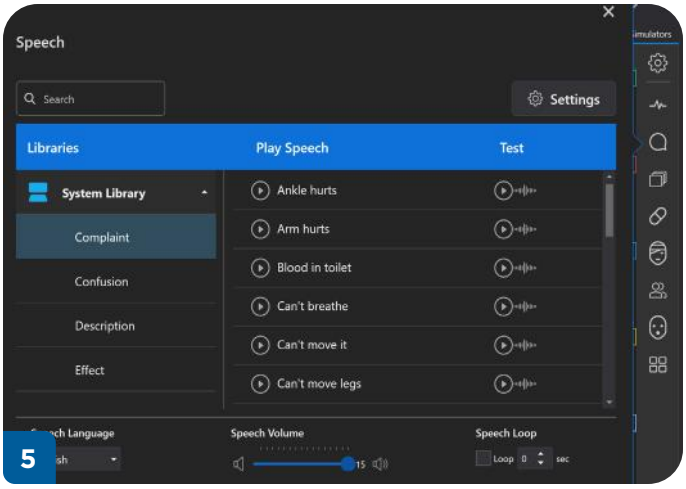


4. Alternatively, Pediatric HAL also features a variety of preprogrammed speech items. To access these items, click on the **Speeches** icon on the far-right vertical toolbar.



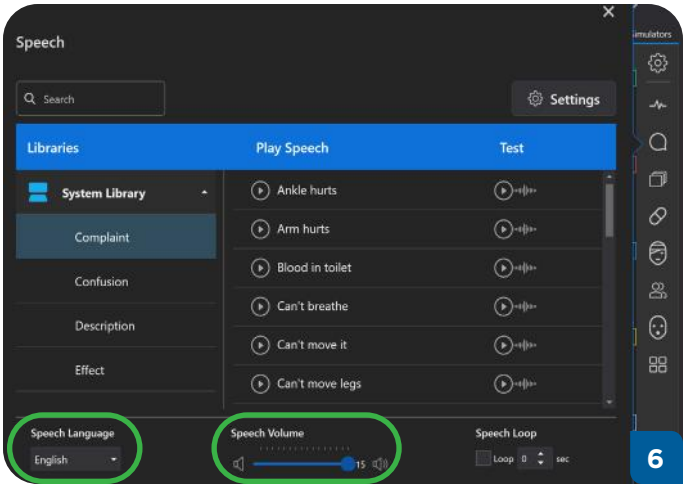
5. Pediatric HAL's jaw will automatically move with the selected preprogrammed speech items.

- Speech item system library includes complaints, confusion, descriptions, and more.



6. Pediatric HAL's volume can be adjusted by using the **Speech Volume** slider that can be found at the bottom-middle of the **Speech** tab.

7. Pediatric HAL also speaks several languages which include English, French, Polish, and Finnish. They can be found at **Speech Language** at the bottom-left of the **Speech** tab.

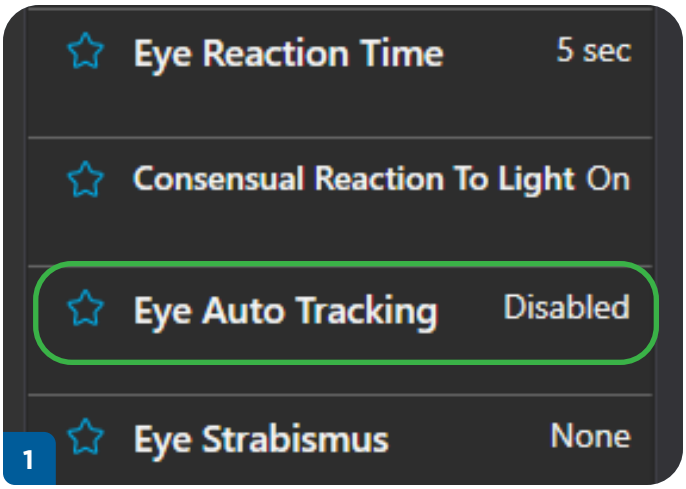


3.3 OCULAR

3.3.1. Tracking Eyes

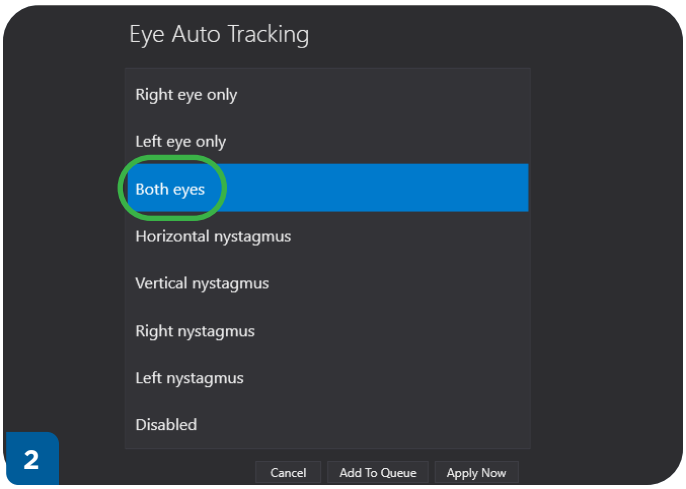
Pediatric HAL S2225 features realistic tracking eyes that can be used for more complete patient assessments. The eyes can be used to stimulate stroke, head trauma, drug use, disease, cranial nerve impairment, and other brain/muscle impairments.

1. To enable tracking eyes, select **Eye Auto Tracking** in the **Ocular** section.



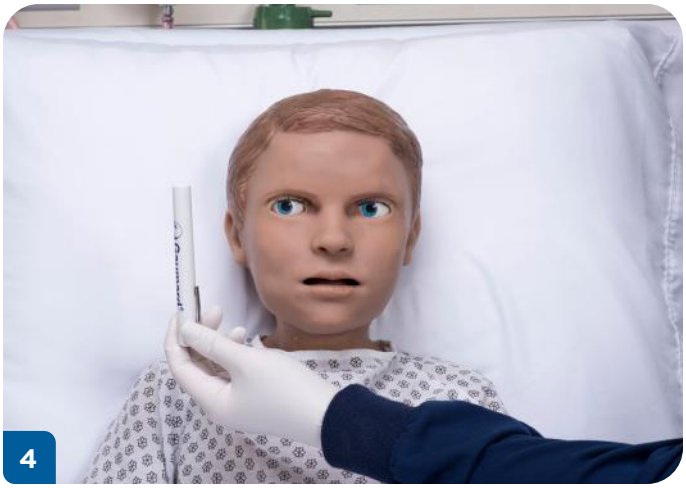
When activating the **Eye Auto Tracking** feature, ensure that objects are clear from the eyes and forehead of Pediatric HAL.

2. Click **Both eyes** to activate tracking for both eyes.



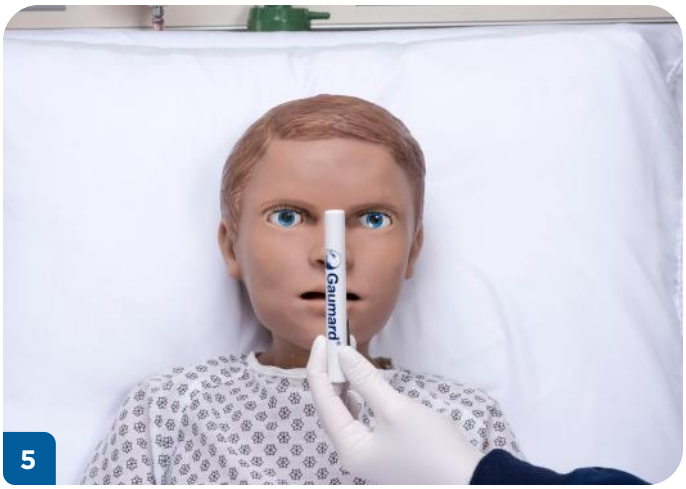
3. Stand in front of Pediatric HAL and place a pen or finger 6″ (15.2 cm) from his face.

4. Move the pen or finger side to side in line with his eyes and within the width of Pediatric HAL's face.



5. Place pen or finger to the center of his eyes and close to Pediatric HAL's face. Subsequently, his eyes will become crossed in concentration with the pen/finger.

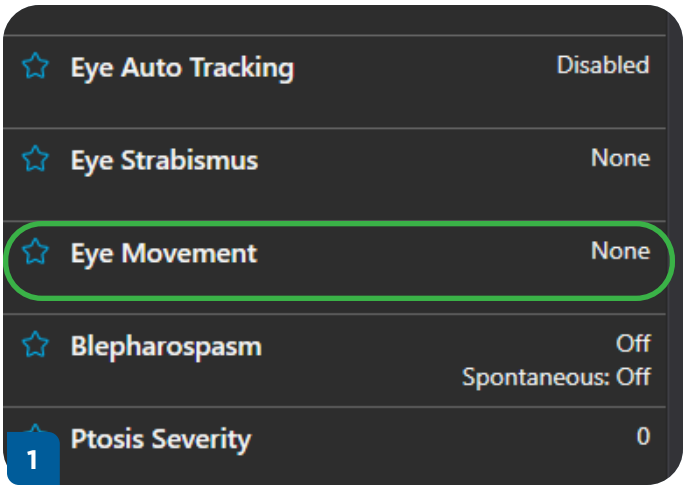
Automatic Tracking only moves Pediatric HAL's eyes horizontally. To activate vertical movement as well, refer to the "3.3.6. Eye Movement Joystick Control" on page 60 this user guide.



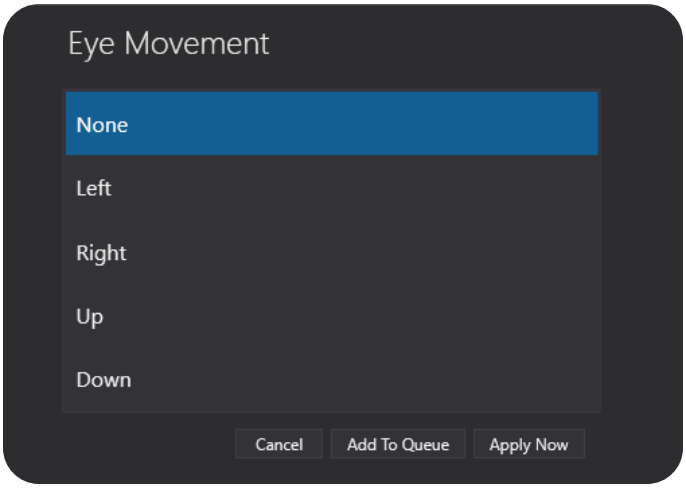
3.3.2. Eye Movement

Pediatric HAL is capable to hold static positions for each set of eye positions including left, right, up, down.

1. Select **Eye Movement** from the **Ocular** section and choose a static eye position.

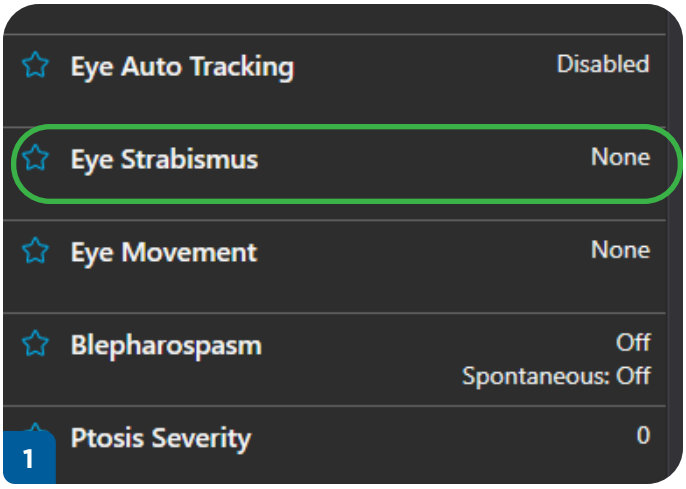


If **Automatic Tracking** is still active, then eye movements will continue to be tracked while a static eye position is chosen.

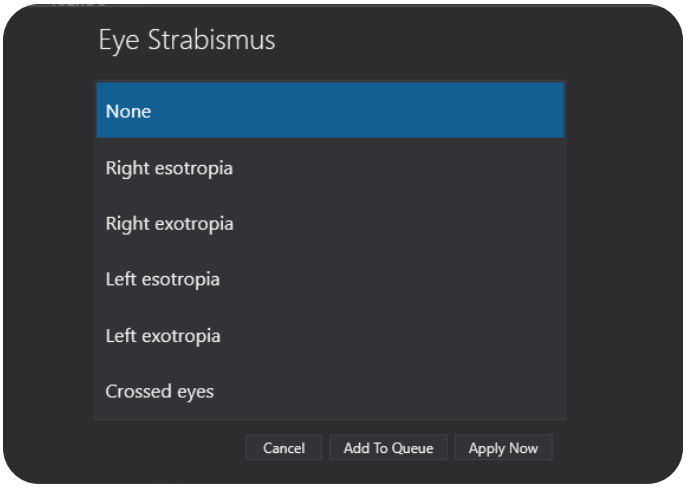


3.3.3. Strabismus

Pediatric HAL has the ability to mimic Strabismus which is a condition that involves the state of having crossed eyes. Patients who have strabismus have issues involving not being able to keep a regular ocular alignment. Instead, where the eyes' muscles should normally work together to keep both eyes pointing in the same direction, strabismus involves the eyes being misaligned.



1. To activate strabismus, select **Eye Strabismus** within the **Ocular** section.

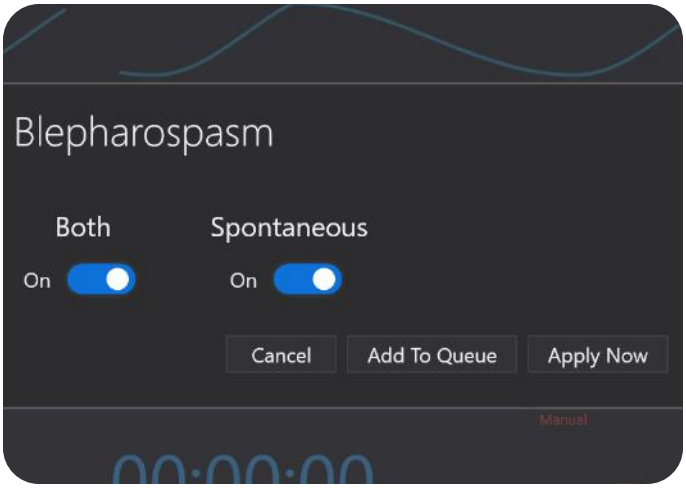


Strabismus will remain active for all eye movements including **Automatic Tracking** and eye movements triggered by Joystick Control.

3.3.4. Blepharospasm

1. Select **Blepharospasm** within the **Ocular** section.

2. Check **Spontaneous** to cause twitching to occur at random intervals.



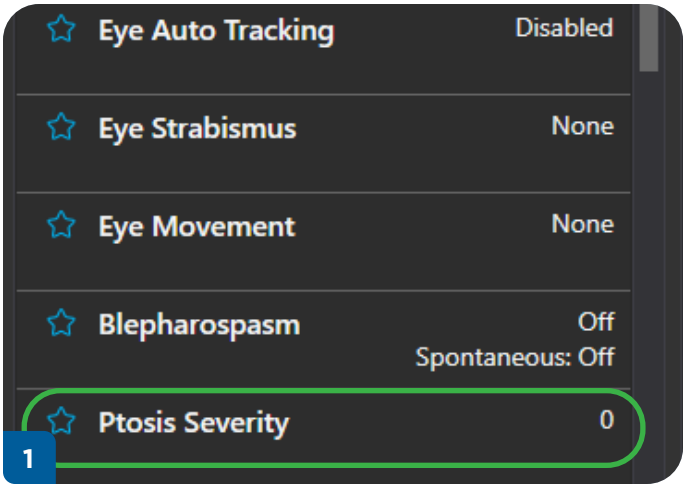
Blepharospasm can operate simultaneously with any other eye states.

3.3.5. Ptosis

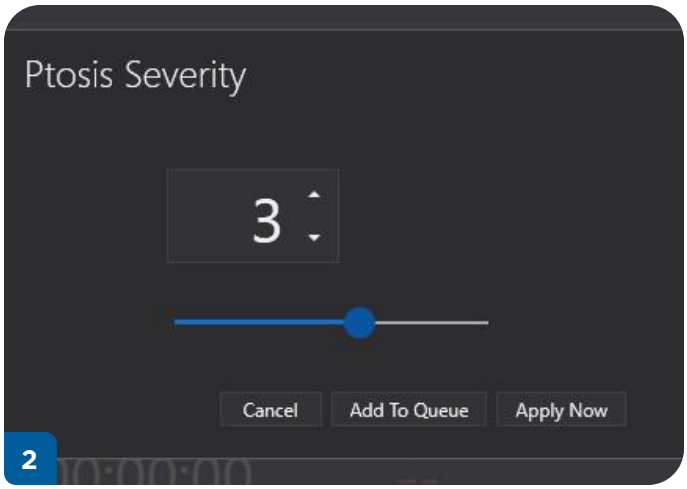
Pediatric HAL has the ability to mimic Ptosis. In a real clinic, a patient may have the condition where their upper eyelid droops over the eye and might even be severe enough to completely block their normal vision. Some people may be born with ptosis, or it can occur later in life if the muscles/ligaments that raise the eyelid are weakened, whether that occurs by age or injury.

To activate ptosis on Pediatric HAL:

1. Select **Ptosis Severity** within the **Ocular** section.

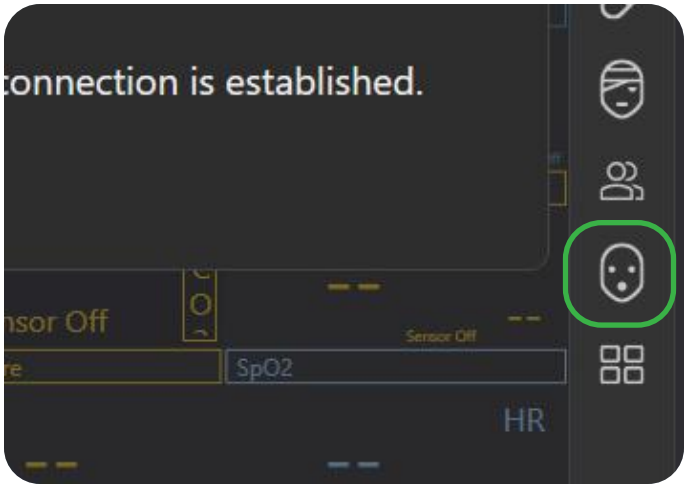


2. When the setting is set to **0**, the feature is turned off and HAL's eyelids are at normal setting. Adjusting the slider to a higher value will increase the severity of the eyelid.



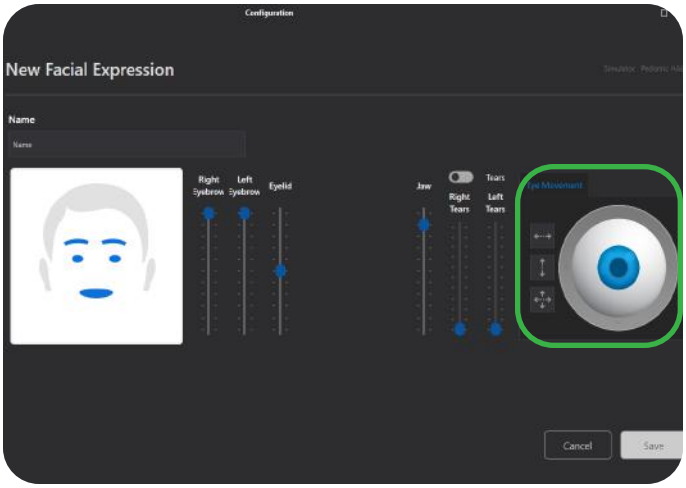
3.3.6. Eye Movement Joystick Control

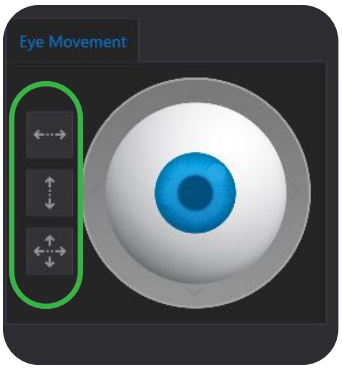
- Pediatric HAL features the capability of having his eye movements manually controlled by using the Joystick Control.
- To activate the Joystick Control feature, select the **Facial Expressions** icon on the far-right vertical toolbar.



- The Real-time Eyes Control will appear with a diagram of the current eye position.
- Select the **arrow icons** on the left to move the eyes in both the horizontal and vertical directions.

These controls can be combined with Automatic Tracking or preprogrammed movements, however, tracking will only be activated while using the vertical control. The horizontal movements will disable tracking.



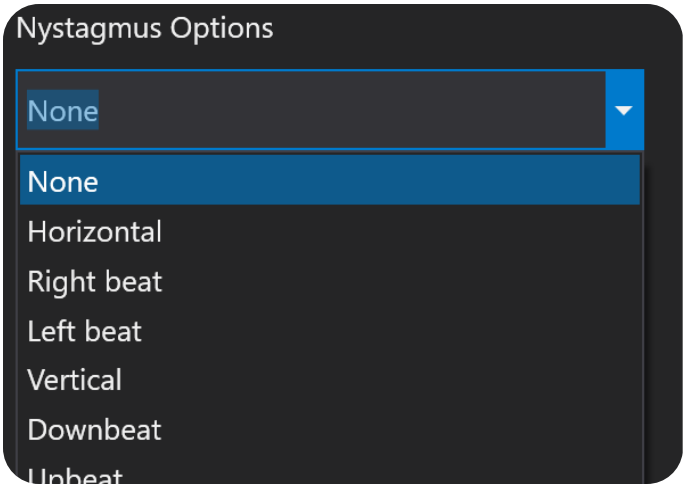


3.3.7. Nystagmus

Pediatric HAL can activate **Nystagmus**. In real life assessment, the illusory sensation, oscillopsia, involves the involuntary (side-to-side, up and down, or circular) movement of the eyes.

To simulate nystagmus on Pediatric HAL:

1. Locate **Nystagmus Options** on the **Facial Expressions** tab. Upon pressing the small arrow key, a drop-down menu will be opened with a list of options.

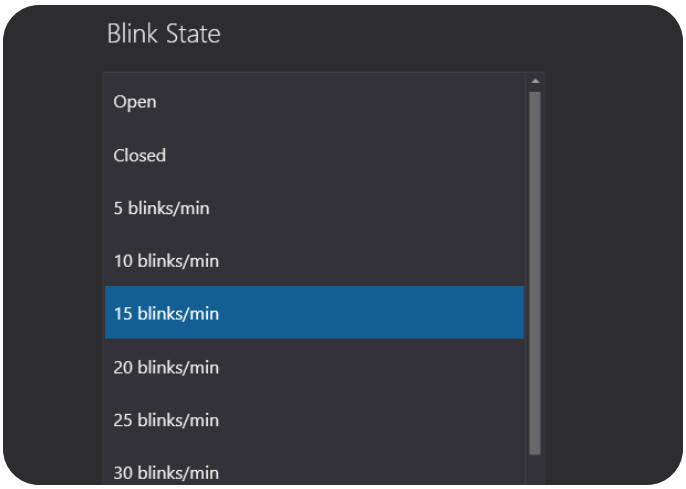


3.3.8. Blinking

Pediatric HAL's blinking has variable rates and states that can be selected by the user.

To activate Pediatric HAL blinking feature and manipulate his blink rate:

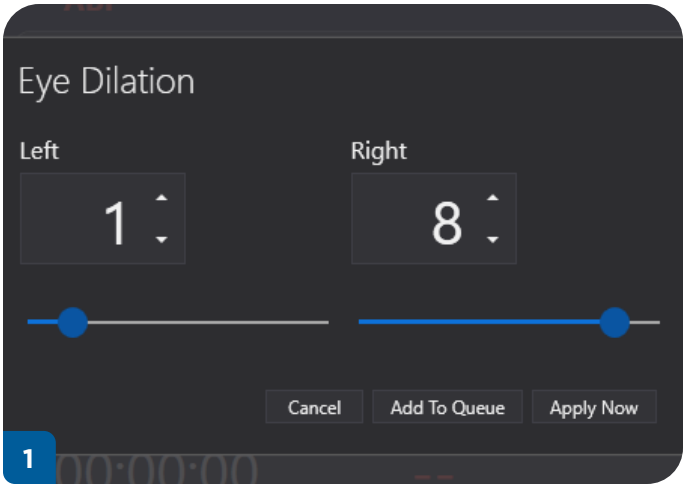
1. Select **Blink State** in the **Ocular** menu to open the menu for the varied blinking options.



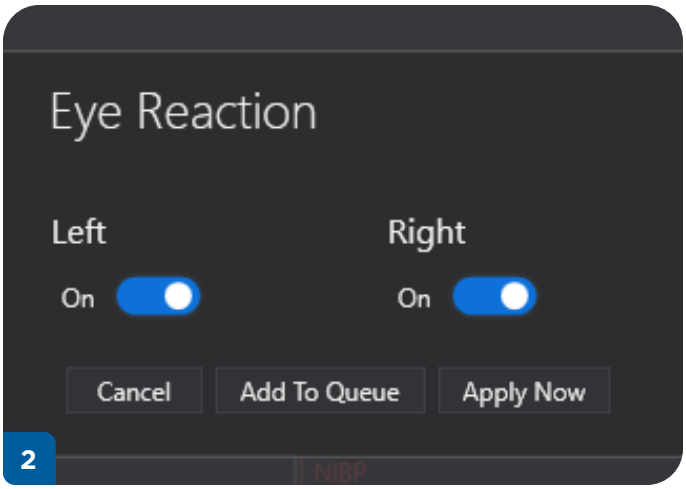
3.3.9. Pupil Dilation

Pediatric HAL has the feature to allow him to automatically constrict and dilate his pupils whenever a pupil is stimulated.

1. Select **Eye Dilation** from the Ocular section and adjust the pupil dilation for each eye by adjusting the sliders with a range from 0-9.



2. To turn off the pupil dilation for either the left or right pupil, select **Eye Reaction** from the **Ocular** section to make the eyes react independently.



3.4 AIRWAY

3.4.1. Nasal and Oral Intubation

Pediatric HAL has an anatomically accurate oral cavity and airway that supports a multitude of functions. He can pair together airway complications and throat sounds for realistic intubation scenarios that support the use of standard adjuncts like endotracheal tube (ET), supraglottic airway devices, oropharyngeal airways (OPA), and nasopharyngeal airways (NPA).

The Pediatric HAL Airway supports BVM (Bag Valve Mask), nasal/oral intubation, and suctioning with the following medical devices:

- Endotracheal (ET) tubes
- Nasogastric (NG) tubes
- Laryngeal Mask Airways (LMA)

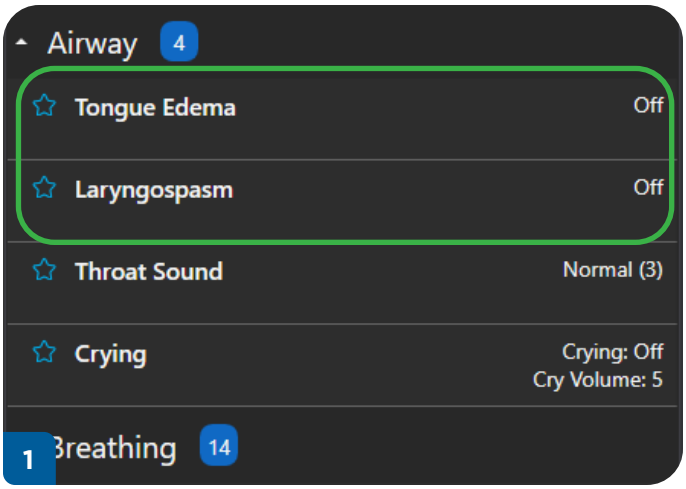
Recommended Device Sizes:

Procedure	Recommended Device Size
Intubation (Blade size)	2 MAC or MIL
LMA	2
Nasal Intubation	10 Fr
Oral Intubation	5.5 Fr (uncuffed)
NG/OG tube	10 Fr
Tracheal tube	4.5 mm (outer diameter)

3.4.2. Airway Complication

Use the software controls to enable Pediatric HAL's airway complication features (Tongue Edema and/or laryngospasm) to make intubation more difficult.

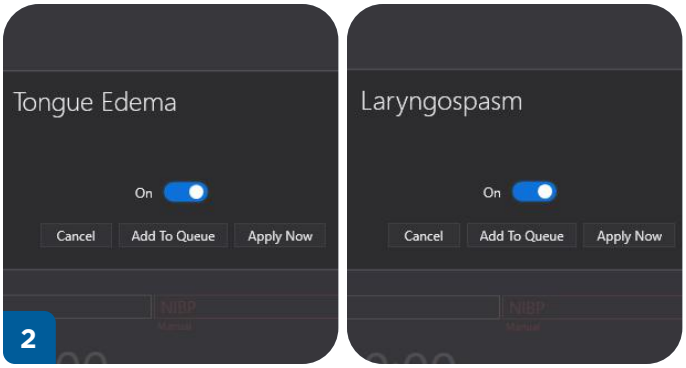
1. Select the desired airway complication (**Tongue Edema** or **Laryngospasm**) within the **Airway** menu



Tongue Edema simulates a swollen tongue on Pediatric HAL. This airway complication feature may be seen on a patient after occurences such as infection or allergic reaction.

Laryngospasms on Pediatric HAL will simulate the spasm of the two fibrous bands that are the vocal cords.

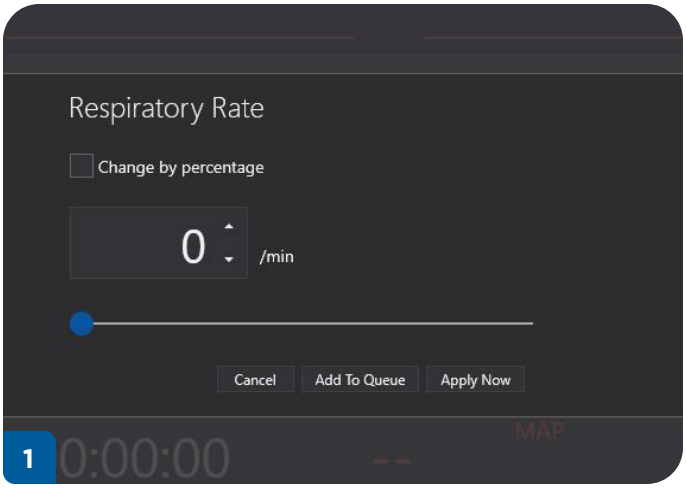
2. Select the **ON** option to enable the feature.



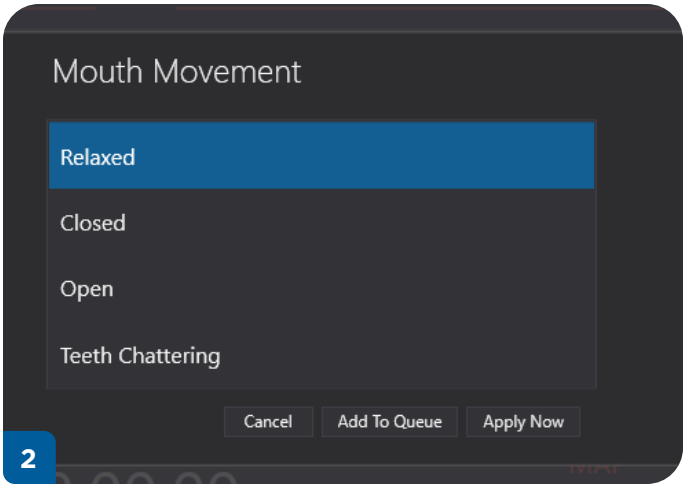
Activating an airway complication will stop chest rise.

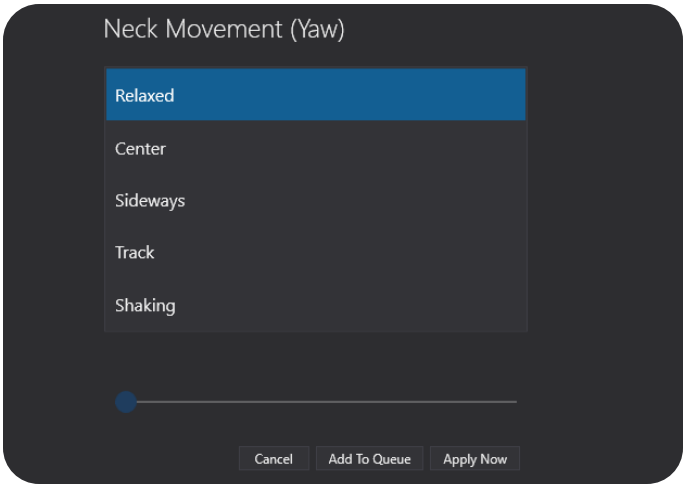
3.4.3. Intubation

1. Navigate to the **Breathing** section and set the **Respiratory Rate** vital to **0** in the Airway menu.



2. In the Cephalic menu, set the **Mouth Movement** to **Open** and the **Neck Movement (Yaw)** to **Relaxed**.





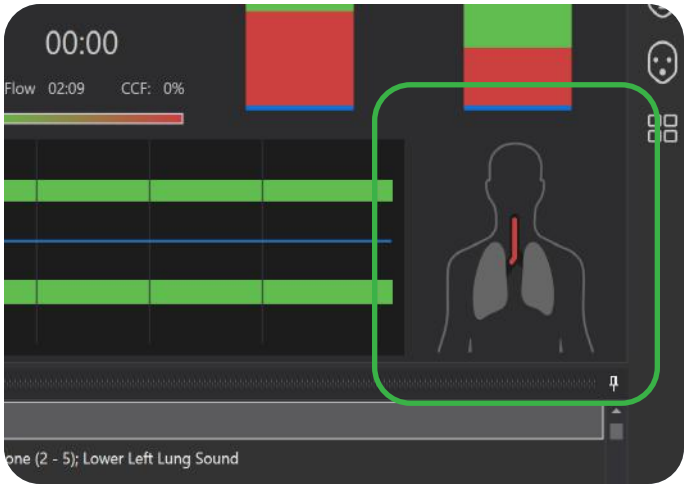
3. Lubricate the airway adjunct with mineral oil.

4. Intubate the simulator.

3.4.4. Intubating Incorrectly

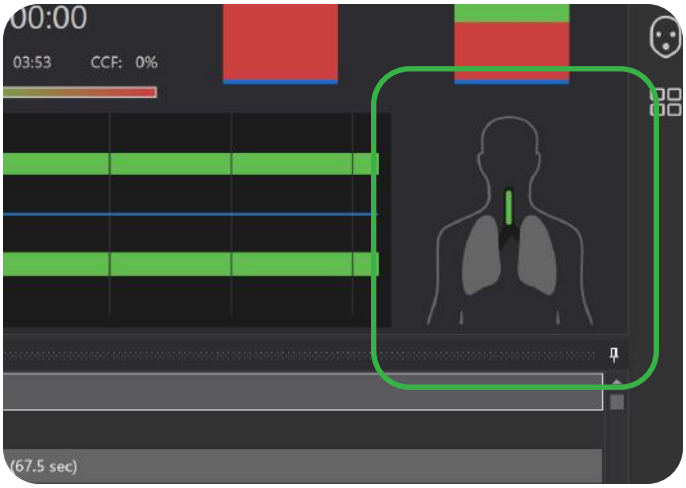
Lubricate the endotracheal tube using mineral oil before intubation. Do NOT introduce liquids into the airway or spray mineral oil into the airway. Doing so may cause permanent damage to the system.

During the intubation process, UNI will let the user know should incorrect intubation occur. When performing intubation, the sensors in the airway will detect the placement of the endotracheal tube. If the tube is inserted too deep, the left lung will automatically be disabled to demonstrate right mainstem intubation.



An update on the **Log** tab will appear making note of esophageal intubation once the ventilation process begins. If the tube is corrected to its proper depth, the left lung will be enabled to allow for chest rise. All activity in regards to intubating Pediatric HAL will be recorded in the UNI log as well to review during debriefing.

In UNI, click the **CPR** tab to view the visual graphic of Pediatric HAL's airway and intubation sensor that detects endotracheal tube placement.



3.4.5. Gastric Distension

Pediatric HAL has the ability to simulate a gas-related complaint or excessive ventilation while intubated in the esophagus such as gastric distention. This enlargement of the stomach area appears in Pediatric HAL similar to real gastric distention as it increases the abdominal girth, or the area between your hips and chest.

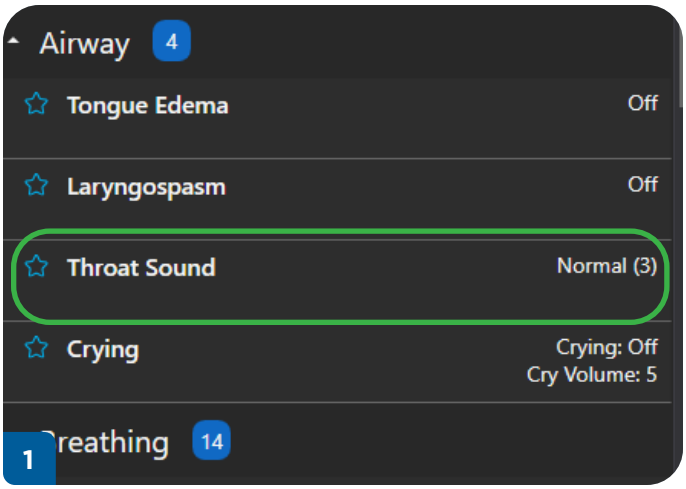
When gastric distension occurs, Pediatric HAL will resolve itself or may be assisted by the provider by placing pressure on the simulator's belly.

3.4.6. Throat Sounds

Pediatric HAL can produce throat sounds to mimic patients with breathing issues. Pediatric HAL has normal and abnormal throat sounds that include different types of stridor which can be selected to give auditory clues for assessments.

To select throat sounds and adjust their volume:

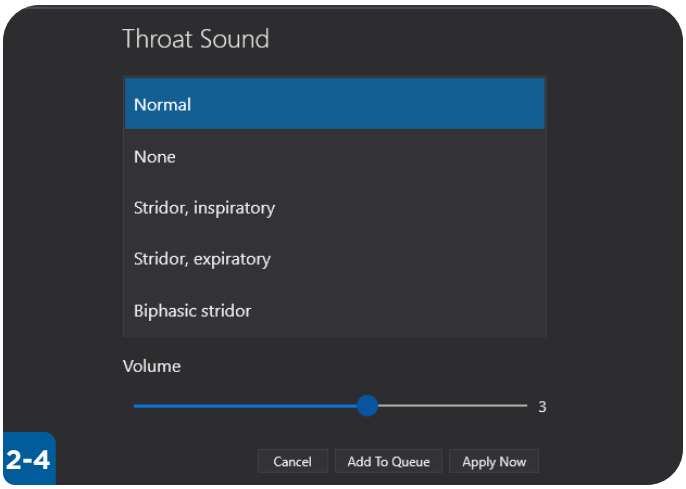
1. Click **Throat Sounds** in the **Airway** section.



2. From the available options, select which type of **Throat Sound** to activate for Pediatric HAL.

3. Use the **Volume** slider to increase or decrease the volume level of the selected throat sound.

4. Click **Apply Now** to immediately apply the selection to Pediatric HAL or click **Add to Queue** to load at a later time.



3.4.7. Surgical Airway

Pediatric HAL has a versatile surgical airway that supports:

- Cricothyrotomy
- Tracheostomy
- Retrograde intubation

The surgical airway is composed of a layer of a Criocthyroid membrane and then the trachea cover.

The user should keep at least one of their surgical airways intact to perform ventilation exercises.

3.4.8. Replacing the Surgical Airway Insert

It is recommended to replace the Surgical Airway insert after it has been punctured. If a punctured surgical airway is not replaced it will affect Pediatric HAL's ability to be properly ventilated whether using a BVM or when placed on the mechanical ventilator.

Ensure that the simulator is on a clean, flat surface.

1. Gently remove the trachea cover.

2. Gently remove the simulated cricothyroid membrane.

3. Insert the new cricothyroid membrane.

4. Replace the trachea cover.

3.5 BREATHING

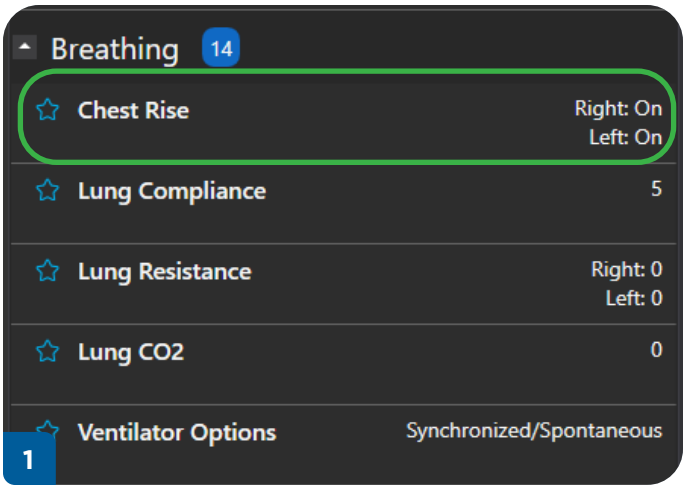
Pediatric HAL has an impressive range of breathing capabilities that simulates life like chest rise, pneumothorax, hemothorax, different respiratory patterns, lung sounds, oxygen saturation, mechanical ventilator options, and vitals waveforms.

Pediatric HAL's realistic bilateral chest rise allows providers to visually assess breathing. HAL's chest rise can also be controlled to independently stop one side of the chest from rising to simulate a variety of breathing conditions. In particular, HAL can simulate a pneumothorax on his left side only by selecting this option in UNI 3 as well as utilizing the **Needle Decompression** insert located on his left side of the chest.

3.5.1. Chest Rise

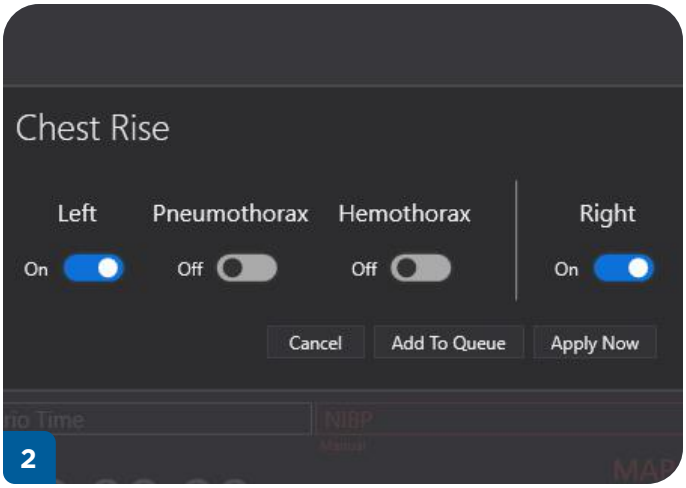
By default, Pediatric HAL presents normal, bilateral chest rise but this can be adjusted to present unilateral chest rise. The simulator's lungs can be enabled or disabled independently.

1. Select **Chest RIse** in the **Breathing** section.



2. Click on the switch for **Left** and/or **Right** to turn chest rise **ON** or **OFF**.

When the switch is highlighted blue this indicates that the feature is ON. When the switch is greyed out this indicates that the feature is OFF.



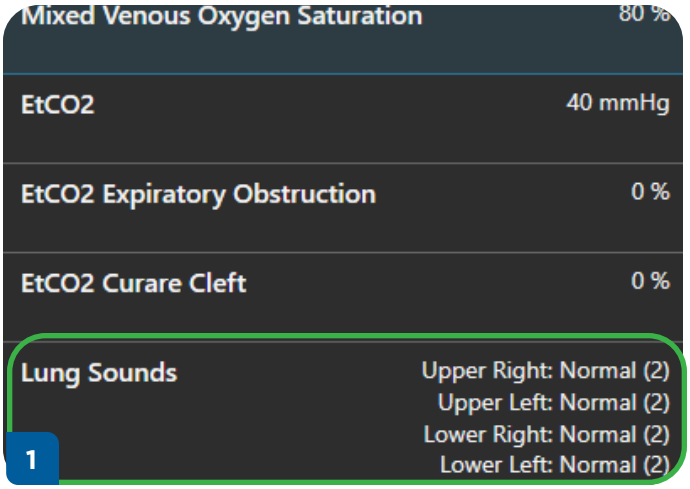
3.5.2. Lung Sounds

Pediatric HAL has the features to generate both anterior and posterior sounds. The available lung sounds include normal, none, wheezing, inspiratory squeaks, various crackles, and stridor. He can also be auscultated with a stethoscope.

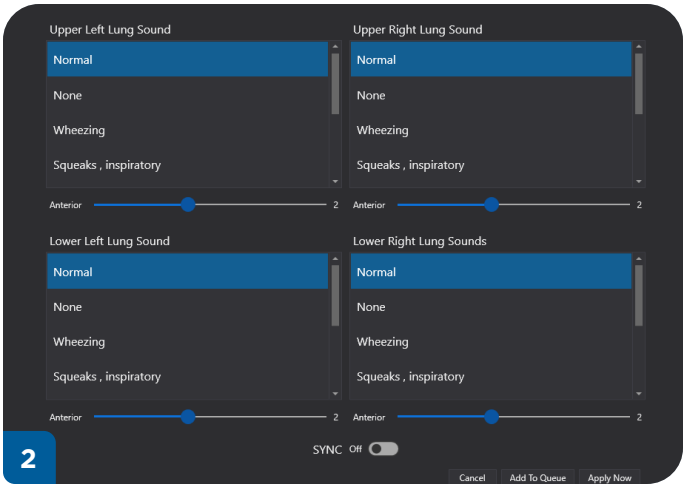
The simulator has 2 anterior lung sounds and 4 posterior lung sound sites. The posterior lung sounds are activated when the simulator is seated.

To activate lung sounds in UNI:

1. Select **Lung Sounds** in the **Breathing** section and select the desired lung sound.



2. Once the lung sound is selected, the volume for both the anterior and posterior positions can be adjusted by using the slider.



3.5.3. Real CO_2 Exhalation

To mimic realistic breathing, Pediatric HAL has the ability to exhale real Carbon dioxide (CO_2). Once installed, the amount of CO_2 can be controlled by changing the Lung CO_2 level in UNI.

Refer to the "Real CO_2 Exhalation" section for further information about the CO_2 feature.

Gaumard does not ship CO_2 cartridges but they are available for purchase at your local bicycle shops or hardware stores.

3.5.4. Installing the CO_2 Cartridge

1. Unzip the back of the lower left leg.

2. Remove the CO_2 regulator.

3. Align and insert a new cartridge into the CO_2 regulator.

4. Screw the CO_2 cartridge into the regulator until it is tightly secured.

Once you have started inserting the cartridge, do NOT stop or attempt to unscrew the cartridge. The regulator will puncture the cartridge seal during the tightening process and it will begin to feel cold to the touch. Continue to tighten the CO_2 cartridge until it is fully secured. Be sure to NOT over-tighten.

5. When the cartridge is firmly screwed onto the regulator, reinsert the CO_2 system into the back of the left leg and zip it closed.

Once a CO_2 cartridge is installed, use the software controls to adjust the volume of CO_2 exhaled.

The simulator can also be operated without a CO_2 cartridge installed. A virtual CO_2 value is displayed on the virtual monitor.

3.5.5. Lung CO_2

After the cartridge is installed, adjust the Lung CO_2 parameter in the Breathing section to increase or decrease the volume of exhaled CO_2.

To increase the amount of CO_2 exhaled, adjust the range higher (maximum 10). To decrease the amount of CO_2 exhaled, adjust the range lower (minimum 0).

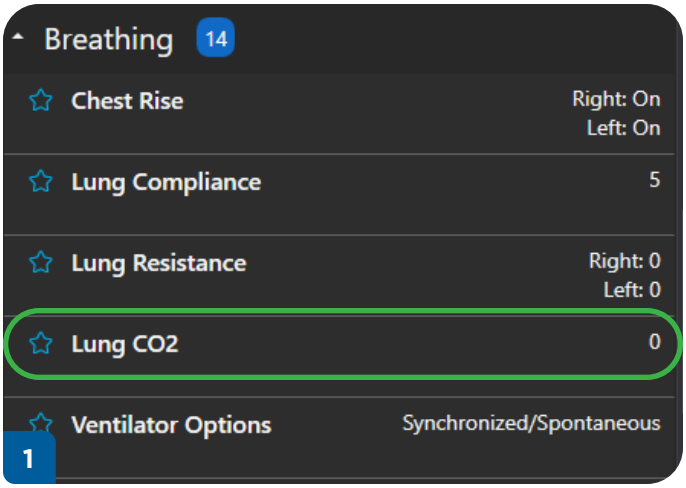
3.5.6. Removing the CO_2 Cartridge

The CO_2 cartridge used for the Lung CO_2 will eventually run out and will require replacing. It is always best practice to confirm there is no CO_2 left in the CO_2 cartridge before removing it and replacing it with a new one. CO_2 levels in the cartridge may be checked either by connecting Pediatric HAL to a capnometer and receive a reading of 0 mmHg or by turning Pediatric HAL OFF to disconnect his lower right leg to test for CO_2.

Before replacing the cartridge, ensure that the cartridge is empty. To deplete the CO_2 contents, turn on CO_2 in UNI until it is no longer detected.

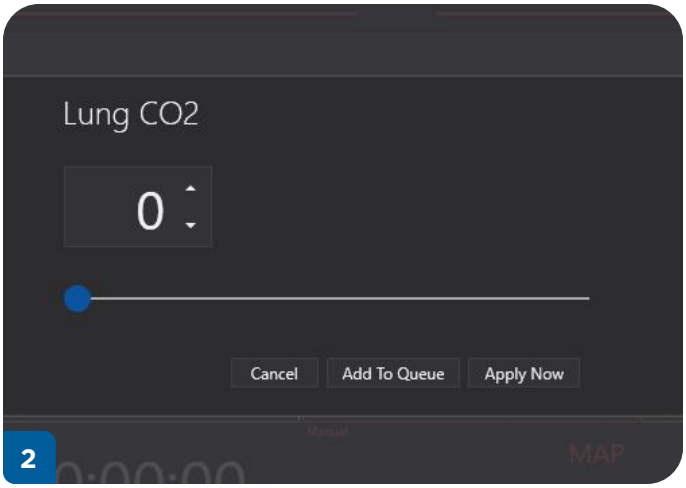
To check Pediatric HAL for left over CO_2:

1. In the Breathing section, select Lung CO_2.



2. To deplete the CO_2 cartridge faster, raise the level of the Lung CO_2 to 10. Leave setting applied until CO_2 is no longer detected. Then return Lung CO_2 to 0.

To be sure of depletion, input the intubation tube and place HAL in the capnography monitor.



3. Once the CO_2 cartridge is depleted, unzip the back of the left leg.

4. Remove the CO_2 assembly and unscrew the empty CO_2 cartridge.

Keep firm grip on the cartridge that is being removed. If the cartridge is still holding CO_2, it may turn projectile.

5. Reinsert the empty CO_2 regulator back into the left leg.

3.5.7. Mechanical Ventilation Support

The Pediatric HAL has the feature to support real mechanical ventilation with programmable variables. This feature includes lung compliance, bronchi resistance, and respiratory effects for weaning/ liberation.

Pediatric HAL supports the following modes of ventilation:

- AVC
- SIMV
- CPAP
- PVC
- PSV and more

Pediatric HAL can hold therapeutic levels of PEEP up to 20 cmH20. He can withstand PIP levels of 60 cmH20.

Always follow your manufacturer's guidelines and precautions of your mechanical ventilator and any other medical devices.

Do NOT introduce liquids, humidified gases, oxygen, or administer aerosol medications into the airway of Pediatric HAL. Moisture in the airway will damage the simulator's internal sensors and mechanics.

Pediatric HAL's operating limitations are consistent with that of a real patient. Treating Pediatric HAL in a manner that would seriously harm a real patient is likely to result in damage to the internal mechanics. Always treat Pediatric HAL like a real patient.

- Pediatric HAL's theoretical weight is 15.7 kg (34.6 lbs.) which may be a dimension needed for respiratory therapy calculations.
- The flow/pressure trigger rates on the mechanical ventilator may need to be adjusted so it can easily recognize HAL's inhalations. The suggested settings on the mechanical ventilator are:
  - Flow ≤ 3 Lts/min, or
  - Pressure ≤ 3 cmH2O
- Place Pediatric HAL in a clinical state that requires mechanical ventilation.
- Always remember to properly lubricate any adjunct used to intubate Pediatric HAL with his provided MINERAL OIL lubricant.

3.5.8. Ventilator Options

In the **Breathing** section within UNI, Pediatric HAL has the feature to decide between different ventilator options. When helping a troubled patient to breathe or raise oxygen levels, they may receive ventilation assistance to aid in the breathing process until the patient improves enough or no longer needs it.

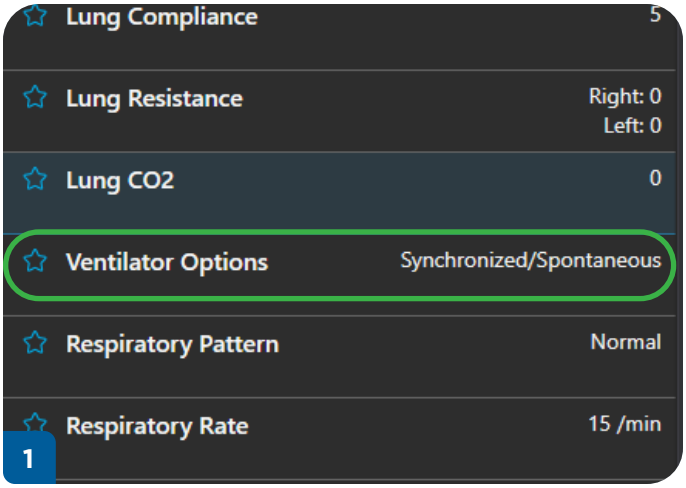
The three main ventilator options showcased on Pediatric HAL are:

- **Synchronized/Spontaneous Breathing** - This setting is marked as default for Pediatric HAL. It allows for the control by the user to change/assist Pediatric HAL's breathing to a manual device or a mechanical ventilator.

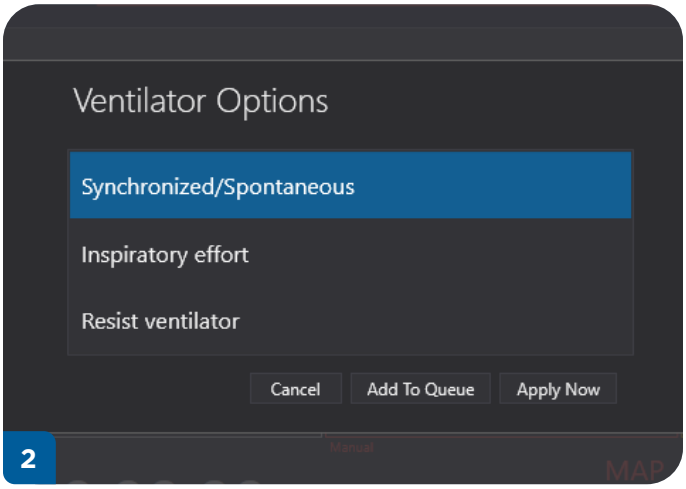
- **Inspiratory Effort** - This setting refers to the user entering a respiratory rate on the UNI software and Pediatric HAL, in turn, recognizing and triggering the mechanical ventilator at that rate to help complete the breath.

- **Resist Ventilator** - With this option, Pediatric HAL's breathing will not be synchronized with the ventilator, but rather involve Pediatric HAL taking full breaths for every respiration.

1. To activate or switch the **Ventilator Options** from **Synchronized/Spontaneous** breathing (default option), click **Ventilator Options** within the **Breathing** section on UNI.



2. Choose the desired ventilator option.



3.5.9. Synchronized/Spontaneous Breathing

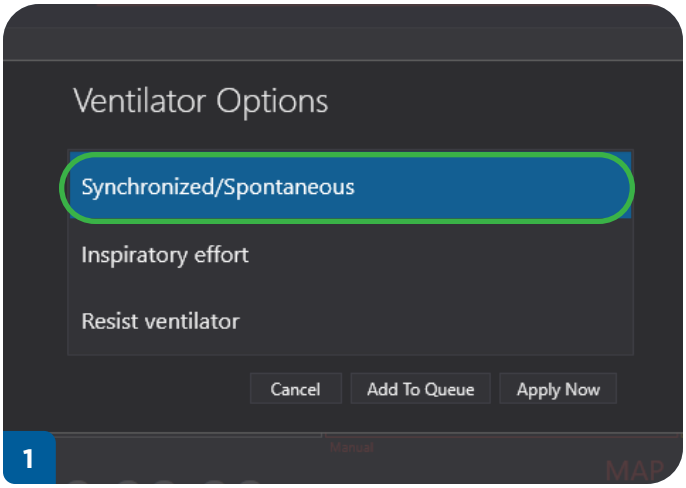
Synchronized/Spontaneous breathing is a feature that Pediatric HAL makes use of by default. This change from spontaneous breathing to synchronized breathing happens without direct change from the user on UNI.

Spontaneous breathing refers to Pediatric HAL's normal respiratory rate; it is his normal state where he breaths on his own, despite the respiratory rate given by the user. During this time of spontaneous breathing, if the simulator detects any kind of assisted ventilation such as BVM or mechanical ventilation, he will automatically switch from spontaneous breathing to synchronized breathing.

Synchronized breathing means that Pediatric HAL is attempting inspiratory effort by drawing in a small breath which is completed by am assisted ventilation.

Pediatric HAL can recognize whether he's being ventilated. If 1 breath is given to the simulator, he will not transition from spontaneous breathing to synchronized. However, if he is given 2 breaths in the span of 8 seconds (which would amount to 15 breaths per minute), the transition will occur as Pediatric HAL can recognize assistance at that rate.

1. In the **Breathing** section, select **Synchronized/Spontaneous** in **Ventilator Options**,



The simulator will recognize 20 seconds of stopped synchronized breathing before returning back to its default spontaneous breathing.

2. In the **Breathing** section, select **Respiratory Rate** and adjust the rate per minute to **0**.

3. Intubate the simulator.

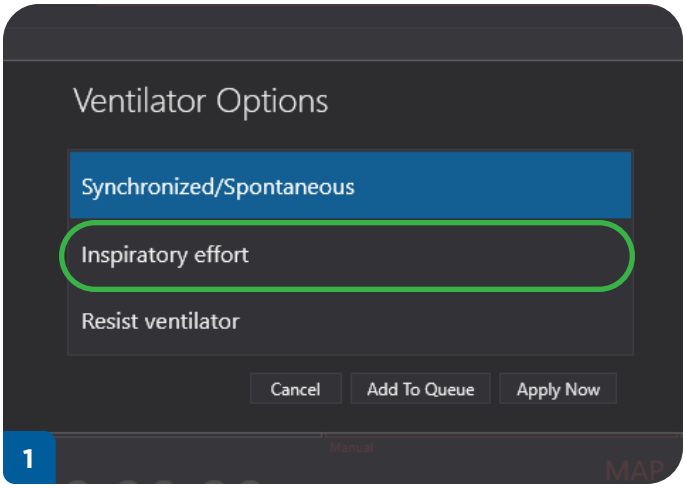
Ensure that the ETT is always lubricated before intubation so as to not damage the simulator.

3.5.10. Inspiratory Effort

Inspiratory Effort functions in a similar manner as synchronized breathing, however, its function is activated directly on UNI by choosing it as the new ventilator option.

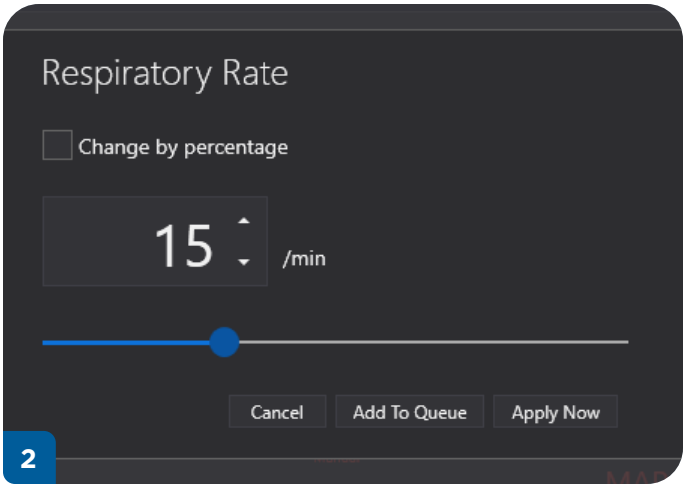
Once Pediatric HAL is in this **Inspiratory Effort** state where he is attempting to draw in small breaths, the mechanical ventilator will help Pediatric HAL to finish that breath so that it is made complete. No matter which respiratory rate is assigned to the simulator, he will trigger the ventilator with his short breaths, and the ventilator will complete that breath with the goal of helping him reach a consistent rate of 15 (or whichever rate the provider sets for the ventilator) breaths per minute.

1. In the **Breathing** section, select **Inspiratory Effort** in **Ventilator Options**,



2. In the **Breathing** section, select **Respiratory Rate** and adjust the rate to specify how many times per minute that the simulator will make an attempt to draw in a breath.

3. Set the mechanical ventilator to 0.3 lpm.



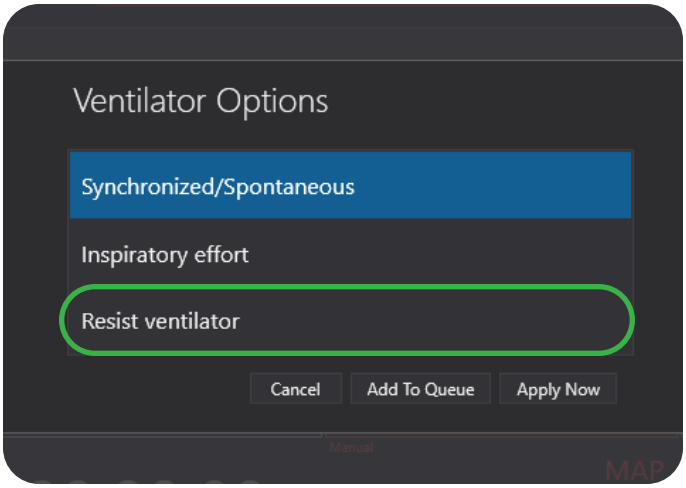
Despite which respiratory rate is chosen on UNI, the inspiratory breathing option will ensure that each breath is completed, and that additional breaths will be added to sum up to a sustainable 15 breaths (or whichever rate the provider sets for the ventilator) per minute.

3.5.11. Resist Ventilator

Pediatric HAL resisting ventilation is the ventilator option that will mimic a patient that is not given enough sedatives or paralytics.

In this simulation, Pediatric HAL creates resistance against the ventilator support, and as the assisted breathing is attempting to complete a breath for Pediatric HAL, the resistance from the simulator (which involves twitches and the shutting of his trachea) may increase the pressure on the ventilator.

1. In the **Breathing** section, set the **Ventilator Options** to **Resist Ventilator**.



3.5.12. Lung Compliance

Lung Compliance refers to the elasticity and surface tension of the lungs. In simple terms, lung compliance is how difficult or how easy it is for the lungs to expand and contract.

For example, let's say there is a patient with pulmonary fibrosis, a disease that scars the lungs resulting in thick, stiff lung tissue. In this case, since the lung tissue is very stiff this makes it harder for the lungs to expand thus making the patient very short of breath. These lungs would be considered to have a lower than normal compliance due to the difficulty of the lungs being able to inflate.

In relation to Pediatric HAL's UNI 3 setting, to mimic a set of "stiff" lungs or low compliance, set his **Lung Compliance** to a value lower than 4 (his default, normal compliance value).

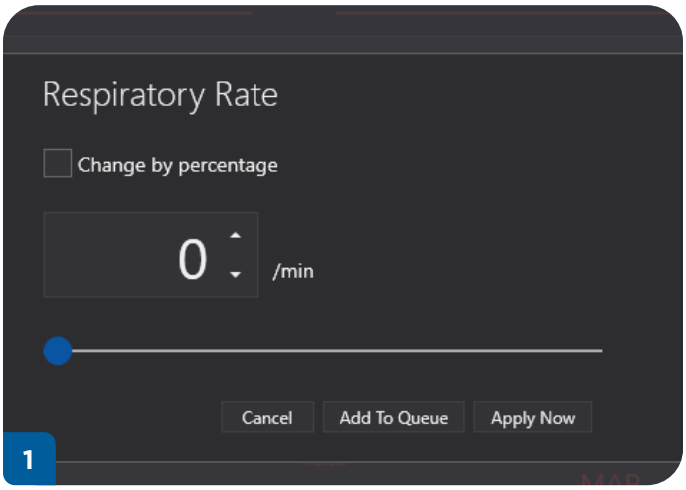
In another example, let's say there is a patient with emphysema, a condition where the inner walls of the air sacs (alveoli) weaken and rupture causing reduced elastic recoil of the lungs. These lungs have lost their shape and become "floppy", making them fairly easy to inflate (inhale) but difficult to deflate (exhale). These lungs would be considered to have a higher than normal compliance due to the decreased work needed to expand the lungs.

In relation to Pediatric HAL's UNI 3 setting, to mimic a set of "loose" lungs or high compliance, set his **Lung Compliance** to a value higher than 4 (his default, normal compliance value).

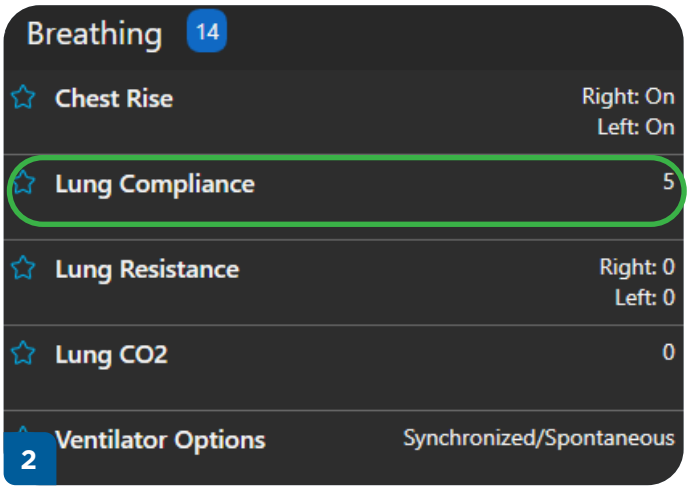
Changes to Pediatric HAL's **Lung Compliance** to mimic the principles given in these examples can be seen in the feedback provided when HAL is connected to a mechanical ventilator.

To change Pediatric HAL's Lung Compliance:

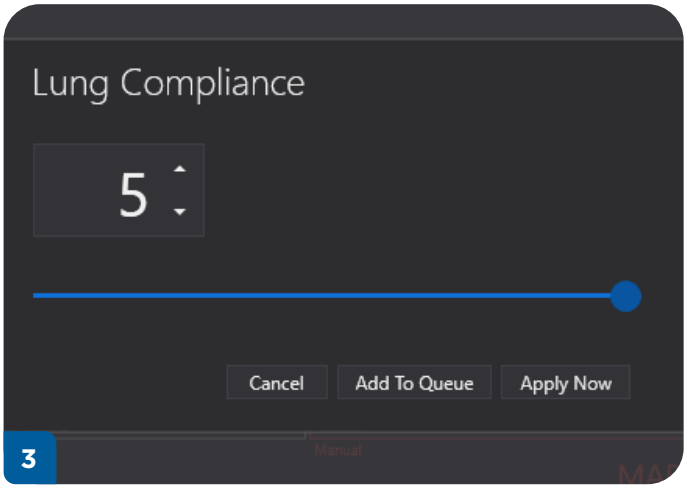
1. In the **Breathing** section, select **Respiratory Rate** and adjust it to **0 breaths per minute**,



2. In the **Breathing** section, select **Lung Compliance**.



3. Enter a numeric value or use the slider to change the level of **Lung Compliance**.



Pediatric HAL's default is set to a "normal" lung compliance at level 4. To simulate a low lung compliance, decrease Pediatric HAL's level of Lung Compliance. To simulate lung compliance, increase Pediatric HAL's level of Lung Compliance.

3.5.13. Lung Resistance

Lung resistance, more commonly known as airway resistance, is the resistance to flow of air caused by any friction with the airways. Resistance in an airway is inversely proportional to the radius of the airway. This means constricted airways, which have a smaller radius, have a higher airway resistance making it harder for air to flow through. Unconstricted, or healthy, airways have a larger radius that results in a lower airway resistance, making it easier for air to flow through.

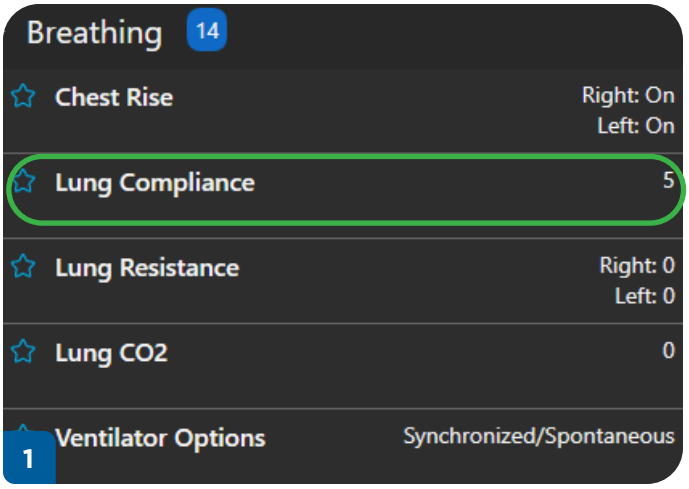
When changes are made to the anatomies that make up the conducting zone for air to pass through—which include the trachea, bronchi, or bronchioles—it can affect airway resistance and, ultimately, the breathing process for a patient. Take an asthma attack, for example, where the bronchioles constrict and spasm. The constriction and spasming of the bronchioles reduces the radius of the airway and thus increases the resistance, making it difficult for a patient to get air through their airway.

After an asthma attack, the bronchioles relax and go back to their normal, healthy state with a larger radius. The larger radius of the airway decreases the resistance and allows air to flow through easier than before.

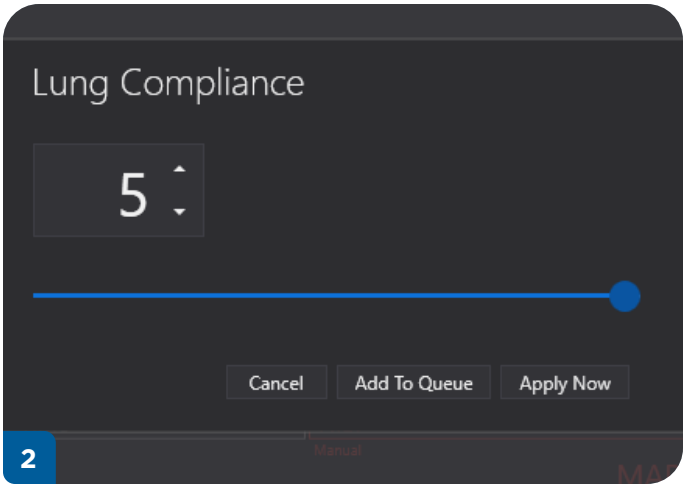
In relation to Pediatric HAL's UNI 3 setting, the independent levels of **Lung Resistance** range from 0 - 9, where level 0 exhibits an unconstricted airway and level 9 simulates a totally obstructed airway that shuts off HAL's breathing. To mimic the example of an asthma attack, or other airway conditions, increase the level of **Lung Resistance** above 0 (his default, normal lung resistance value). To simulate recovery from an asthma attack, set HAL's **Lung Resistance** to a lower level or a level of 0 for a normal, healthy airway.

To change Pediatric HAL's Lung Resistance:

1. In the **Breathing**, select **Lung Resistance**.



2. Enter a numeric value or use the slider to change the level of **Lung Resistance**.



Pediatric HAL's default is set to a "normal" lung resistance at level 0. To simulate increased lung resistance, increase Pediatric HAL's level of Lung Resistance to level 9, which simulates a totally obstructed airway.

3.5.14. Hemothorax Insert Setup

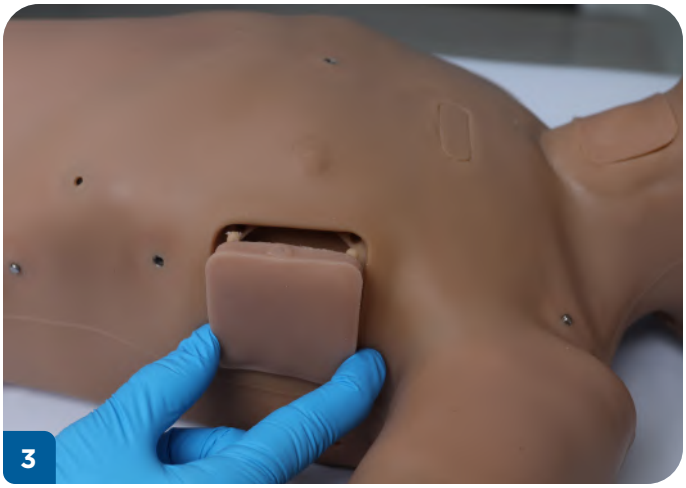
As the hemothorax is when blood collects between the chest wall and the lungs, Pediatric HAL can simulate a damaged hemothorax that requires a chest tube insertion. For instance, a patient, after experiencing some sort of injury to the chest, may leak blood if the blood vessels within the chest cavity are damaged. Such trauma to the chest might require emergency medical attention and depending on the condition's severity, one may need a chest tube inserted or even surgery.

To setup the hemothorax site for chest tube insertion:

1. Assemble the hemothorax syringe by first removing the syringe cap.

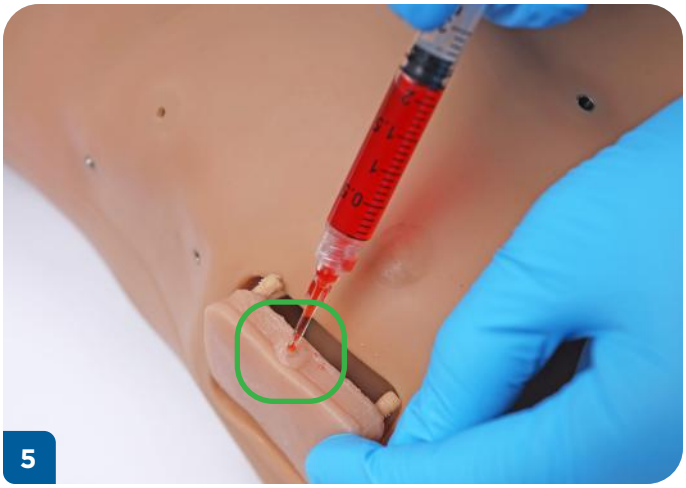
2. Connect the syringe needle to the syringe by twisting.

3. Gently remove the hemothorax site so that it can then be pre-filled with simulated blood.



4. Insert the empty syringe into the hole on the side of the hemothorax insert and suction out any residual air.

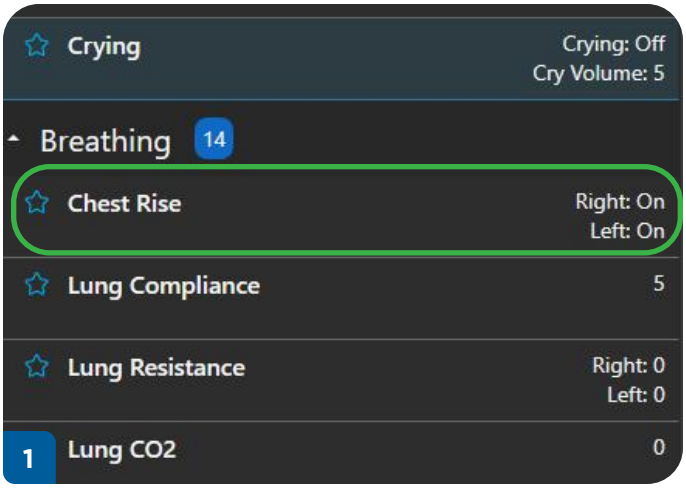
5. Fill the syringe with up to 2-3 mL of simulated blood and insert it into the hemothorax site.



6. Fill the hemothorax port on the right shoulder of the simulator with 30 mL of blood.

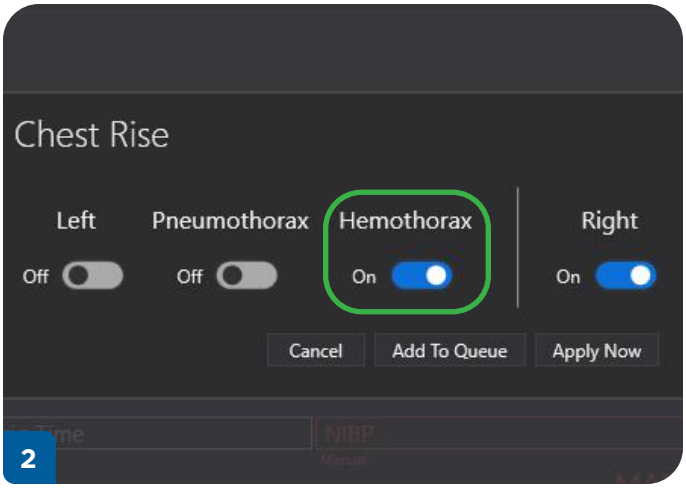
3.5.15. Using the Hemothorax Site

1. In the **Breathing** section, activate a hemothorax using the software controls in **Chest Rise**.

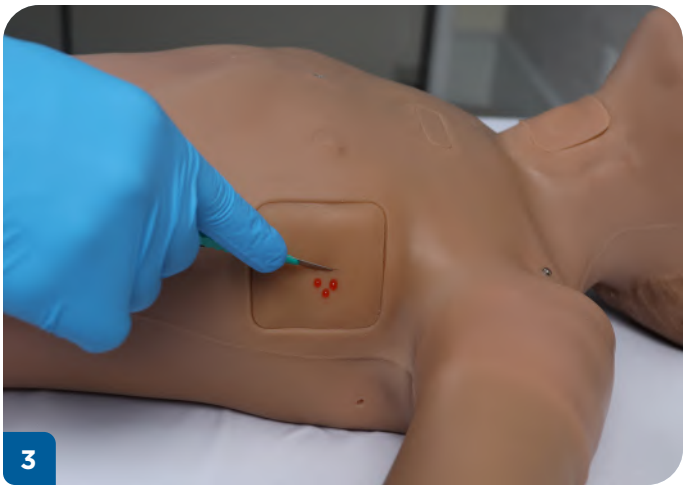


2. Check **On** for the **Hemothorax**.

The **Left** chest rise will disable automatically once **Hemothorax** is turned **On**.

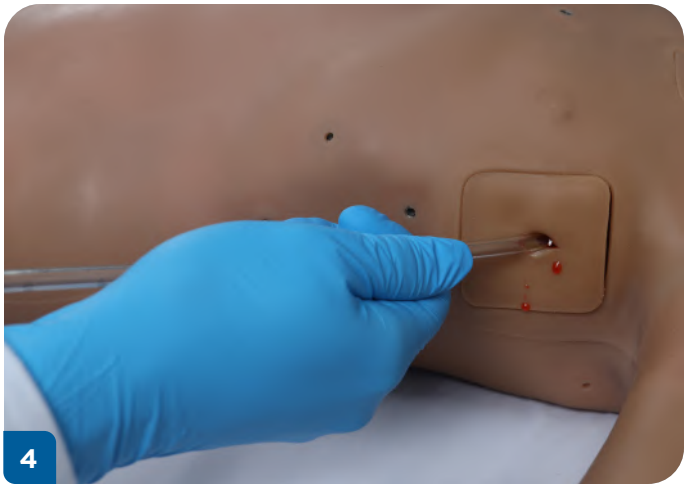


3. Use a scalpel to cut an incision on the hemothorax site.

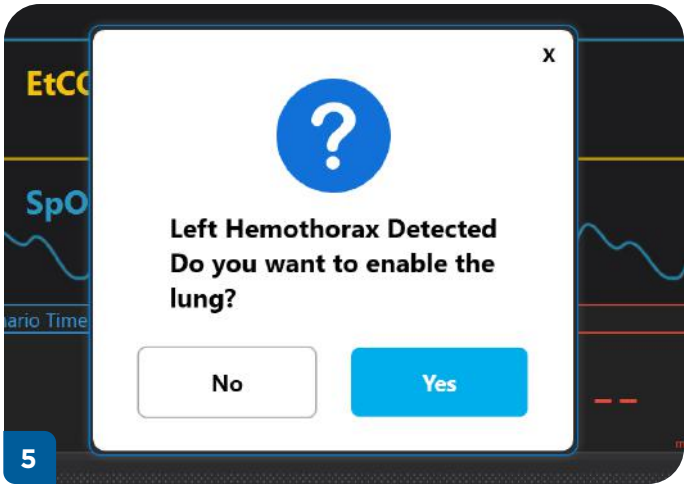


4. Insert a chest tube.

Procedure	Device Size
Chest tube	20-24 gauge



5. The software will detect and log the chest tube insertion. Simulated blood will flow through the chest tube if inserted properly.



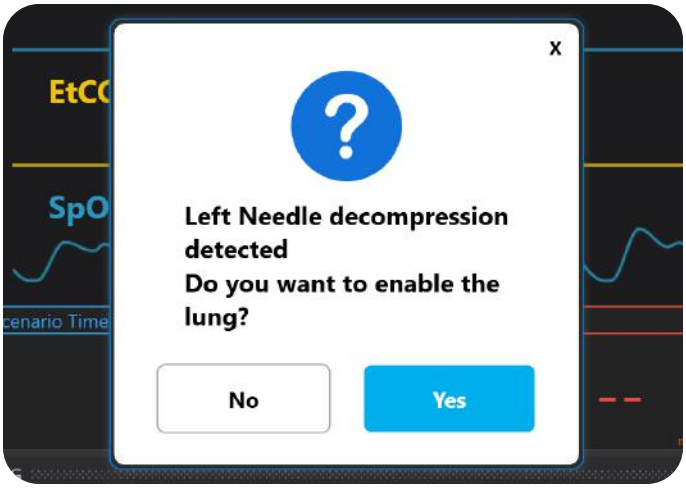
3.5.16. Pneumothorax

Pediatric HAL can simulate a collpased lung, or a pneumothorax. When air leaks in the space between your lung and chest wall and it pushes on the outside of the lung, it may, in some capacity, collapse. The more air trapped in the space, the more life-threatening the injury may be. Patients are typically treated by way of needle decompression. Performing a needle decompression on Pediatric HAL will result in an audible hiss.

Procedure	Device Size
Needle Decompression	16-18 gauge

1. In the **Breathing** section, select the **Chest Rise** and slide **Pneumothorax** to **On.**

When needle decompression is detected it will be logged in the UNI software and a prompt will appear to re-enable the lung.

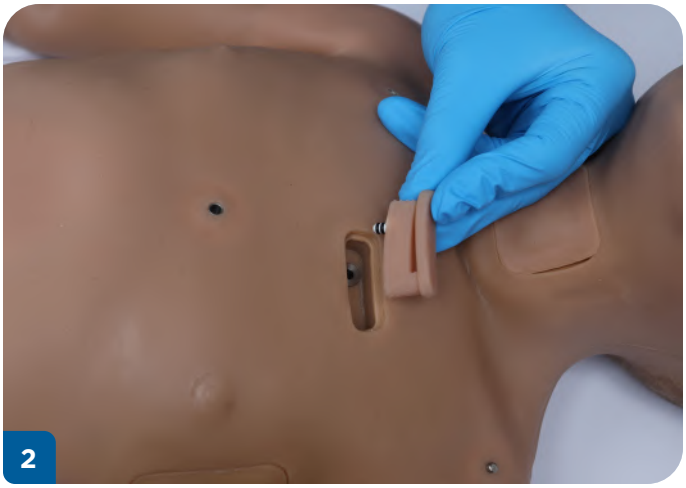


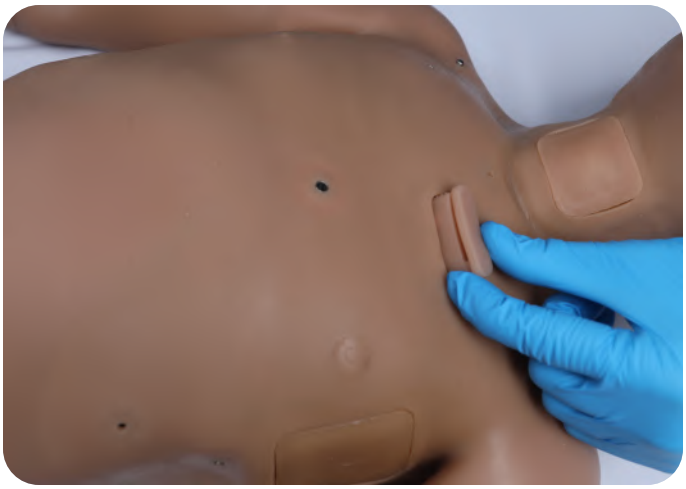
3.5.17. Replacing the Pneumothorax Insert

1. Gently remove the pneumothorax Insert on the left side of the Pediatric HAL's chest.

Do not use your nails to dig into the pneumothorax site or the surrounding chest skin. This may damage the insert or the chest skin further. Instead, use the pads of your fingers to remove the insert.

2. Insert the new pneumothorax site by aligning its post to the opening in the chest. Make sure that the connection is secure so as to ensure that the pneumothorax will pressurize.





3.5.18. Oxygen Saturation

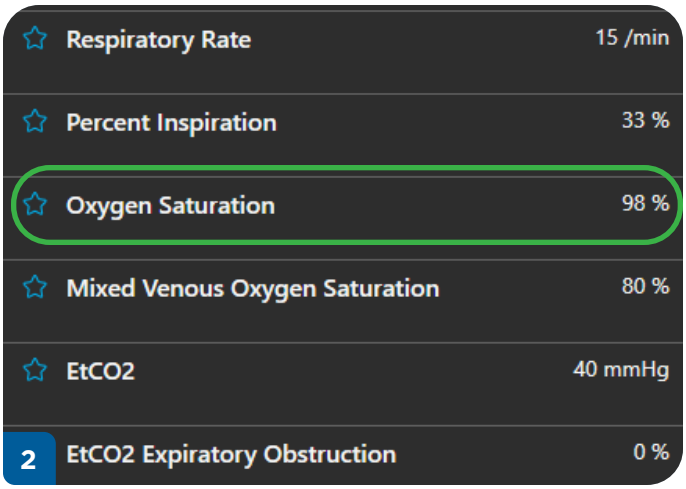
Use an oxygen saturation monitoring device to get an OSAT reading from the left index finger.

Oxygen saturation monitors that detect carbon monoxide and/or methemoglobin are not supported.

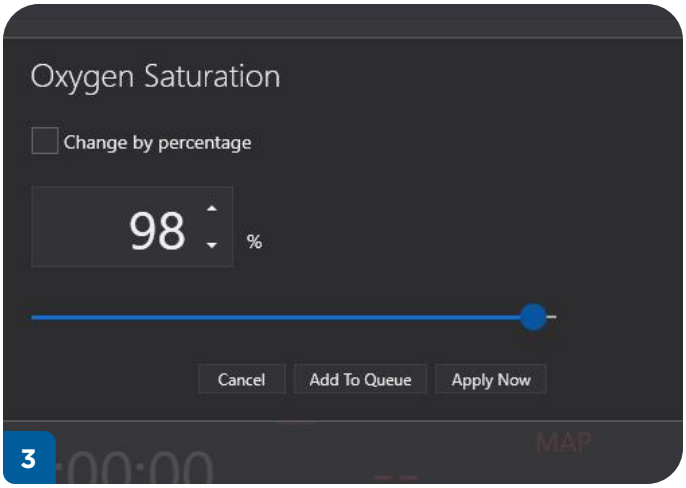
1. Place the OSAT monitor on Pediatric HAL's left index finger, and turn on the monitor.

Ensure that Pediatric HAL's fingers are lined up correctly in the monitor. It may need a bit of correction before proper alignment.

2. In the **Breathing** section, locate and select **Oxygen Saturation**.

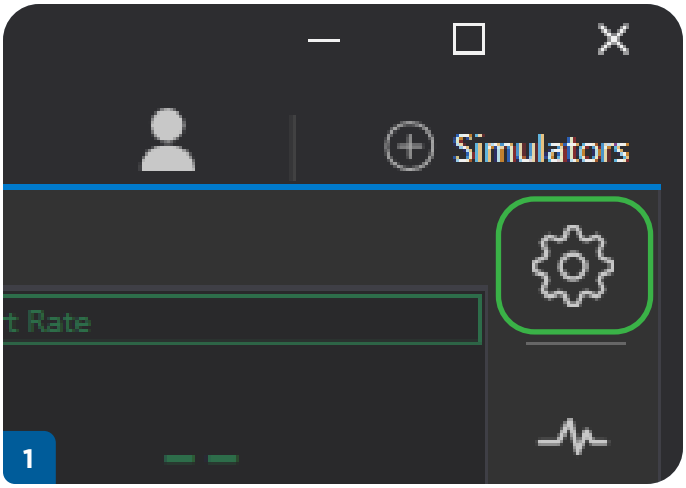


3. Adjust the oxygen saturation slider to the desired value.

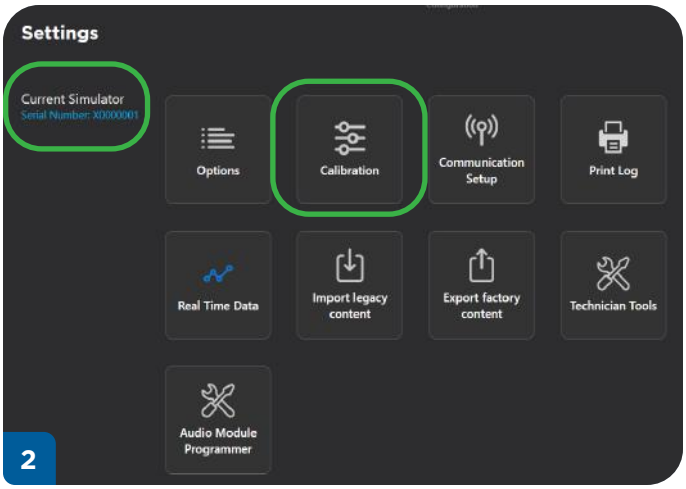


3.5.19. Oxygen Saturation Calibration

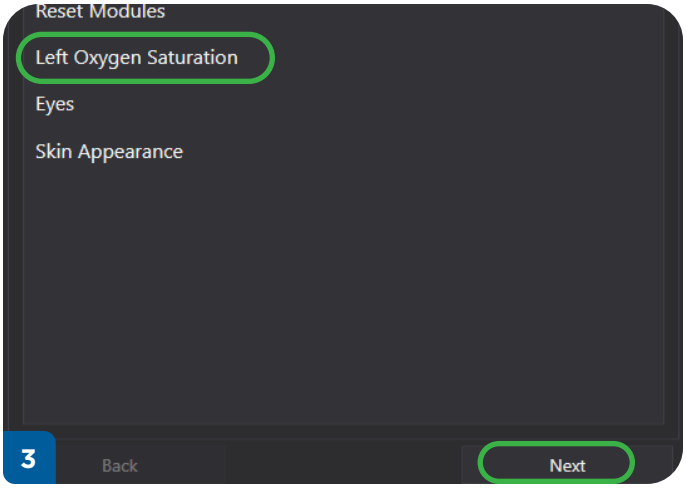
1. Click the **Settings** icon in the UNI software.



2. Then locate the **Calibration** setup that is found in the **Current Simulator** section.

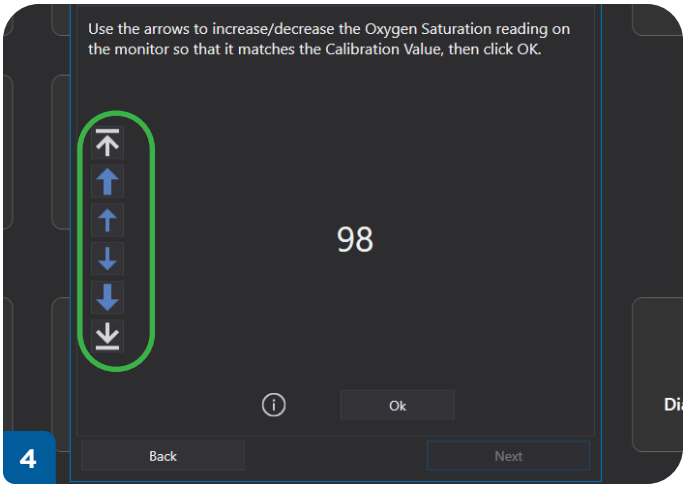


3. Select **Left Oxygen Saturation** and click **Next**.

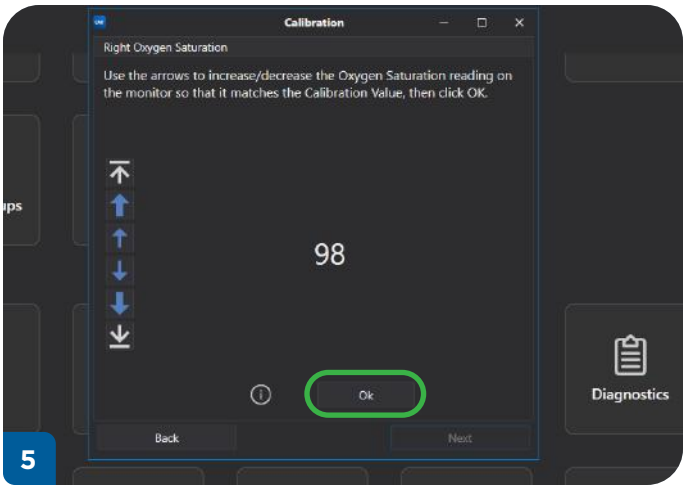


4. Slowly, use the arrows to adjust the oximeter's values to match the value shown on the screen.

The arrows will affect the numbers shown on the oximeter, not the number shown on the calibration menu.



5. Click **Ok** and go through the calibration process. Each time **Ok** is pressed, a new number to match and calibrate will appear. Once the calibration process is complete, press **Finish**.



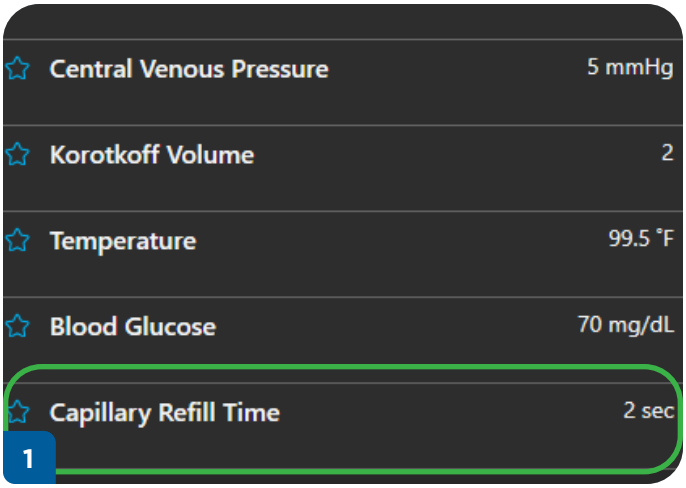
3.6 CIRCULATION

3.6.1. Capillary Refill Time

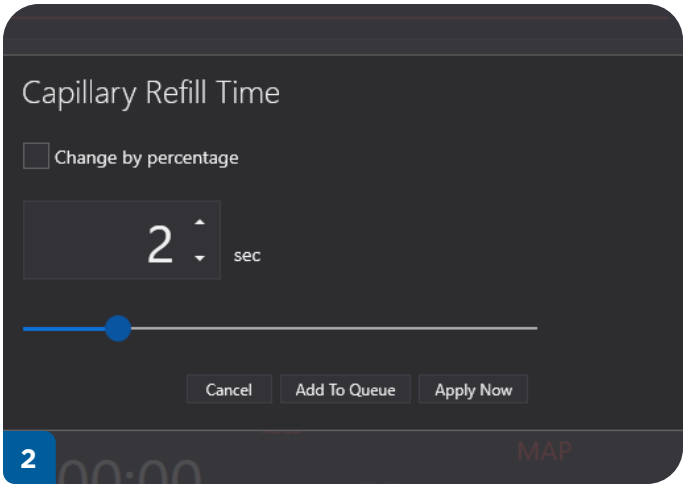
Pediatric HAL's right knee is capable of simulating capillary refill. As a patient may need to be assessed for their blood flow, a quick test is usually performed (typically on a finger or toe) when a patient is medically unstable. As any sudden decreases in blood flow could indicate that a patient's organs aren't receiving their necessary amounts of oxygen, a capillary refill test can be very important to perform.

Check the capillary refill time (CRT) above Pediatric HAL's right knee.

1. In the **Circulation** section, select **Capillary Refill Time**.

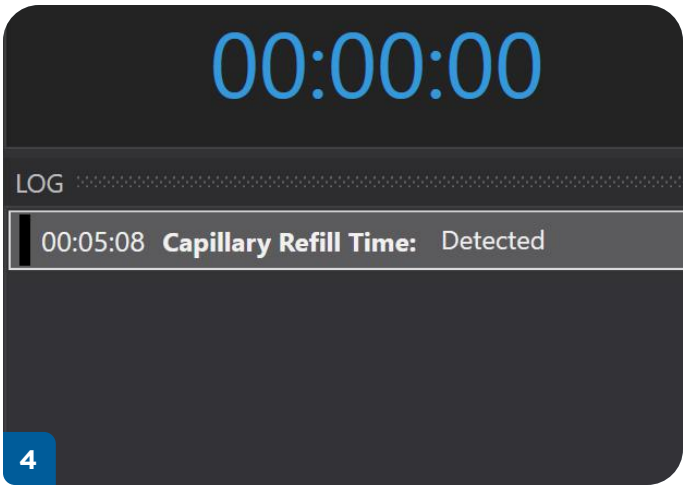


2. Increase or decrease the slider for **CRT** in UNI.



3. Gently press the **CRT** located above Pediatric HAL's right knee. Hold for about 4 seconds and release when it begins to light up.

4. The action will be recorded within the Log in UNI.

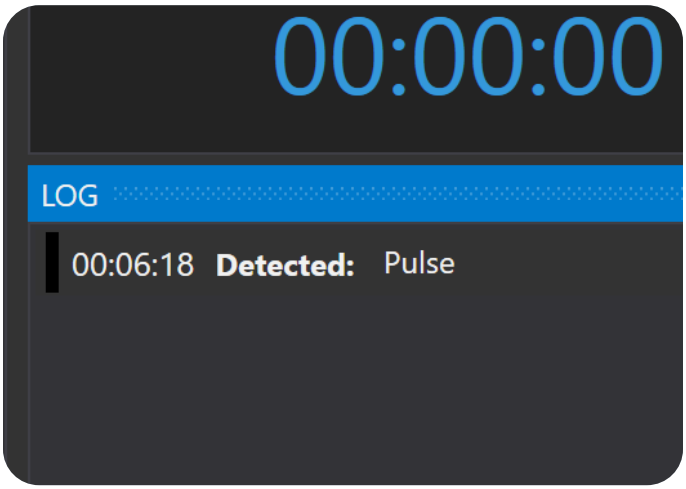


3.6.2. Pulses

Pediatric HAL has the ability to simulate pulses in 5 different places. He has bilateral carotid, brachial, radial, femoral, and pedal pulses that are dependent on his blood pressure and heart rate.

The simulator's pulses are, by default, not active unless palpatated by the provider by placing their two fingers on any of the pulse sites. Once activated, the pulse sites will remain pulsing for 2 minutes, and then they will deactivate. If the provider attempts to palpate at any of the pulse sites, the remaining 4 pulse sites will all begin pulsing.

All the pulse checks will be logged on UNI.



If the pulse sites are not being activated upon touch, a troubleshooting response would be to make sure the connection with the blue pulse lines are secure within the left and right leg. For more info, refer to "6.3 Pulses not Activated on Touch" on page 161.

Pulse Sites


Radial


Femoral

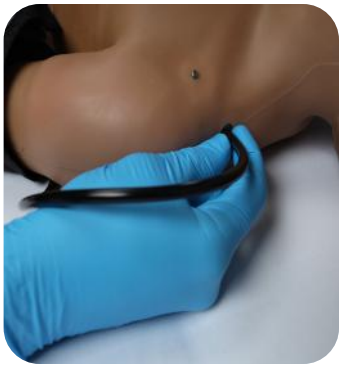

Pedal

3.6.3. Manual Blood Pressure

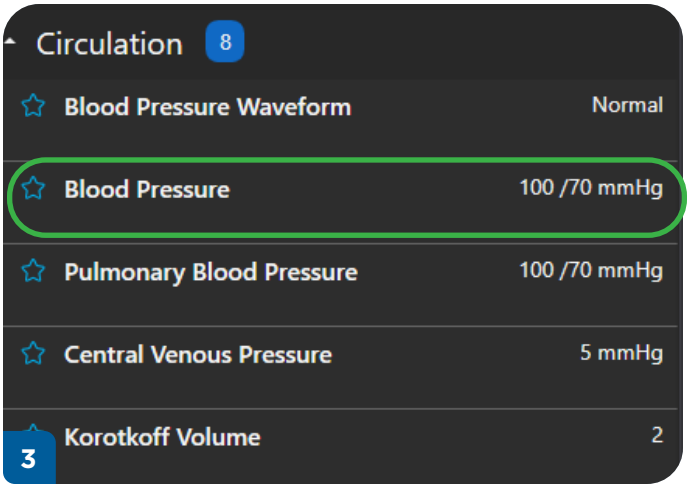
Pediatric HAL's manual blood pressure can be taken using a modified blood pressure cuff.

1. Place the blood pressure cuff on the simulator as it would be placed on a real patient.

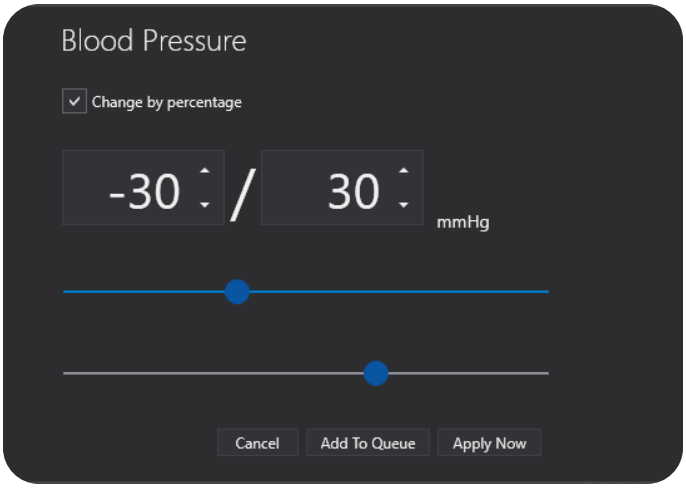
2. Connect the modified hose to the port on Pediatric HAL's left shoulder.



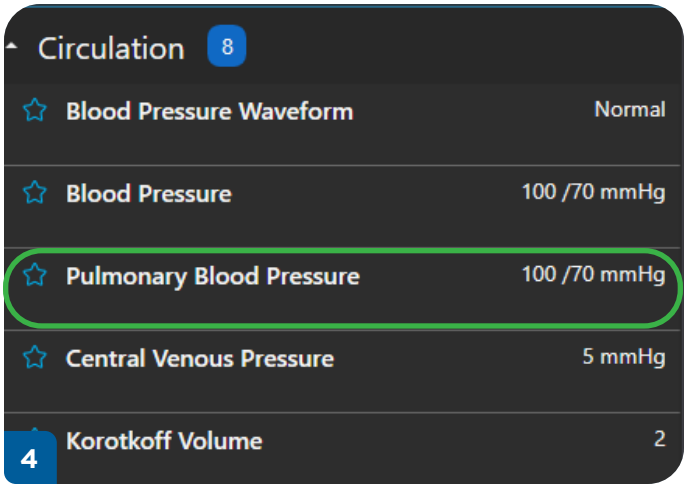
3. To simulate different blood pressures, adjust the **Blood Pressure** vital which can be found in the **Circulation** section in UNI.



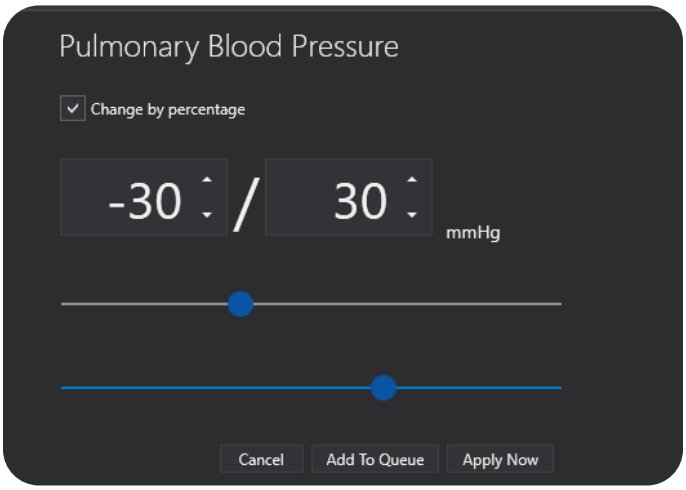
The blood pressure vital can also be adjusted by percentages, if the **Change by percentage** box is checked.

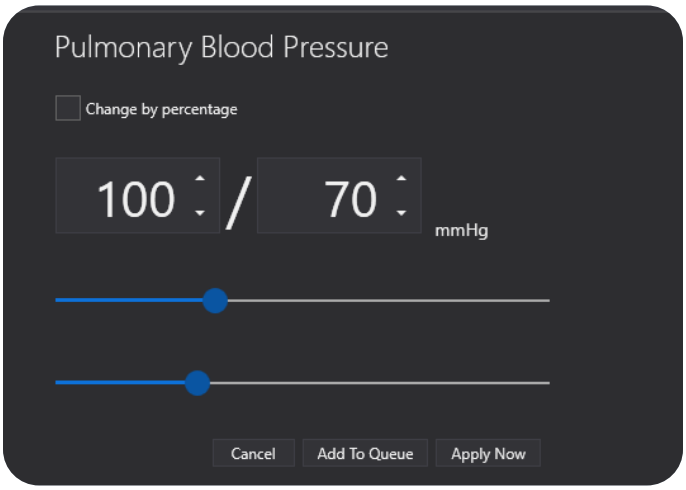


4. The **Pulmonary Blood Pressure** can also be adjusted in the vital of the corresponding name in the **Circulation** section.



The pulmonary blood pressure vital can also be adjusted by percentages, if the **Change by percentage** box is checked.



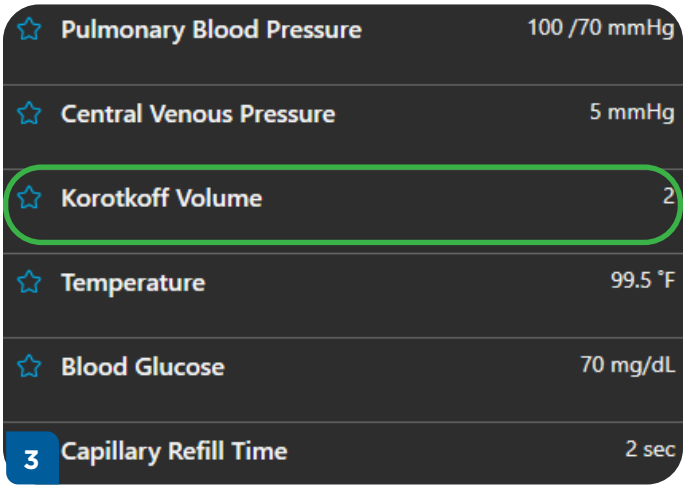


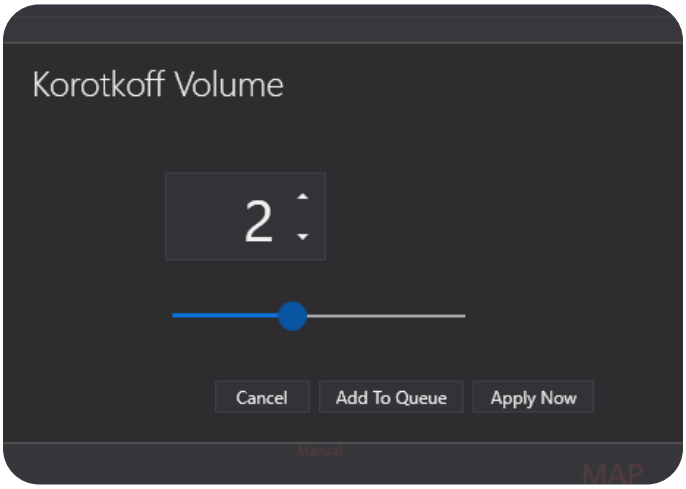
3.6.4. Auscultating the Korotkoff Sounds

1. Place the blood pressure cuff on the simulator as it would be placed on a real patient and place the bell of the stethoscope above the bend of the elbow.

2. Connect the modified hose to the port on Pediatric HAL's left shoulder.

3. If necessary, to turn up the volume of the **Korotkoff Sounds** use its slider which can be found in the **Circulation** section.





4. Now, adjust the **Blood Pressure** vital which can be found in the **CIrculation** section in UNI.

The blood pressure vital can also be adjusted by percentages, if the **Change by percentage** box is checked.

3.6.5. Automatic Blood Pressure

Be aware that the non-UNI pictures used in this section are taken with the Adult HAL S5301 simulator and his accessories. The color/style of the cuff and simulator will vary from the Pediatric HAL but the steps remain the same.

To monitor Pediatric HAL's blood pressure, a modification and calibration must be done on the automatic blood pressure cuff before use.

The maximum automatic blood pressure that can be achieved is 160/100.

1. Cut the hose of the NIBP cuff.

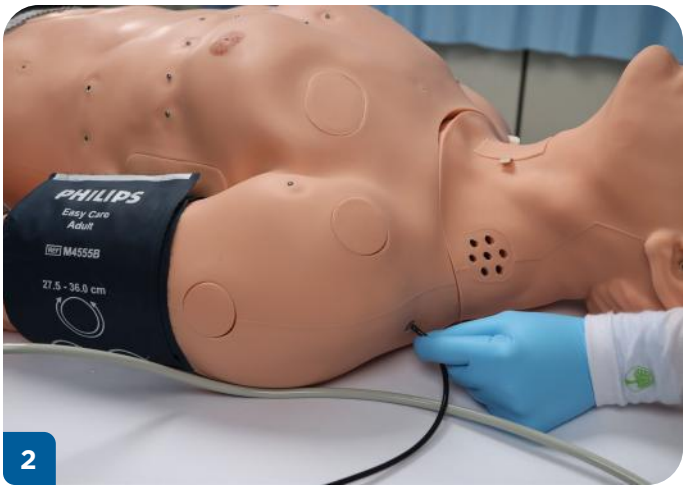
Note that the cuff color on Pediatric HAL is black of color.

The "T" connector of the Blood Pressure Tube Adapter is what gets connected to the cut ends of the hose on the automatic blood pressure cuff. This adds the additional pneumatic line that ocnnects to the upper left shoulder of HAL.

1

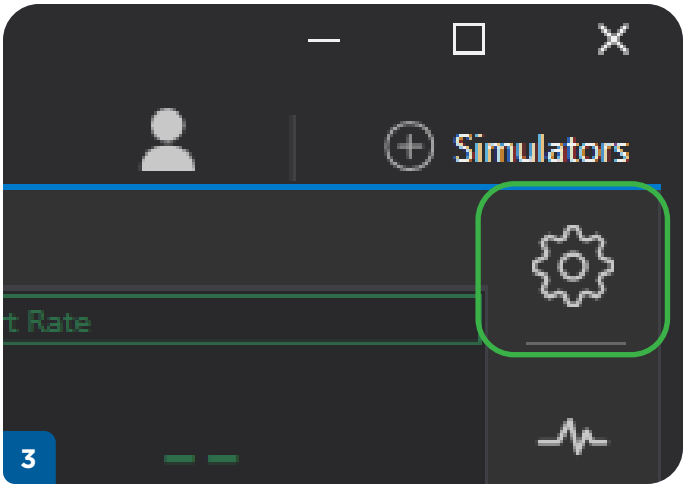
2. Connect the modified hose to the NIBP port on Pediatric HAL's upper left shoulder.

3. Apply the cuff to Pediatric HAL's left arm as you would a real patient and be sure to connect the cuff to the automatic blood pressure machine as well.

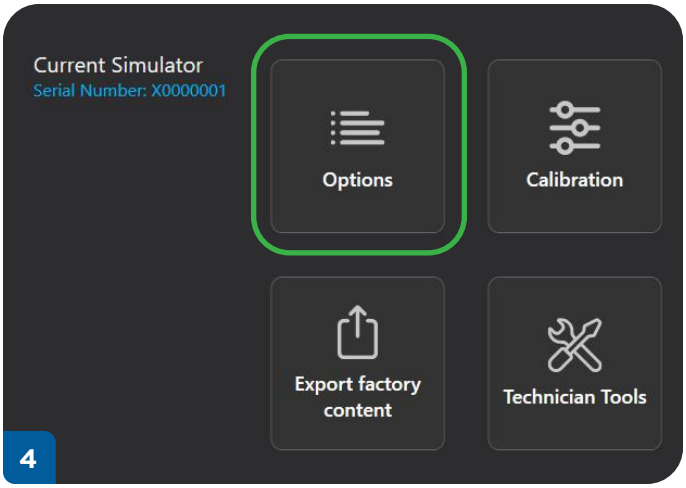


2

3. To activate the Automatic Blood Pressure, click on the settings icon in the upper right corner.

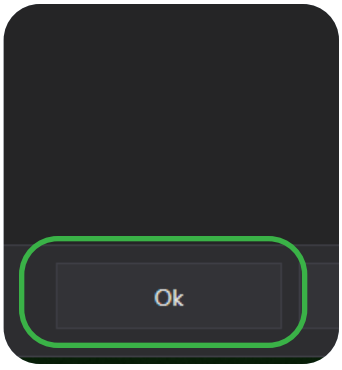


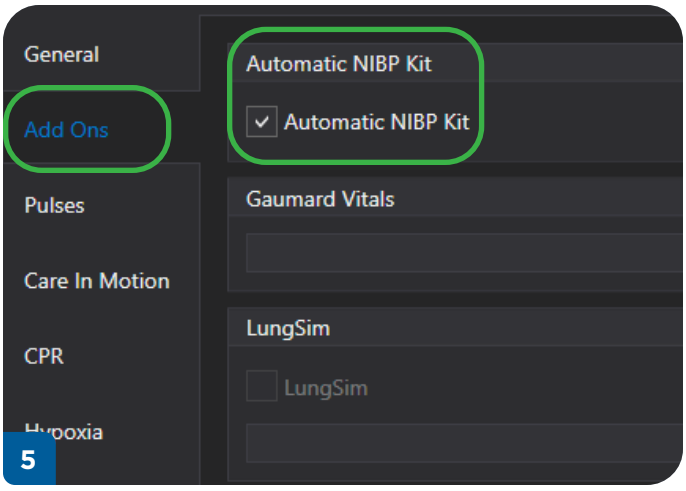
4. Select **Options** in **Current Simulator** section.



3. Click the **Add-Ons** tab, and check the **Automatic NIBP Kit** box.

4. Click **Ok**.





3.6.6. Using the Automatic Blood Pressure Cuff

1. Place the blood pressure cuff on the simulator as it would be placed on a real patient.

2. Connect the modified hose to the port on HAL's left shoulder.

2

3. Connect the NIBP cuff to an automatic blood pressure monitor.

3

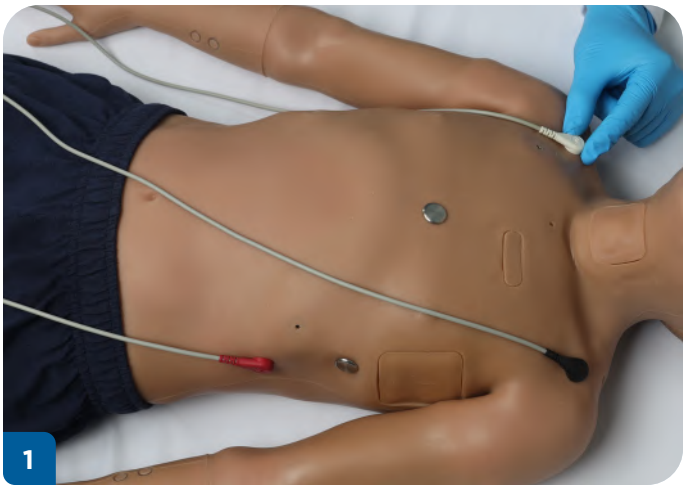
3.7 CARDIAC

3.7.1. ECG Monitoring

Pediatric HAL is equipped with ECG snap connectors that allow the attachment of real ECG Fs.

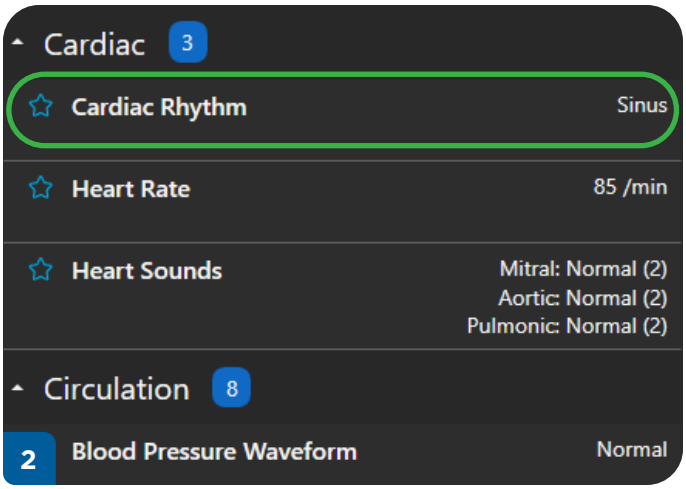
The simulator also supports ECG-Derived Respiration monitoring.

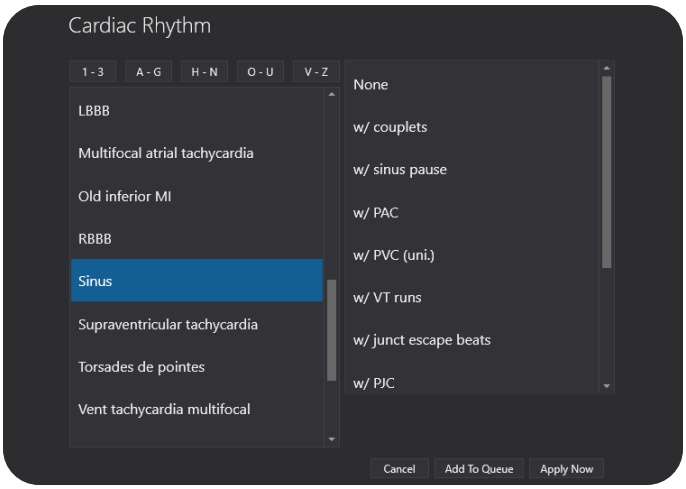
1. To use the ECG sites, push in the ECG leads to Pediatric HAL's ECG sites.



A 3 or 4 lead ECG can be connected to HAL's chest.

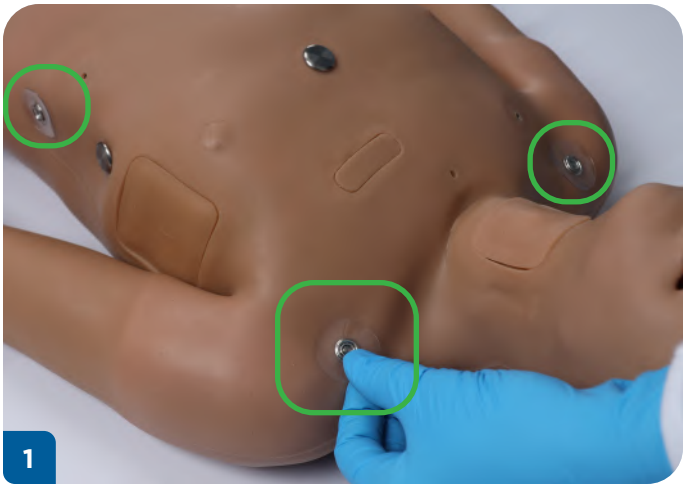
2. Connect the leads to the monitor and turn it on. In the **Cardiac** section, choose from a library of ECG rhythms in the **Cardiac Rhythm** vital.





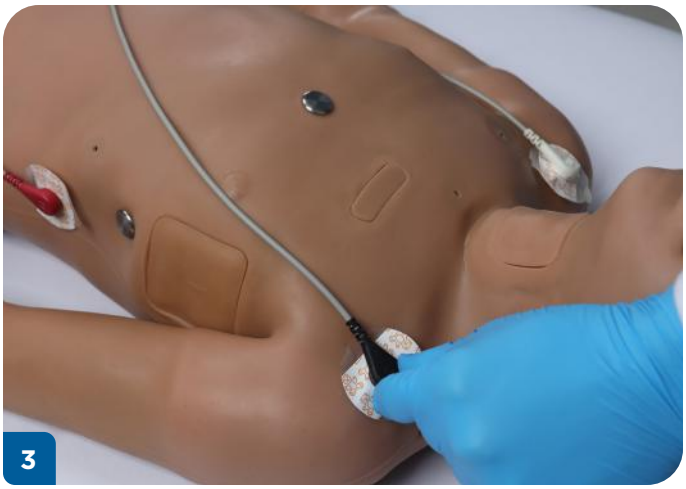
3.7.2. Using Snap Adapters for ECG Electrode Patches

1. Connect the adapters to Pediatric HAL's ECG sites.

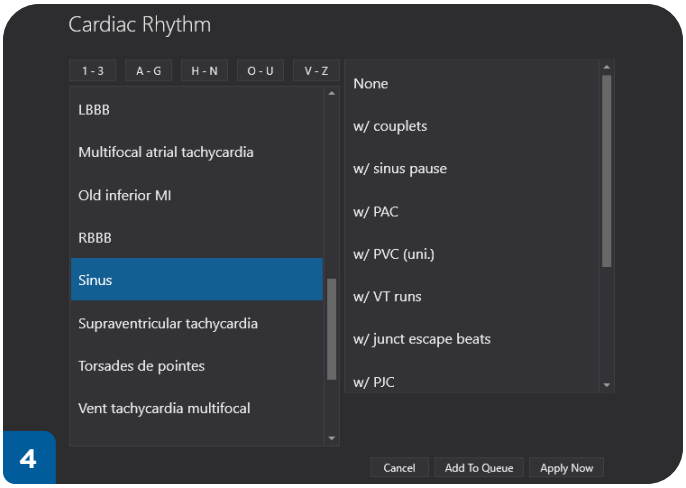


2. Attach the ECG leads to the snap adapters.

3. Connect the leads to the monitor and turn it on.



4. In the **Cardiac** section, choose from a library of ECG rhythms in the **Cardiac Rhythm** vital.



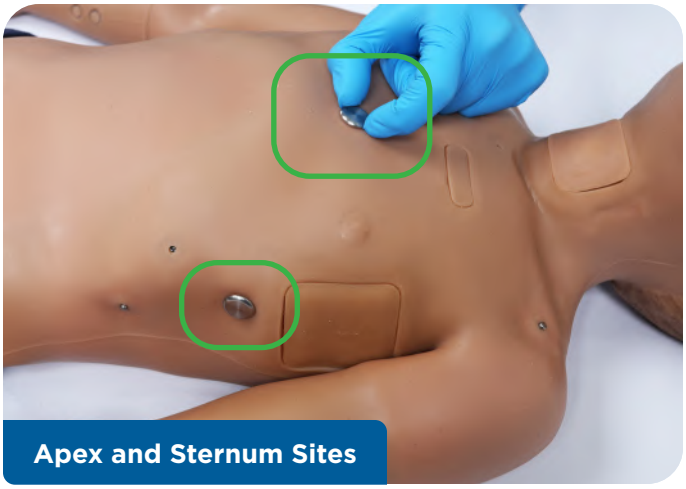
3.7.3. Electrical Therapy

Review the Care and Cautions section before defibrillating Pediatric HAL for the first time.

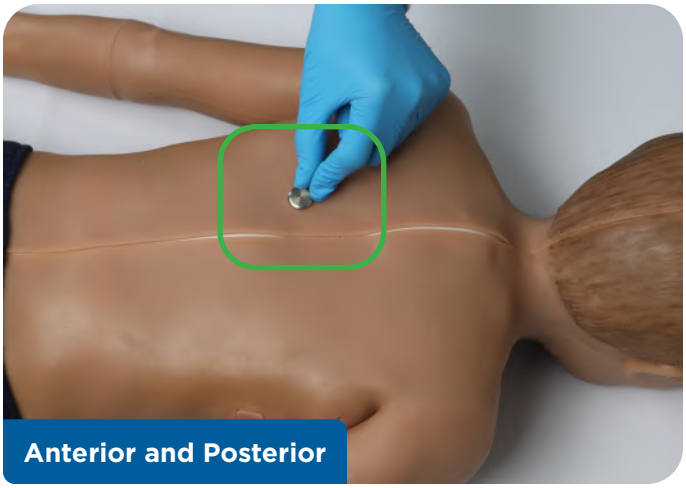
Pediatric HAL can be defibrillated, paced, or cardioverted using real equipment. Energy can be delivered to either his sternum or apex sites, or it can be delivered to his anterior and posterior sites. Pediatric HAL also supports double sequential external defibrillation (DSED).

Do not defibrillate Pediatric HAL at over 150 Joules of energy. Doing so may cause serious internal damage to the simulator.

1. Connect the adapter for non-snap DEF electrodes into either the sternum/apex sites, or the anterior/posterior sites.



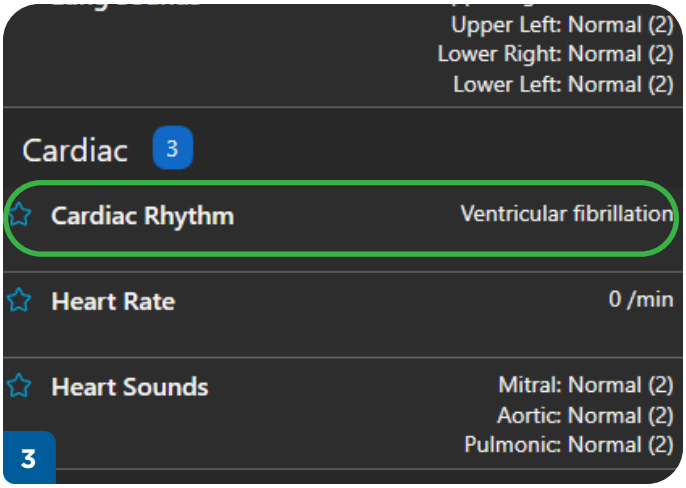
Apex and Sternum Sites



Anterior and Posterior

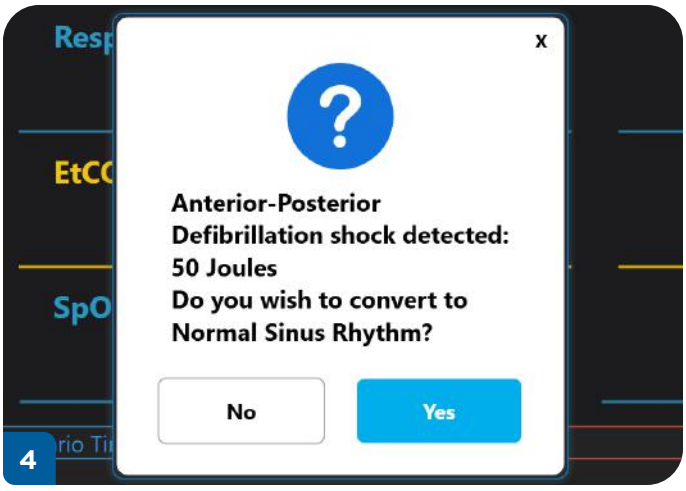
2. Attach the defibrillation pads on top of the adapters.

3. Set the simulator to a shockable rhythm by locating **Cardiac Rhythm** is the **Cardiac** section, and making a choice.



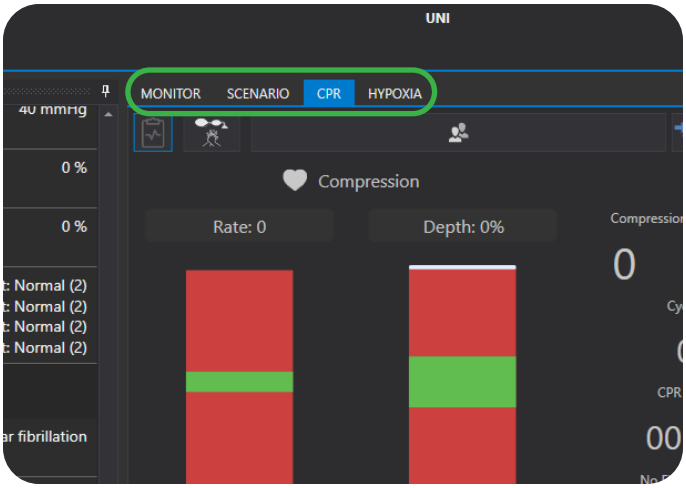
4. Deliver up to 150 Joules of energy. UNI will log the shock.

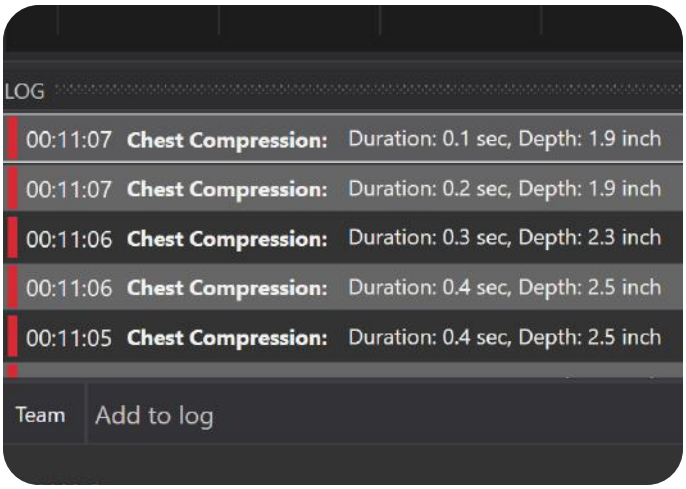
Refer to the UNI 3 user guide for more information on Auto Responses.



3.7.4. Chest Compressions

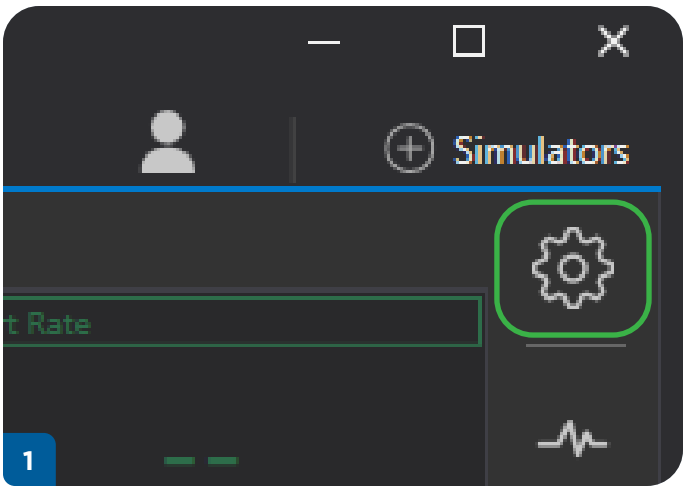
Providers can administer chest compressions to Pediatric HAL as part of a CPR protocol. The provider can use the **CPR** tab in UNI to monitor the effectiveness of the compressions. Proper compressions results in palpable carotid pulses. All chest compressions are also measured and logged in UNI.

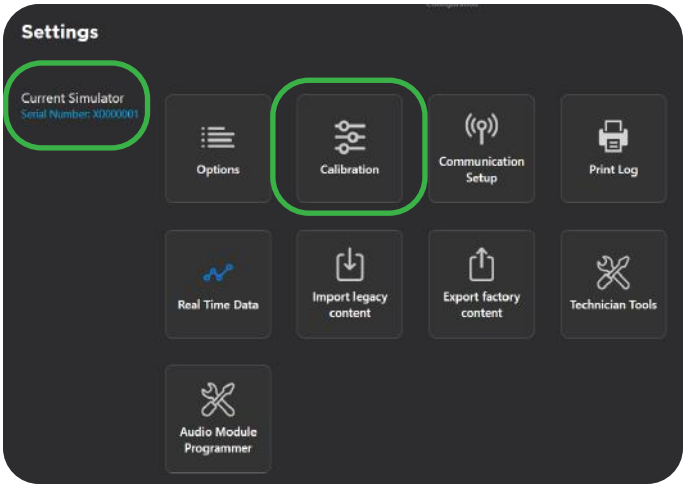




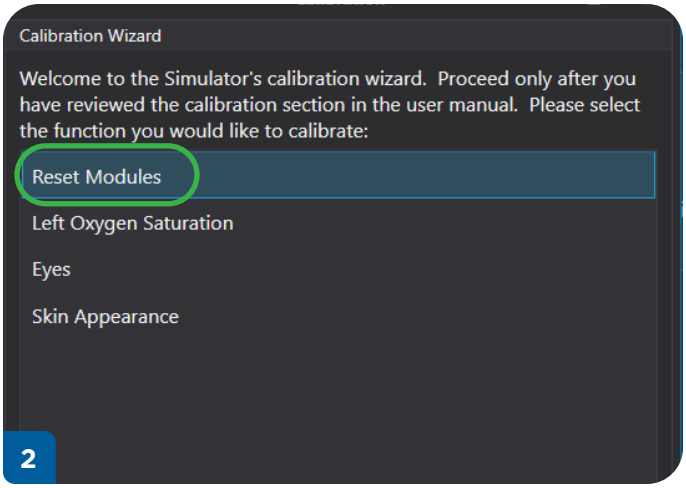
3.7.5. Chest Compression Calibration

1. Click the settings icon in the UNI software. Then locate the **Calibration** setup that is found in the **Current Simulator** section.



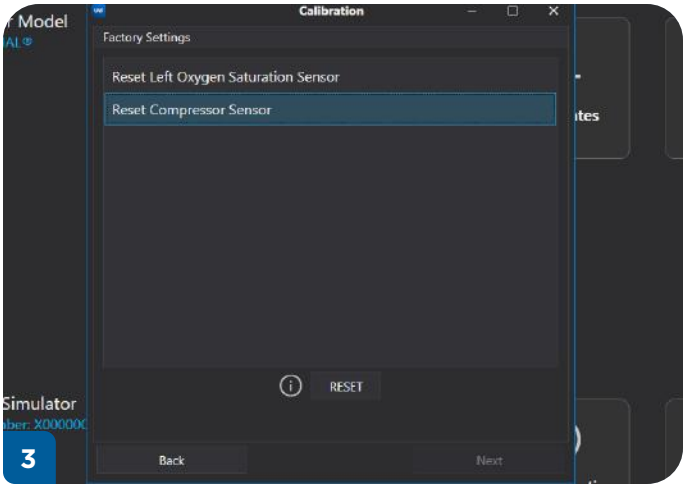


2. Select **Reset Modules** and then click **Next**.



3. Select **Reset Compression Sensor**.

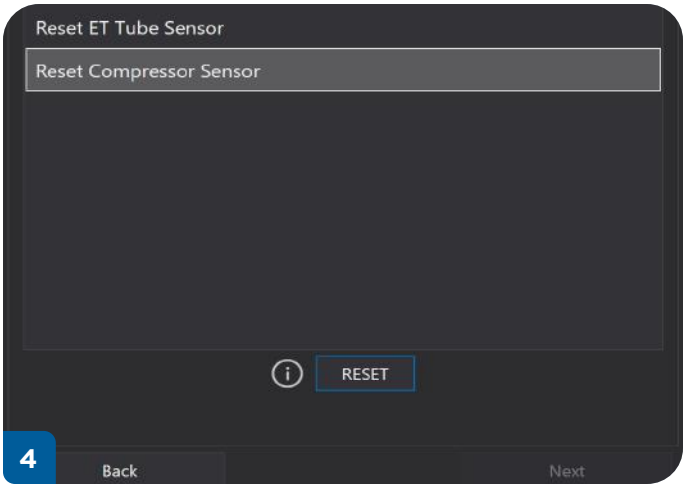
The next step may require the aid of a second person



4. Perform and hold a correct chest compression on the Pediatric HAL and select **Reset**.

It is best practice to place Pediatric HAL on a hard, flat surface while performing chest compressions.

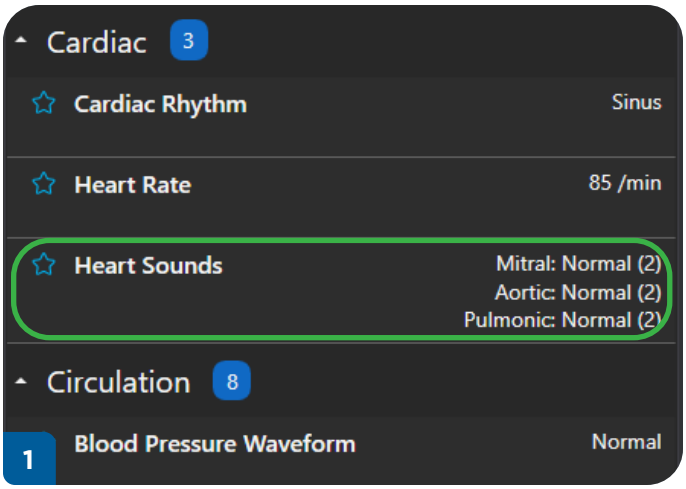
5. Click **Next** to complete the calibration.



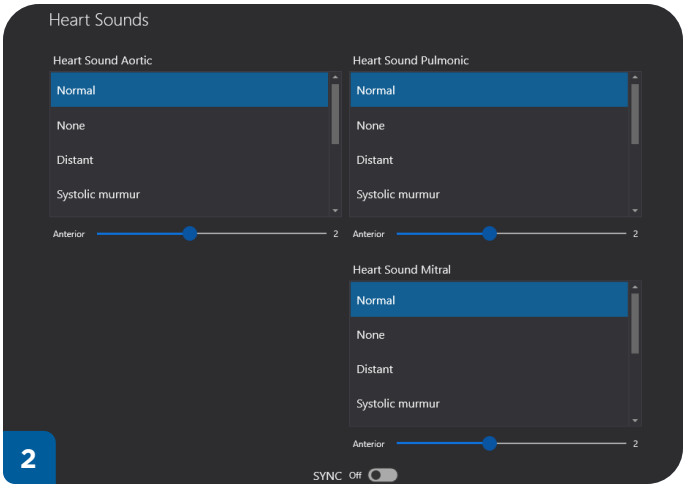
3.7.6. Heart Sounds

Pediatric HAL can be auscultated for normal and abnormal heart sounds at the aortic, pulmonic, and mitral sites.

1. To change heart sounds in UNI, locate **Heart Sounds** in the **Cardiac** menu.

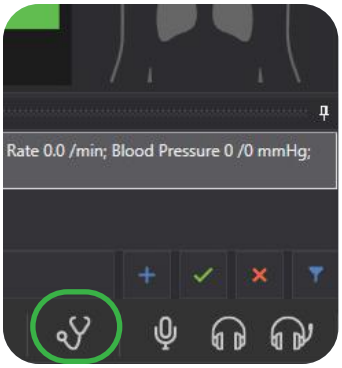


2. Choose heart sounds from the **Aortic**, **Pulmonic**, and **Mitral** sites and use the slider to adjust the volume.

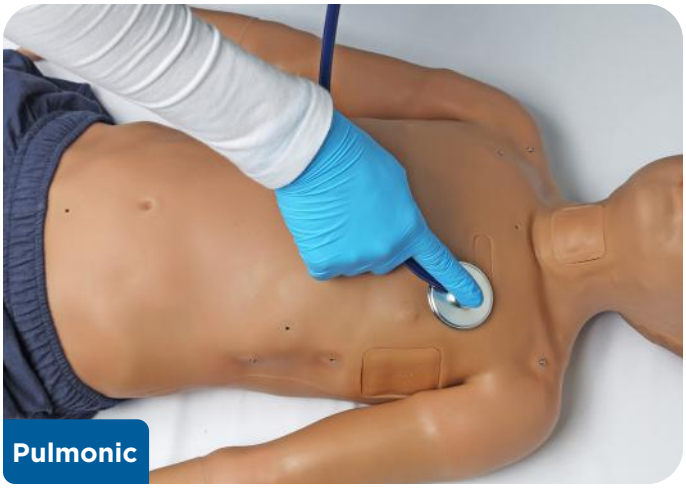


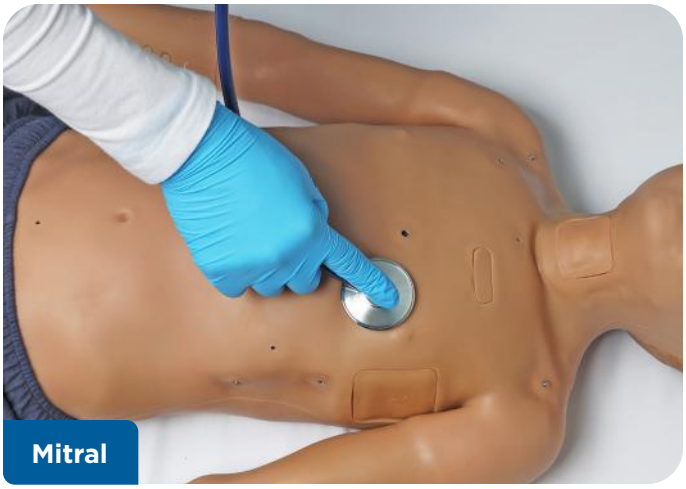
If the provider wants to isolate the heart sounds (so as to not confuse its sounds with other noises within Pediatric HAL) when auscultating, click the **stethoscope icon** for Auscultation Mode.

Pediatric HAL's breathing, blinking and pulses will stop in Auscultation Mode.



3.7.7. Heart Sound Locations





3.8 VASCULAR ACCESS

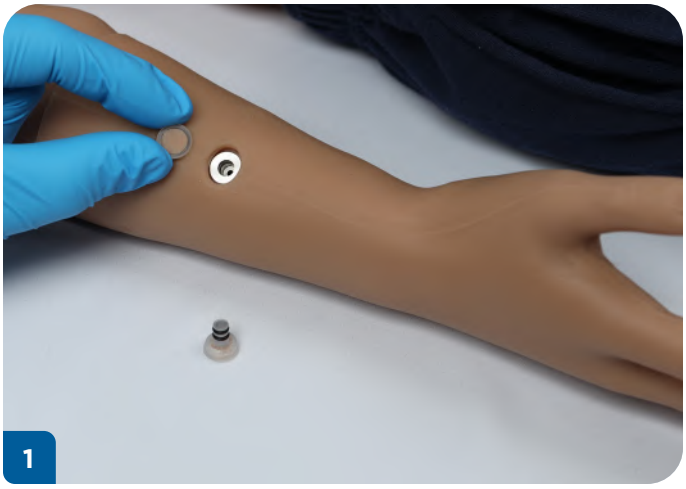
3.8.1. IV Arms

Collect samples and setup a continuous infusion on Pediatric HAL's bilateral IV arms. It is recommended to use needle size 22 gauge or smaller to extend the life of the veins and skin. The skin and tubing is latex free.

Use only Gaumard's provided simulated blood. Any other simulated blood brand containing sugar or any additive may cause blockage and/or interruption of the vasculature.

3.8.2. IV Arm Setup

1. To prime the veins, remove Pediatric HAL's fill and drain port covers on the lower arm.



2. Attach the unclamped drainage hose to one port on the lower arm.

3. Place the other end of the drainage hose into a receptacle to catch excess fluid.

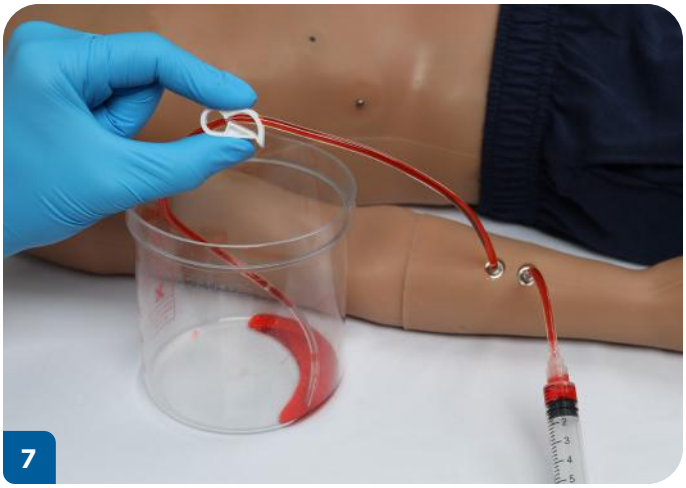
4. Assemble and fill syringe with the provided artificial blood concentrate.

5. Connect the fill syringe to the other port on the lower arm.

6. Inject the blood concentrate until no air bubbles flow through the drain hose.

7. Close the clamp.

If a continuous infusion is going to be performed, keep the clamp open.



8. Remove the fill syringe and the drainage hose..

3.8.3. Cleaning the IV Arm

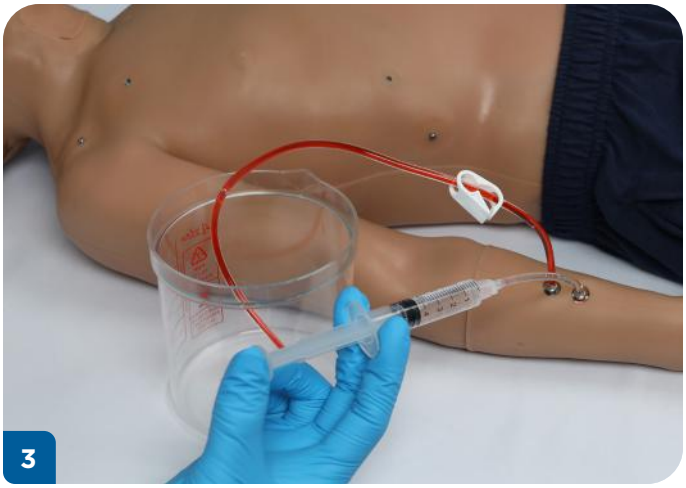
It is common practice to clean and dry the forearm vasculature at the end of each simulation day to prevent mold or clogs from forming.

1. Fill the syringe with a solution of 70:30 water to isopropyl alcohol.

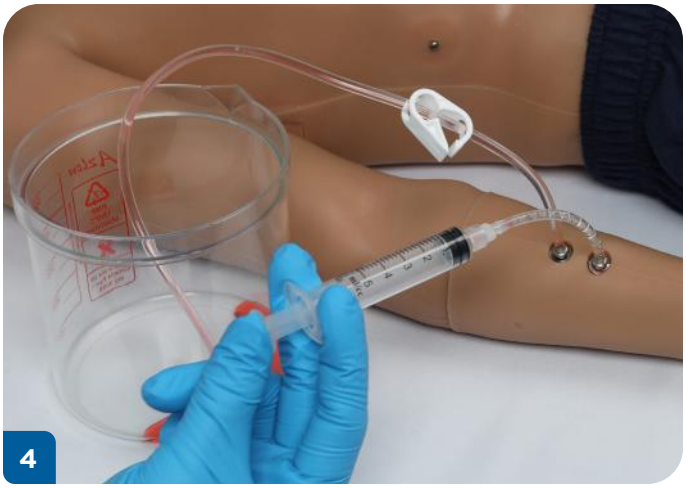
2. Connect the fill syringe and the unclamped drain hose to the lower arm.

2

3. Flush the arm with the cleaning solution until the fluid runs clear through the drain hose.



4. Disconnect the syringe, fill it with air, and then purge the vasculature with air to dry.



3.8.4. IO Access

To mimic a vascular access solution for the emergent patient, Pediatric HAL allows for continuous infusion. Intraosseous access (IO access) is a site featured on Pediatric HAL's right tibia.

As blood vessels collapse, and bones do not, the bone marrow can be used in a patient to gain access to a non-collapsible vein

To set up Pediatric HAL's IO to be able to infuse fluids, bloods and/or drugs into Pediatric HAL's bone marrow:

1. Connect the drain hose to the back of the right leg.

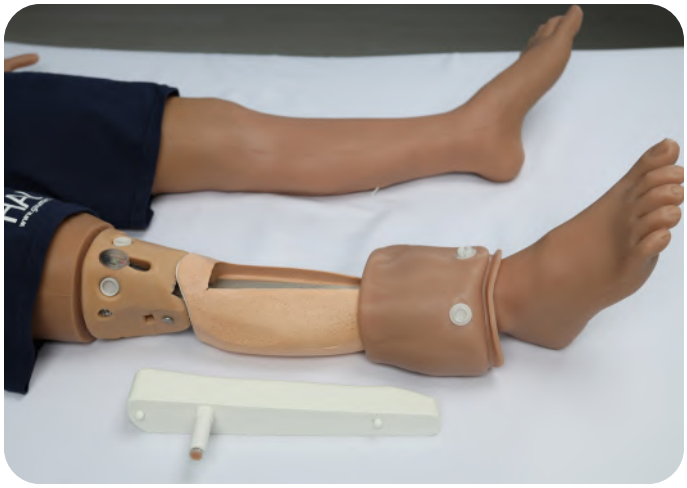

1

2. Perform the IO exercise.


2

3.8.5. Replacing the Tibia Insert

After several uses where Pediatric HAL has been infused and drilled into during the IO exercise, the provider might want to replace the tibia bone piece.



To replace the tibia insert:

1. At the lip of Pediatric HAL's lower RIGHT leg, gently lower the skin until the white snaps are visible.

Grip the skin using the pads of the fingers.

2. Below the knee, unsnap the white skin snaps.

3. Continue to roll the skin down to expose most, if not all, of the tibia down for easy removal.

It is not necessary to remove the skin completely.

4. Remove the tibia bone and replace it with a new one.

5. Carefully roll the skin back up and snap the leg skin back in place.

If there is too much resistance, use mineral oil on the skin.

6. Insert the edge of the leg skin into the crease of the upper leg.

To ensure a nice fit when the skin of the lower legs reaches the upper thighs, make sure the lips of the skin at the top of the lower legs fill into the crease. It may be necessary to lightly pull on the skin to push it in.

7. Press down until skin is flush with the thigh.

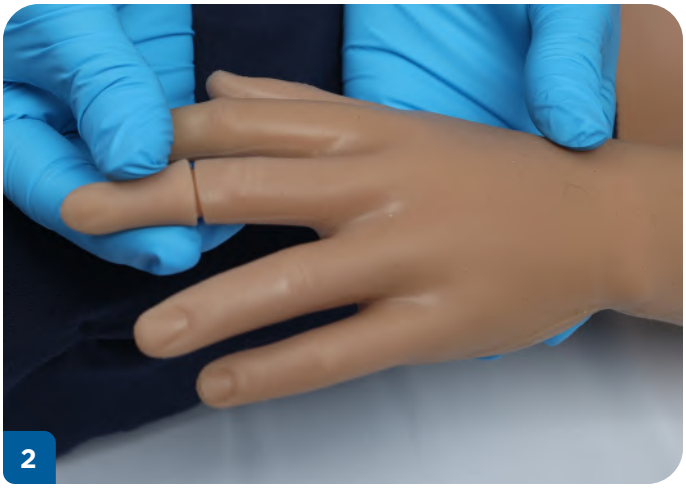
3.8.6. Glucose Finger

Pediatric HAL has the ability to obtain a real glucose reading from the left middle finger. To mimic the act of checking a patient for their blood sugar level, perhaps for diabetes management, first:

1. Select the glucose level from the 3 provided bottles.

The simulated glucose solutions include three seperate bottles which contain the concentrates of 350, 85, and 40 mg/dL, respectively.

2. Remove the left middle finger.



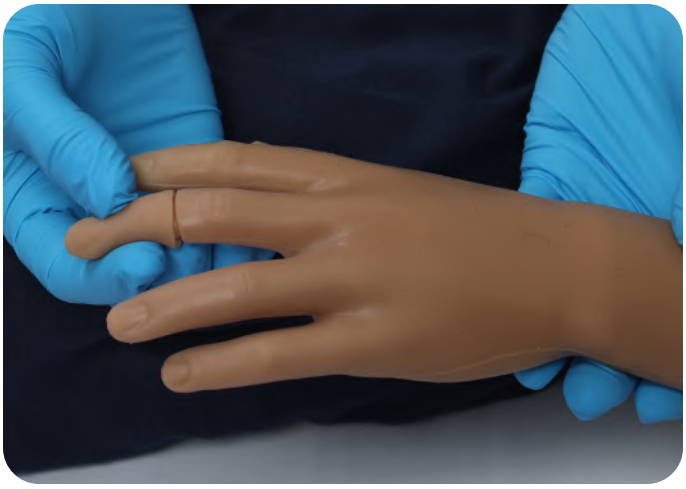
3. Unscrew the metal tip.

4. Fill the syringe with fluid from the desired simulated glucose bottle.

5. Fill the finger with 1 mL of fluid.

Insert the fill syringe attachment far enough (about halfway) into the tip of the finger to ensure proper filling without backflush.

6. Screw in the metal tip and reattach the finger.



3.9 BOWEL

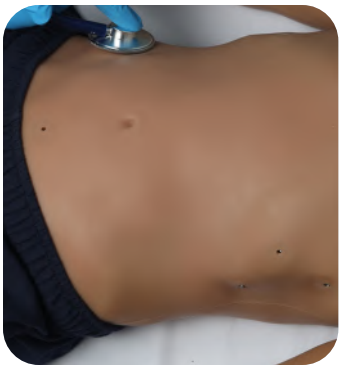
3.9.1. Nasogastric and Orogastric

Pediatric HAL has a patent esophagus that supports the insertion of a Nasogastric (NG) tube or an Orogastric (OG) tube. Lubricate each device before inserting it.
Refer to "1.4 Device Sizes" on page xii for recommended device sizes.

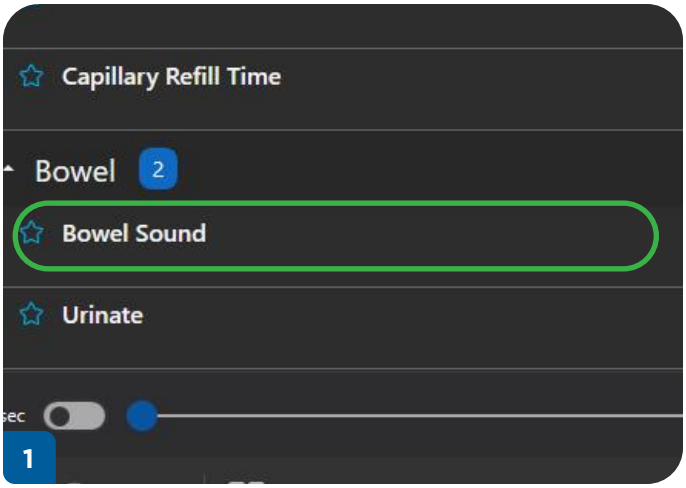
Do not inject any fluid into the esophagus. This exercise is ONLY meant for placement.

3.9.2. Bowel Sounds

Pediatric HAL can be auscultated for bowel sounds with a stethoscope. He can activate bowel sounds in the Upper Left, Lower Left, Upper Right, and Lower Left sides of the bowels.



1. To turn bowel sounds **On** or **Off** independently, locate **Bowel Sound** in the **Bowel** menu.



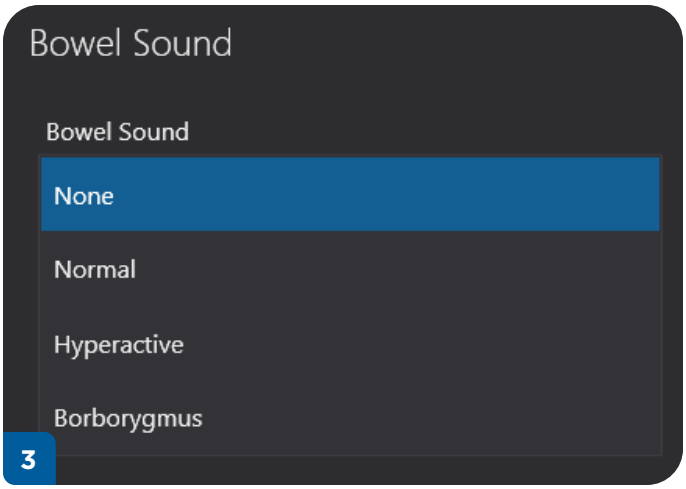
2. To turn on or off a particular quadrant, select the **On/Off** buttons. To change the volume for each/all of the four quadrants, adjust the sliders.

Feature will not work unless the Bowel Sound is changed from **None**.

Use **SYNC** to adjust the sliders for each bowel quadrant simultaneously.

3. To select a particular kind of bowel sound choose between:

- None
- Normal
- Hyperactive
- Borborygmus

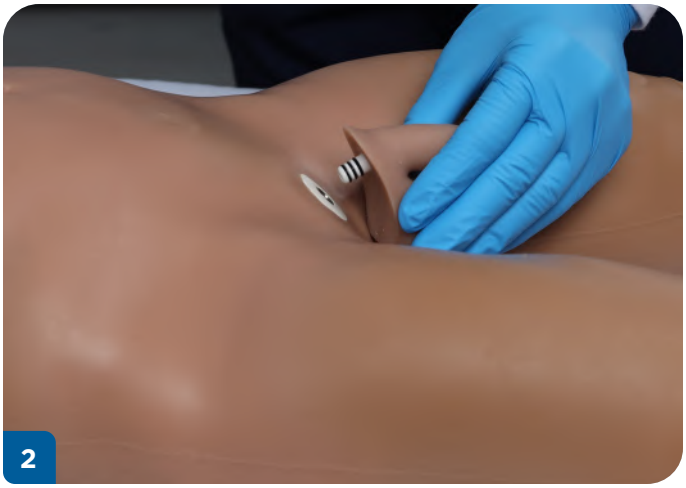


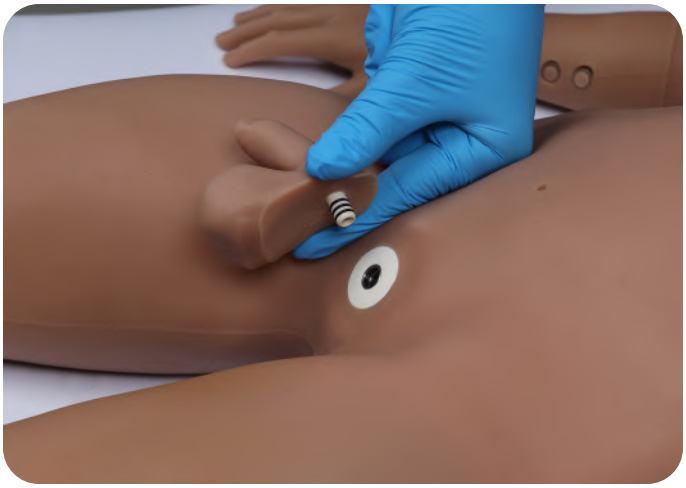
3.9.3. Male and Female Genitalia

Pediatric HAL has interchangeable genitalia.

1. Select either the male or the female genitalia and gently press it into the urinary fill port until the skin fits flush.

2. To remove, use the pads of your fingers to carefully lift it out of the port.





3.9.4. Urinary Catheterization

Perform catheterization exercises with fluid return on the male or female genitalia.

Procedure	Device Size	Reservoir Size
Catheter	12 Fr	30 mL

1. Carefully remove the genitalia.

The female genitalia can be seen on the left, while the male genitalia can be seen on the right.

2. Connect the urine fill adapter to the fill syringe.

3. Fill the syringe with fluid.

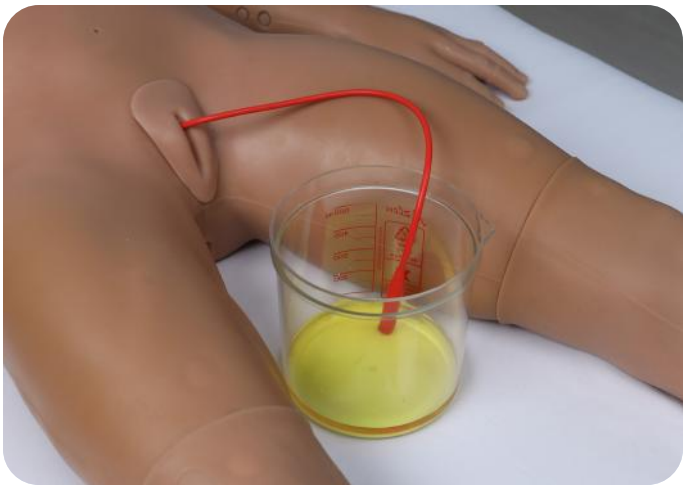
4. Insert the adapter to the urinary port.

5. Inject up to 20 mL of fluid into the bladder.

6. Replace the genitalia.

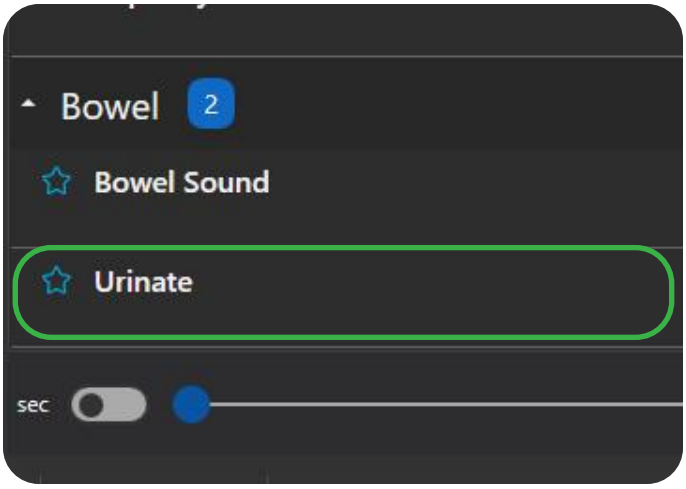
7. Catheterize the genitalia to get fluid return.

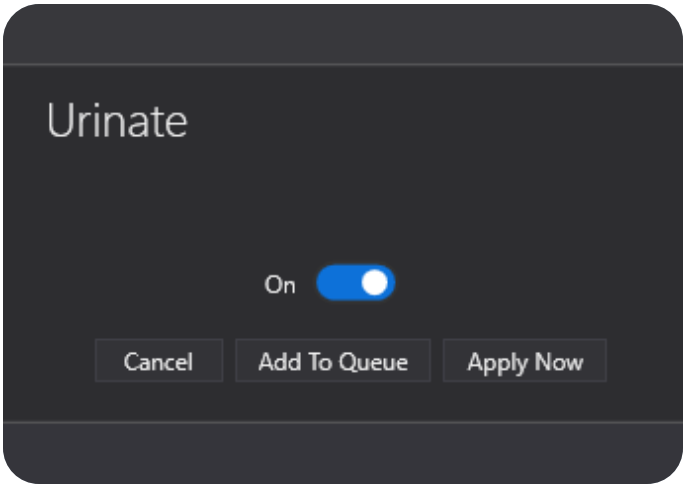
Lubricate the catheter before inserting.



3.9.5. Urination

Use UNI to have Pediatric HAL urinate by locating **Urinate** in the **Bowel** menu and selecting **On**.

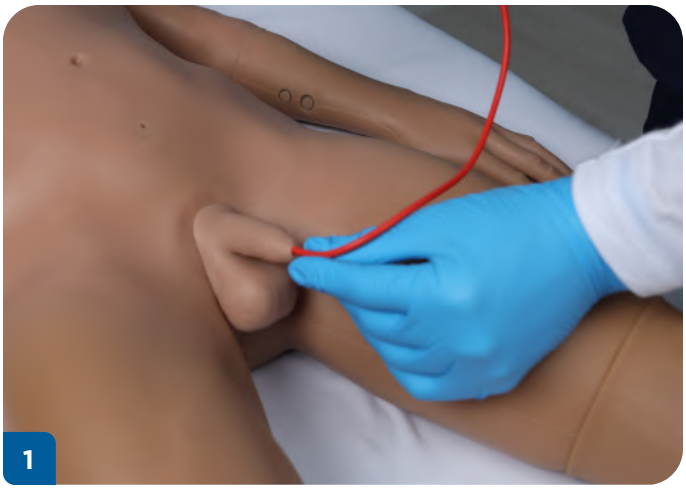


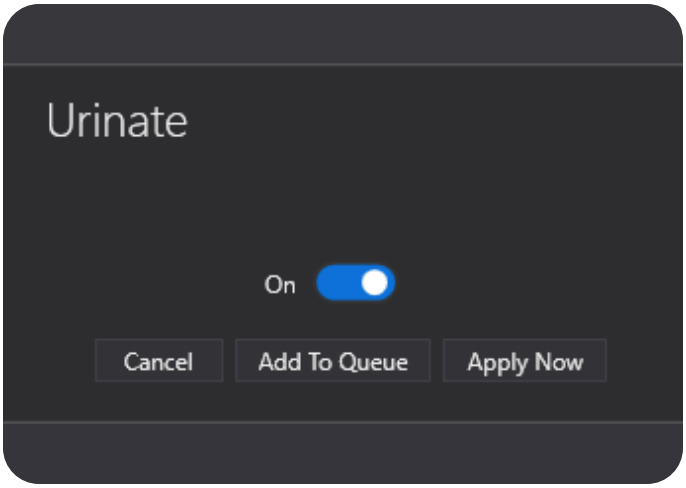


3.9.6. Flushing the Bladder

It is recommended to drain and flush the bladder after each simulation day.

1. Drain the rest of the contents of the bladder by either catheterization or activating the **Urinate** feature in UNI.



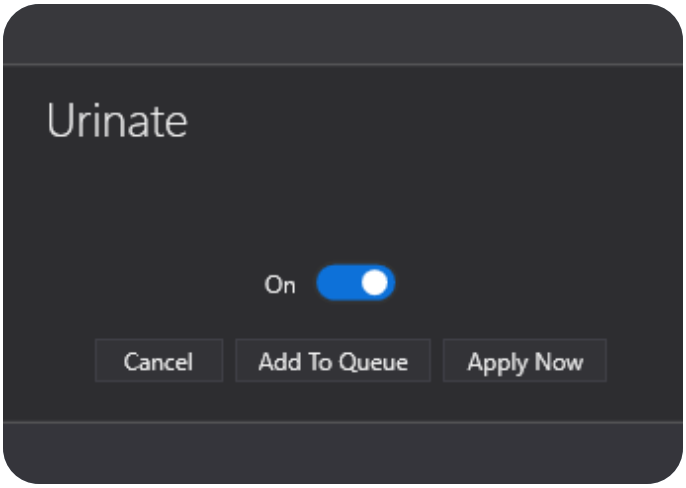


2. Remove the genitalia.

3. Fill the syringe with a 70:30 solution of water to isopropyl alcohol.

4. Plug in the adapter to the urine port and inject the solution.

5. Replace the genitalia and remove the fluid by either catheterizing or activating the urine function.



3.10 ROUTINE MAINTENANCE

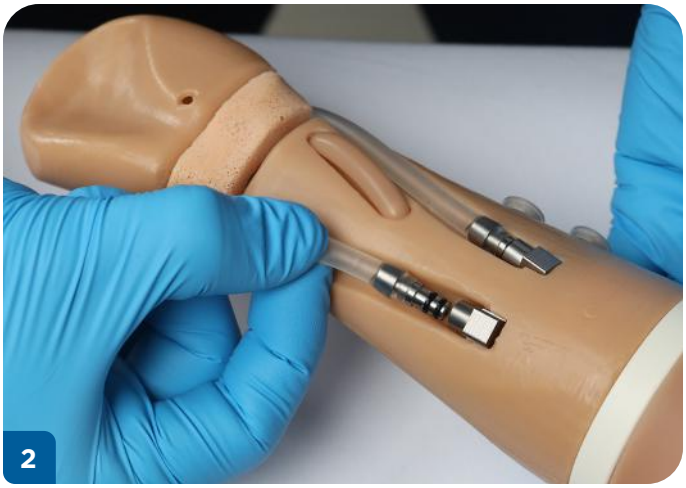
3.10.1. Replacing the Bilateral IV Arms' Anticubital Veins

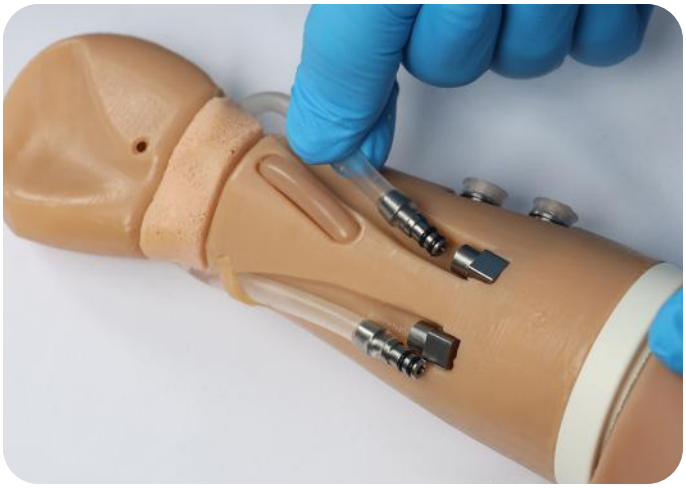
Pediatric HAL's inner anticubital vein tubes within both his wrists could use a routine replacement if they were to ever get clog, break, etc. To reach these vein tubes:

1. Roll down the lip of the arm skin to remove it completely in order to get a visual of Pediatric HAL's vein tube.


1

2. Unplug both sides of the vein tube from the port that connects to his vasculature reservoir.


2

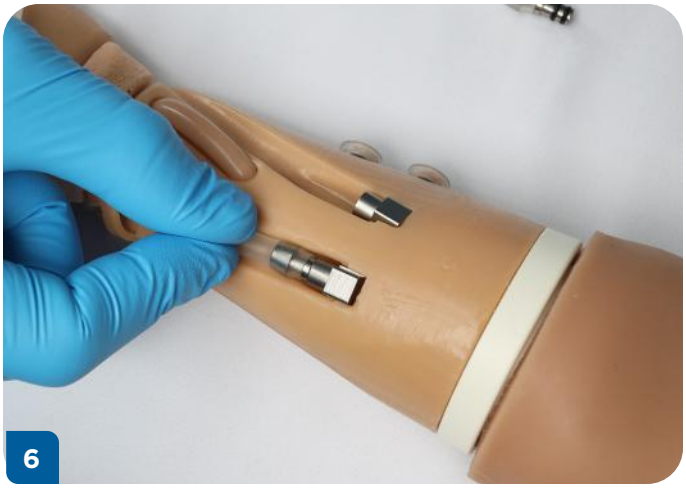


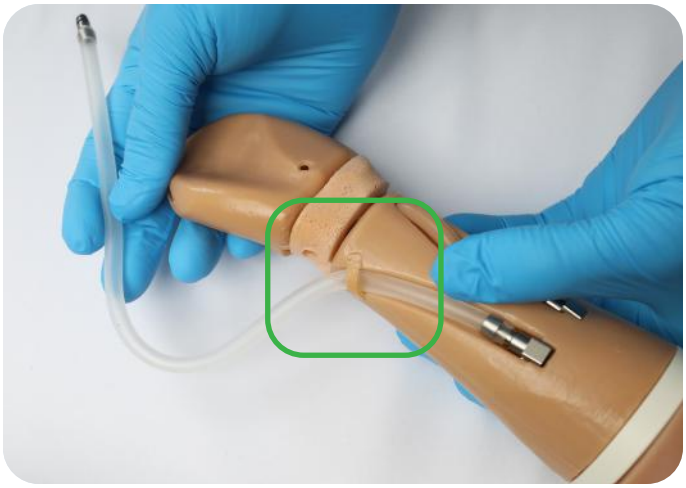
3. Pull both of the metal connectors apart from their sides of the vein tubes.

4. Slide the vein tube through the latches to fully remove it from the arm.

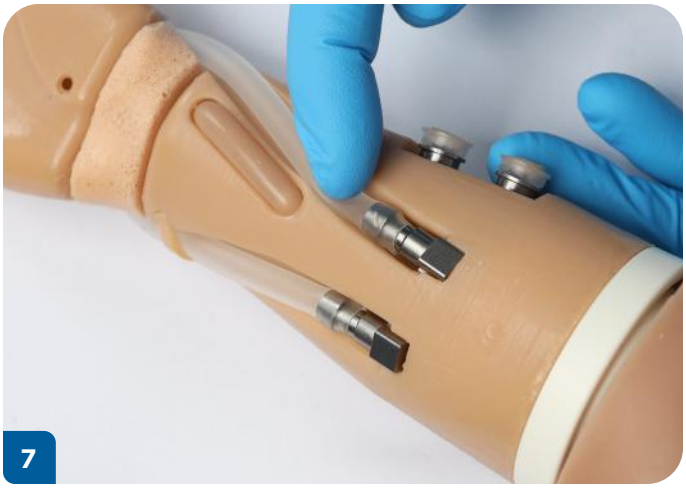
5. Replace the vein tube with a new one and insert the metal connectors back into the new vein tube.

6. Insert one end of the vein tube to the port on Pediatric HAL's wrist and slide the tube through the latches.





7. Connect the other end of the vein tube to Pediatric HAL's port



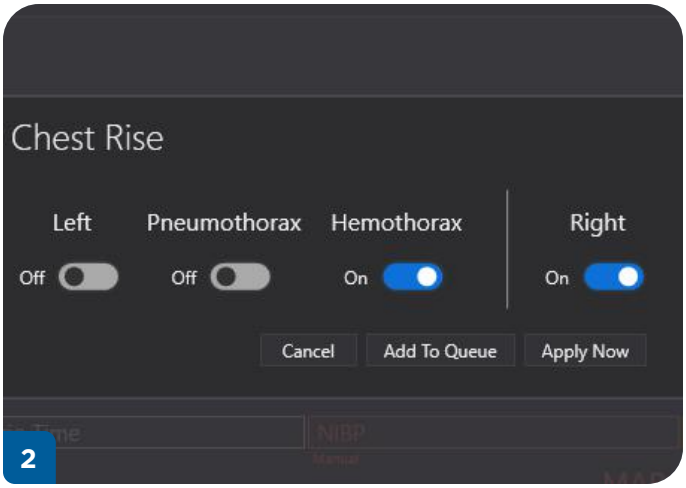
8. Carefully, align and roll up Pediatric HAL's arm skin back up until it fits flush with his upper wrist.

3.10.2. Flushing the Hemothorax Reservoir

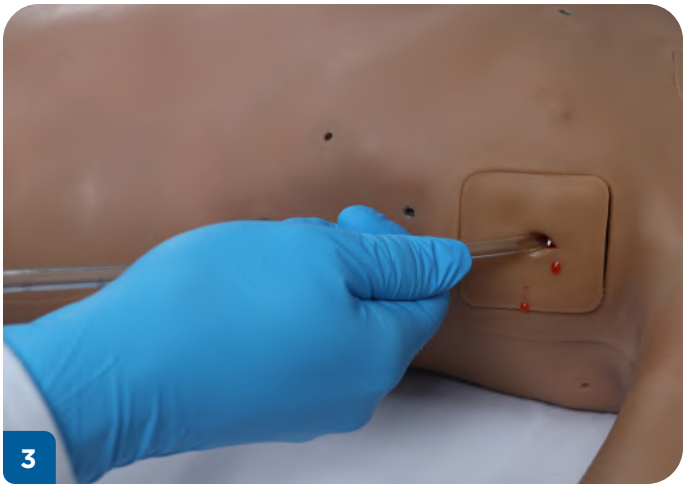
It is recommended to drain and flush the reservoir after every simulation day.

1. Inject a 70:30 solution of water to alcohol through the port in the right shoulder.

2. Activate the hemothorax feature in the software.



3. Insert a chest tube through a used hemothorax insert and allow the solution to flush out of the reservoir.



4. Working with UNI 3®

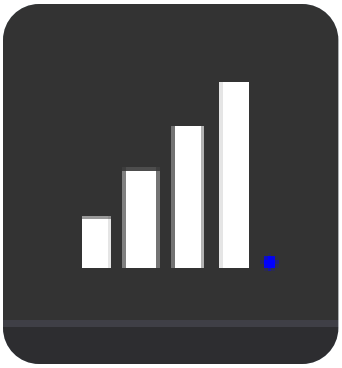
4.1 UNI® INTERFACE

The UNI 3 software is used to control the simulator, monitor the vital signs, and evaluate the provider's performance. The simulation technician or facilitator carrying out the simulation operates the UNI software.

The UNI control elements and scenario programming procedures are consistent throughout the Gaumard family of advanced fidelity simulators. Some software controls and features covered in this guide may be hidden depending on the simulator's hardware configuration and optional upgrade.

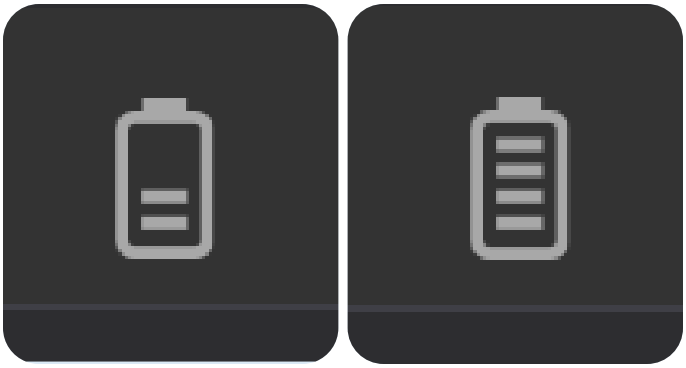
4.1.1. Connection Status

The communication indicator displays the status of the radio link between the tablet's Bluetooth feature/ USB RF module and the simulator. Full bars indicate excellent communication or normal operation.



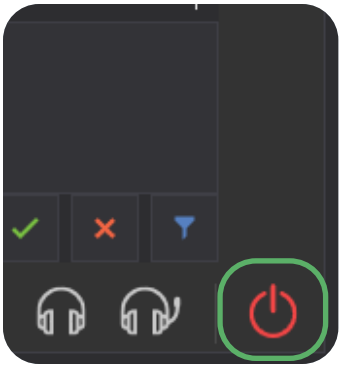
4.1.2. Battery Life Indicator

The battery indicator is located on the lower-left corner of the UNI software. The battery status indicator changes as the battery in the simulator is used; the less battery the simulator has, the less bars that will appear on the indicator.
When the battery is depleted, the simulator is set to STAND-BY mode automatically to protect the simulator's internal components. The simulator will not initialize until it has been recharged.



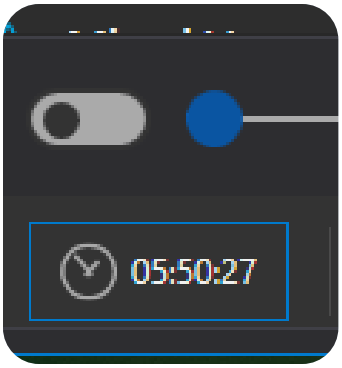
4.1.3. Power/Stand-by Button

The standby button is located on the bottom right corner of the UNI software. Use the stand-by feature to conserve battery.



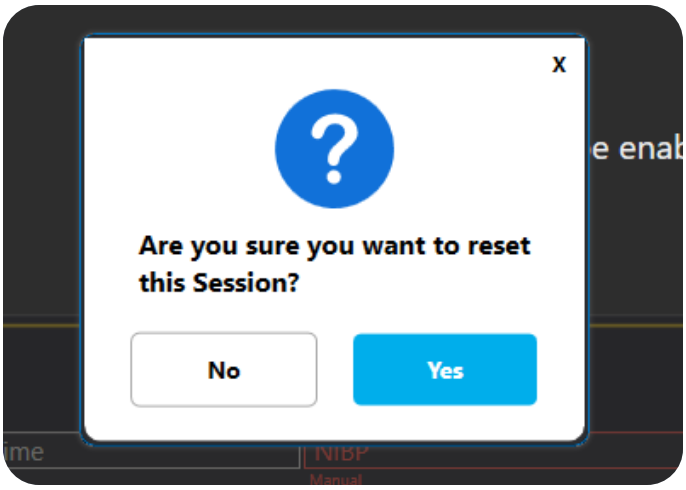
4.1.4. Session Clock

The session timer allows the facilitator to maintain a chronological record of individual simulation sessions. Events during the simulation are logged in accordance to the session time.



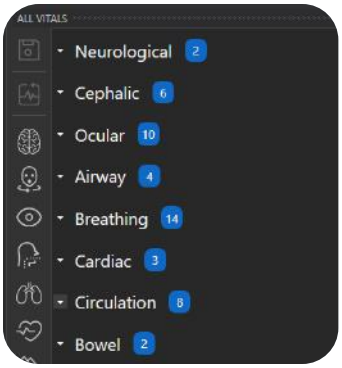
The session timer can be reset by right-clicking the session timer and selecting **Reset Session Clock**.

The session itself can also be reset by right-clicking the session timer and selecting **New Session**. Click **Yes** when the assurance prompt appears.



4.1.5. Systems List View

The vital menu's are divided into separate categories.




Neurological


Cephalic


Ocular


Airway


Breathing

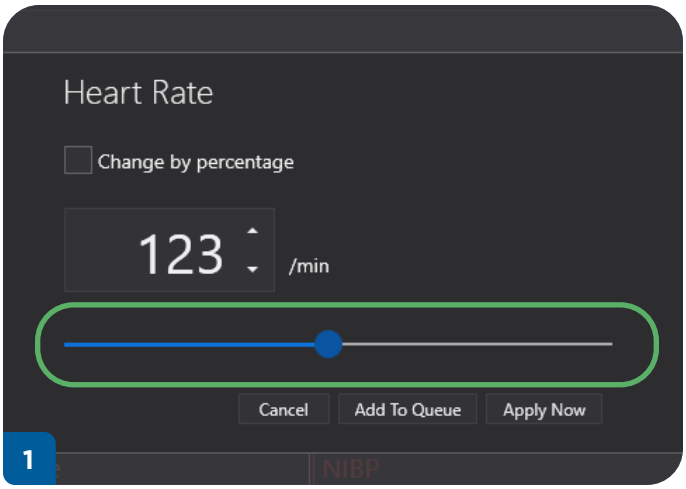

Cardiac


Circulation

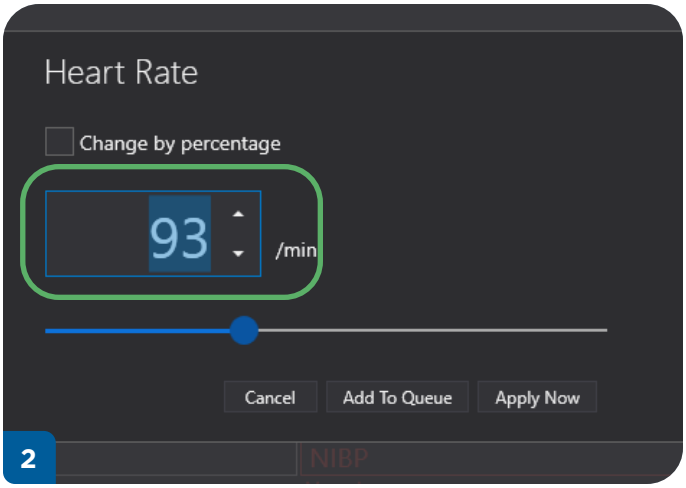

Bowel

4.1.6. Changing Vital Signs

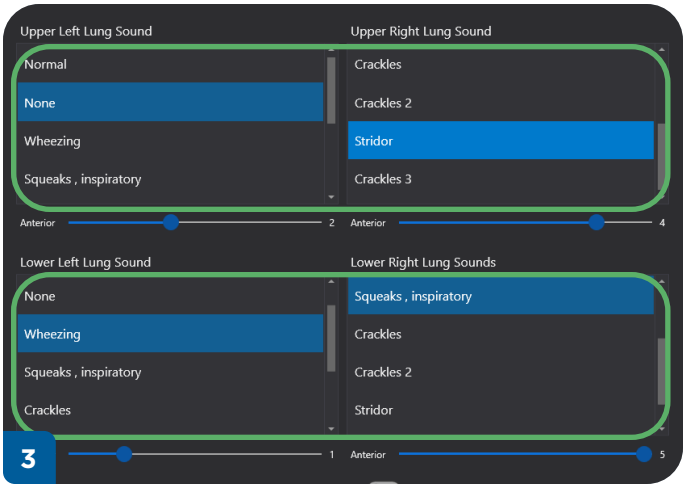
1. To adjust numerical values (e.g. heart rate, blood pressure, respiratory rate, etc.), click a vital and drag the slider control.



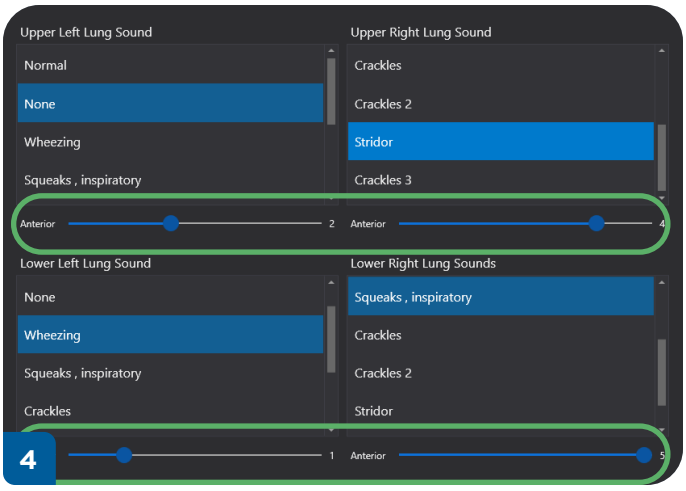
2. The facilitator may also use their keyboard for manual entry and click the green **Apply Now** to confirm the change.



3. To change patterns, sounds, and rhythms, click on the specific control to display the library (e.g. EKG rhythms, heart and lung sounds, respiratory patterns, etc.)

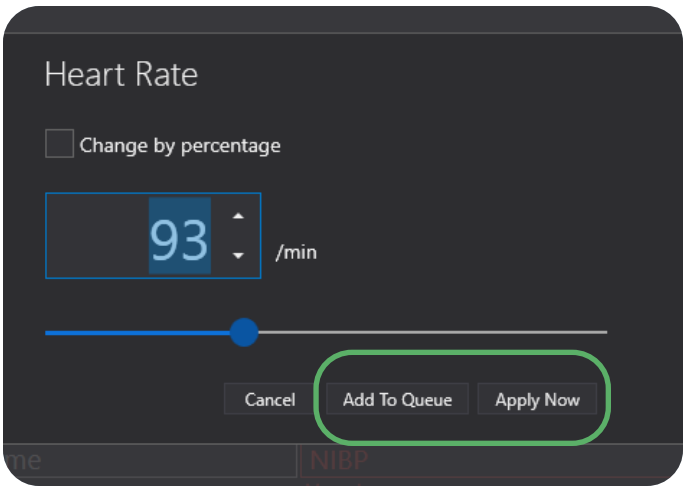


4. Click the slider control below the sound library to adjust the volume of the sounds.

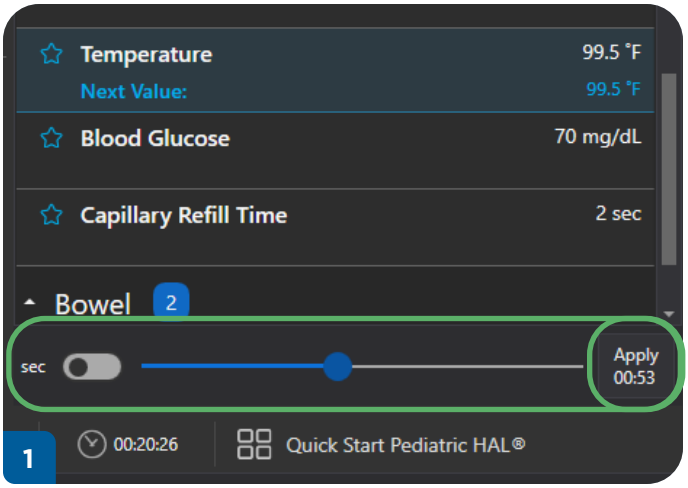


4.1.7. Applying Changes

When applying the changes, it is important to note that no changes will be made to the simulator's condition until they are applied by clicking **Apply Now**. If the conditions are added to queue, then they must be applied at **Apply 00:00**, where the zeros represent the facilitator's chosen time.



1. Adjust the slider to decide on which time the changes will be applied. Then, on the right-hand side of the slider, select **Apply** on whichever time it was adjusted to.



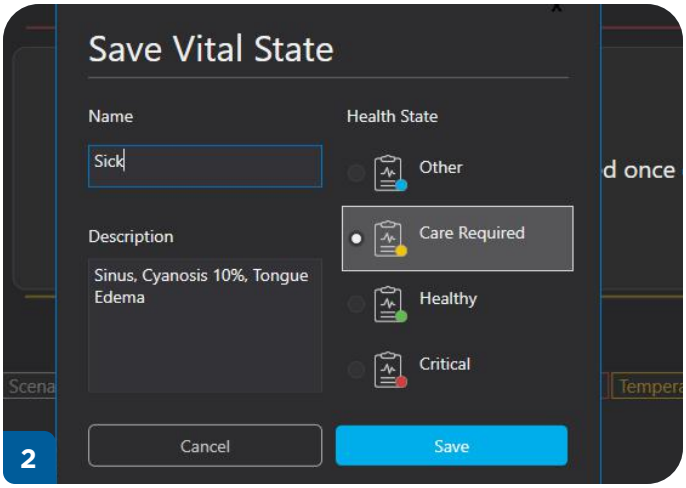
On the left-hand side of the slider is a box to check on seconds or minutes for when the conditions can be applied. The maximum amount of time for seconds is 2 minutes. The maximum amount of times for minutes is 59 minutes.

4.1.8. Creating Palette Items

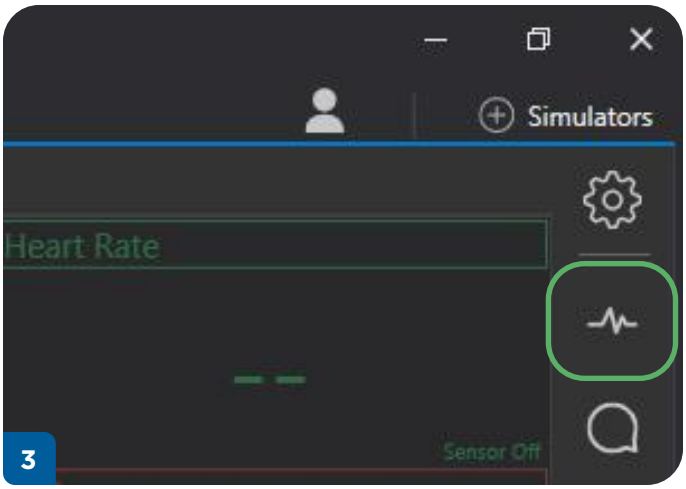
A palette item stores one or more vital sign settings into a single loadable object. Use a palette item to update a set of vital signs quickly. For example, one palette item can be created to update all the cardiac parameters to a healthy state.

1. To create a new palette item, set the values for the desired vital signs parameters and select the **Vital State menu** icon.

2. Enter a name for the palette, add a description, and choose a color code to refer to the Health State. Click **Save** to create the palette item



3. When the palette is needed, it can be searched for in the **Vital States** tab which can be found by clicking the **Vital States** icon.



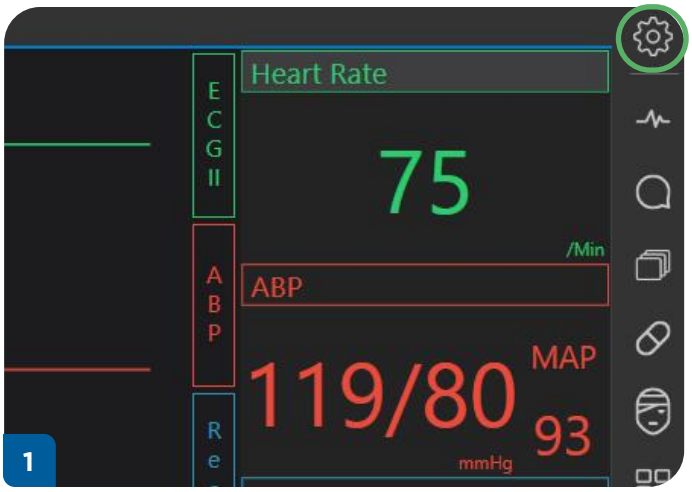
4.2 SCENARIOS

4.2.1. How to Create a Scenario

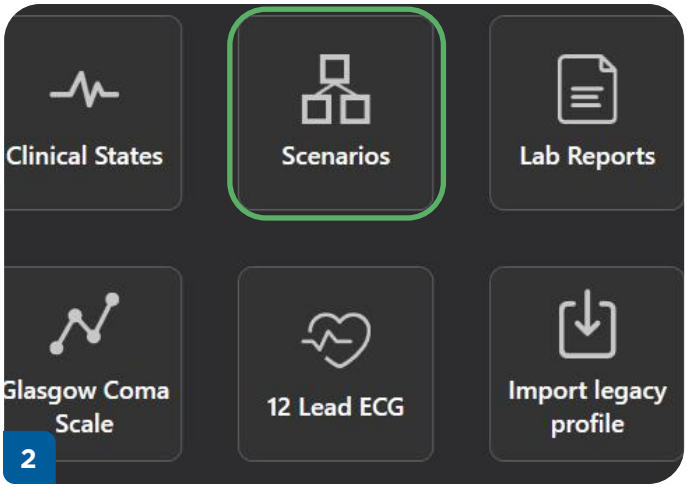
Create and apply scenarios in UNI to simulate a multitude of experiences! UNI has the capability to build a very simple, linear scenario to very complex, multi-path scenarios.

To create a simple, linear scenario:

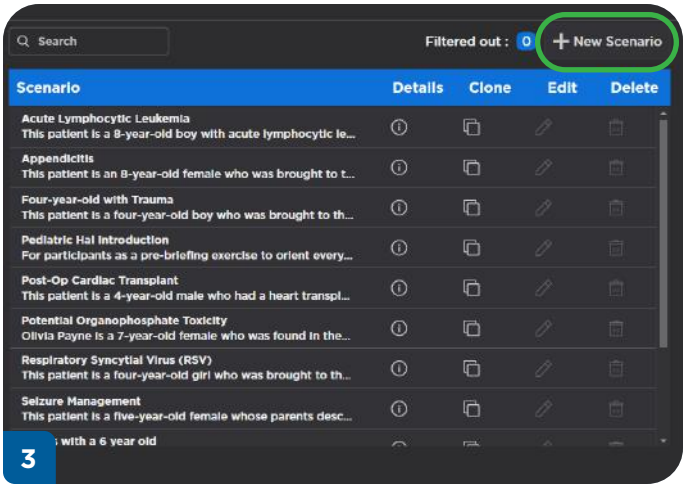
1. In UNI, click on the **Settings** icon in the upper right corner.



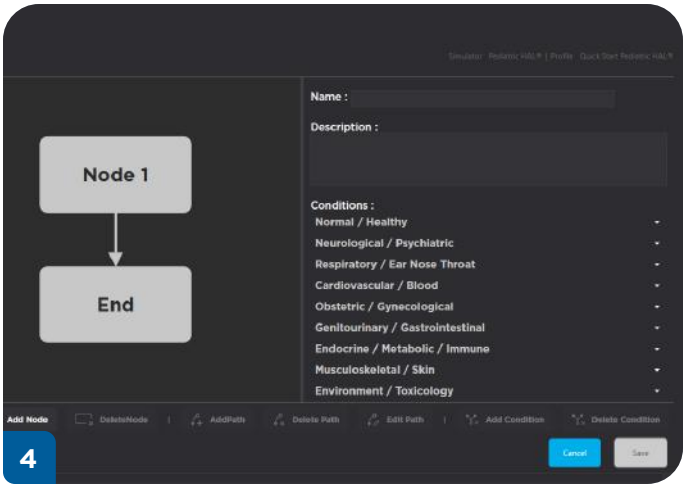
2. Under **Simulator Model**, click **Scenarios**.



3. Click **+ New Scenario**.

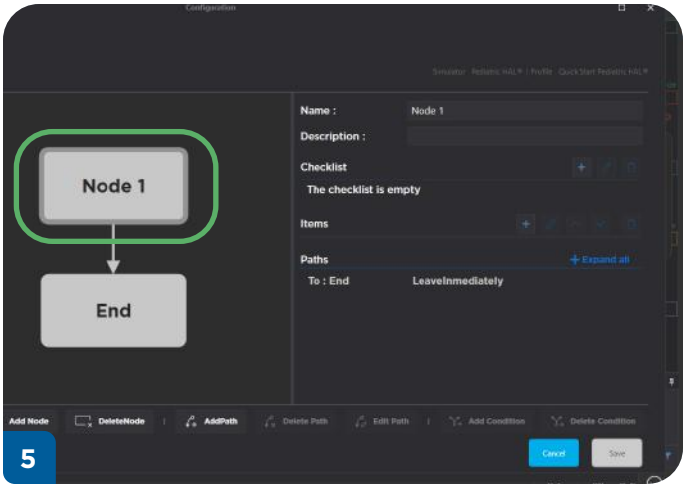


4. Give your scenario a **Name**, **Description**, and assign it a **Condition**.



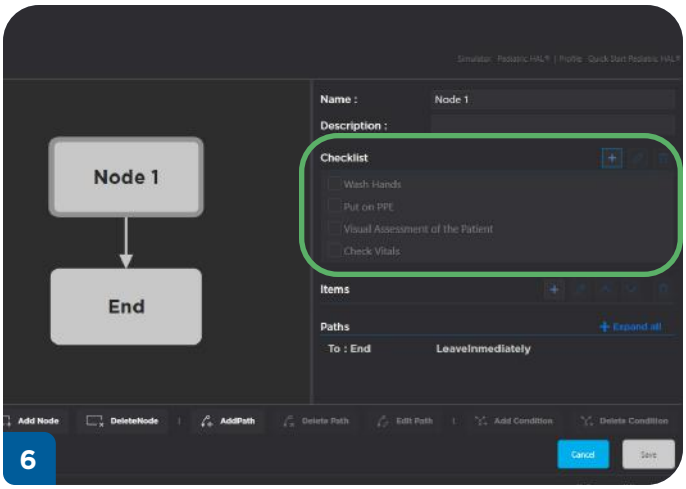
5. Click on **Node 1** to add information.

Nodes contain **Checklists**, **Items**, **Paths**, and **Conditions**.



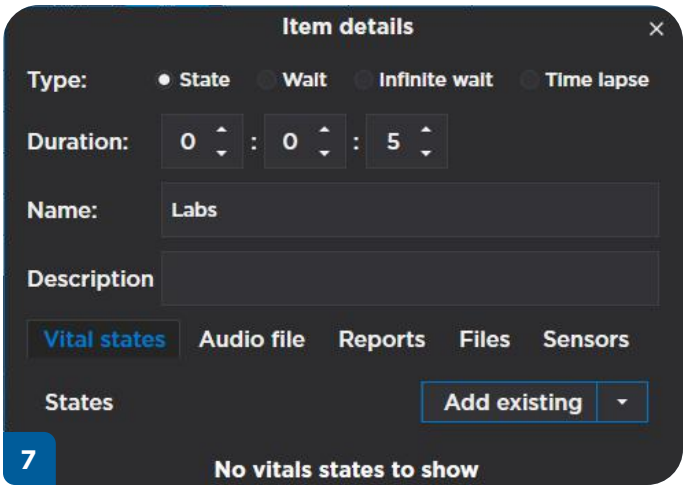
6. Click on the **Add Checklist +** icon to add a checklist to the **Node**.

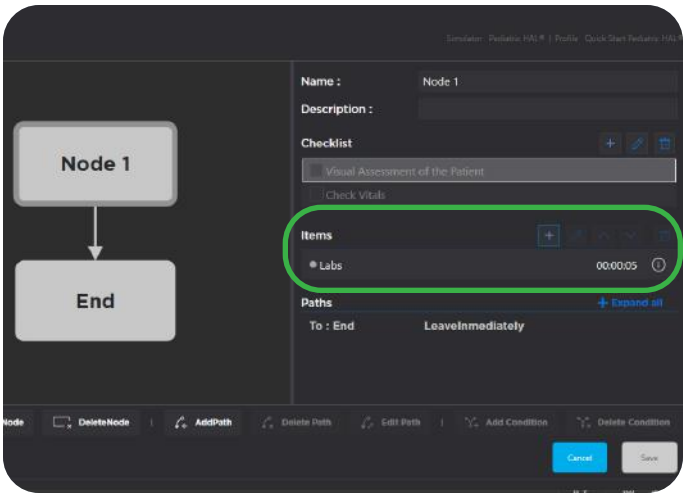
Checklists allow the user to create a list of actions or notes they would like to see participants do during the scenario. The checkboxes next to each entry allows the user to keep track of what the participants do or not.



7. Click on the **Add Item +** icon to add an item to the **Node**.

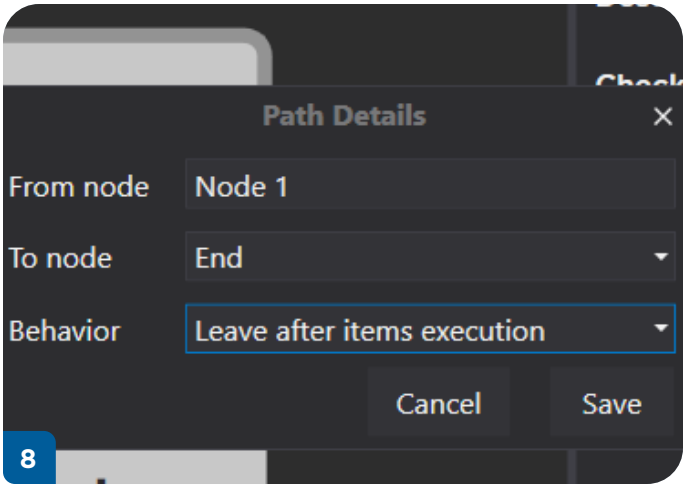
Items include **Visual States**, **Audio Files**, **Reports**, **Files**, and **Sensors**. All of these items can be created beforehand and then added to a scenario.

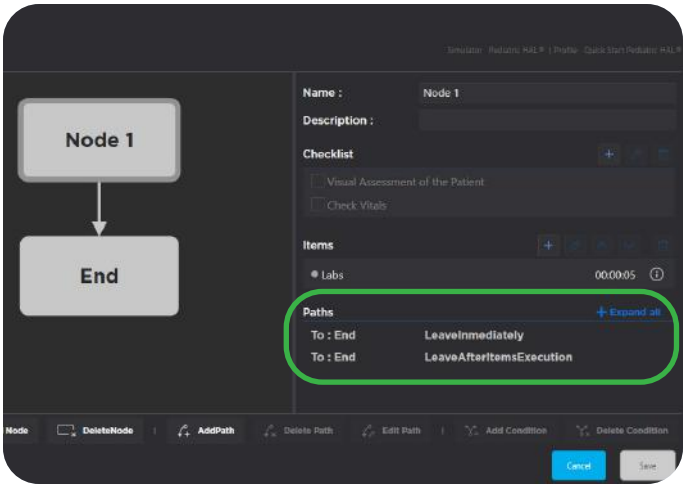




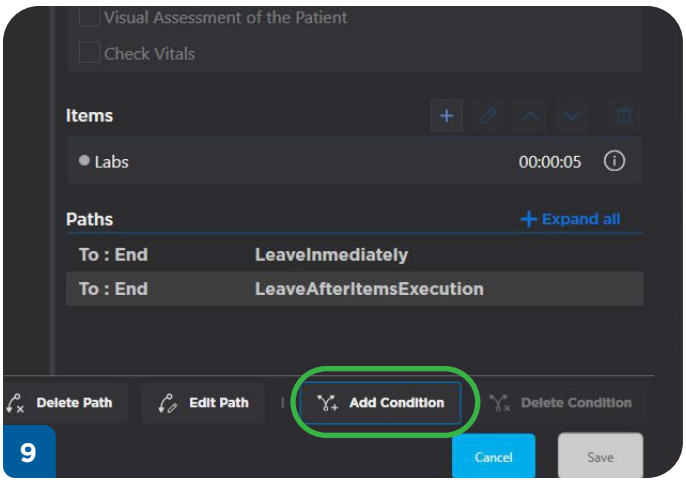
8. Click on the **Add Path +** icon to add a path to the **Node**.

A **Path** refers to the trajectory from one node to another after the last **Item** in a node plays. In this example, **Paths** can be used to tell **Node 1** to go to the **End**.

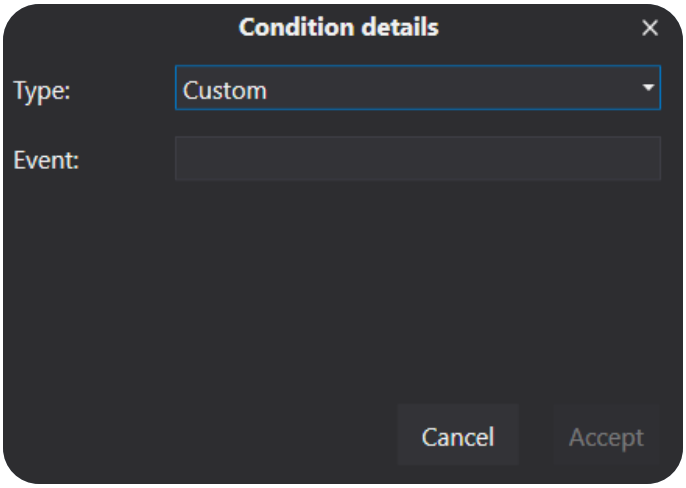




9. Click on a **Path** that has been added, then click the **Add Condition** icon to add a condition to the Node.



A **Condition** refers to the additional actions participants need to address before a **Node** finishes. This includes performing **Electrical Therapy**, administering **Medication**, performing **CPR**, packing or applying pressure to a **Trauma** site, opening an **Airway**, triggering a **Neurologic** pressure sensitive sites, and more.



10. Click **Save** to save changes to all the added information on your scenario.

4.2.2. How to Play a Scenario

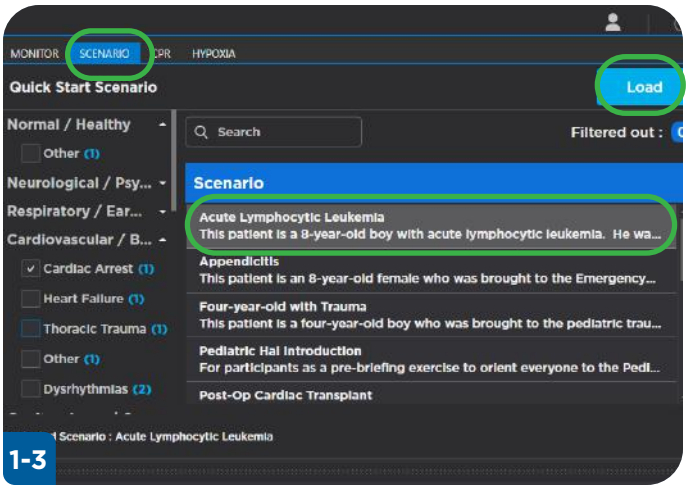
After creating a scenario the next step is to load and play it!

To load and play your scenario:

1. In UNI along the top toolbar, click the **Scenario** tab.

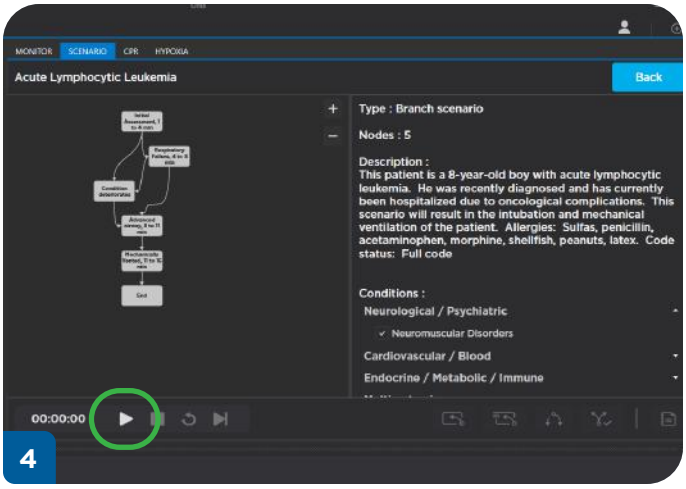
2. Select the desired scenario.

3. Click **Load**.



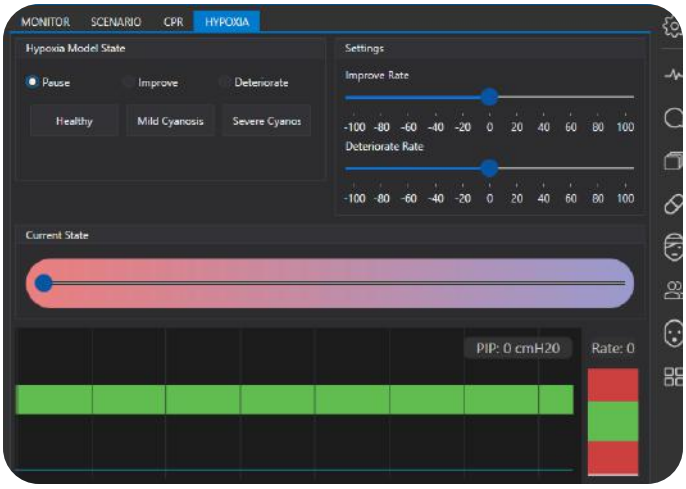
> **Select a System:** On the left-hand side, the kinds of scenarios are categorized by physiological systems to the left of the Quick Launch page; i.e. respiratory, cardiovascular, etc.

4. Click **Play**.



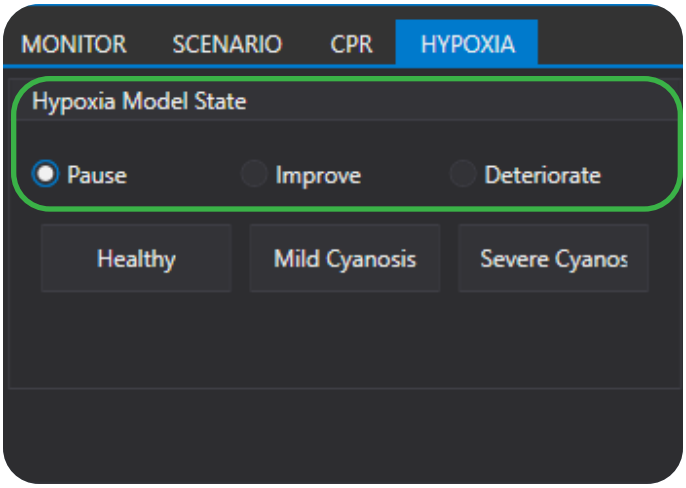
4.3 HYPOXIA MODELING

Use the Hypoxia tab to evaluate the effectiveness of provider intentions on an apneic patient. The model adjusts cardiac, oxygen saturation, and cyanosis dynamically in response to effective ventilations. The model also responds to the administration of virtual drugs.



4.3.1. Hypoxia Model State

The hypoxia model options improve or deteriorate the cardiac and respiratory vital signs gradually.

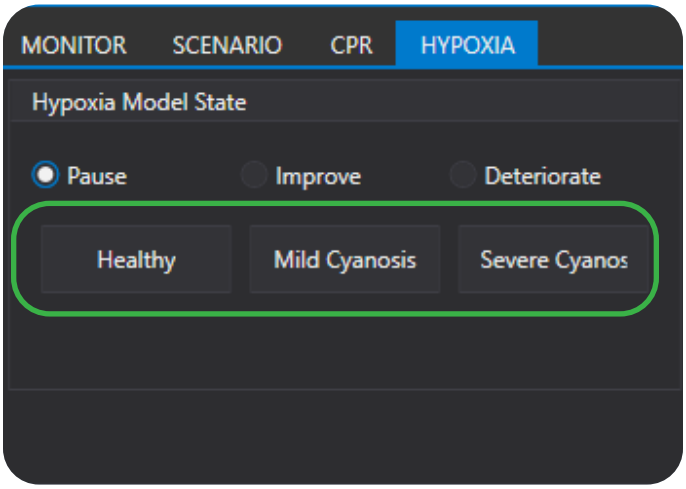


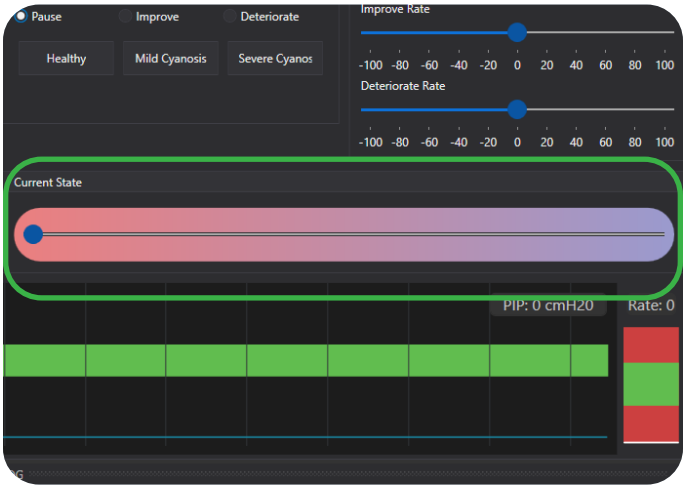
- **Pause**: Model will pause at the current state.
- **Improve**: Trend the vital signs to a healthy state.
- **Deteriorate**: Trend the vital signs to a severe cyanotic state. Ventilations are detected when the respiratory rate is at 0.

4.3.2. Cyanosis Levels

Select the cyanosis level to move to any of the following states immediately. You can see the changes on the pink-to-blue slider seen under **Current State** in the **Hypoxia** tab.

- **Healthy**: Pediatric HAL is pink with adequate oxygenation.
- **Mild Cyanosis**: Pediatric HAL is slightly blue and the vital signs are starting to deteriorate.
- **Severe Cyanosis**: Pediatric HAL is blue, apneic, and vital signs are rapidly worsening.





4.3.3. Modeled Therapy

The modeled therapy menu provides additional Intervention options.

- **Improve Rate**: Adjust the slider to increase or decrease the improving cyanotic response to ventilations.
- **Deteriorate Rate**: Adjust the slider to increase or decrease the deteriorating cyanotic response to ventilations.

5. Options

5.1 VIRTUAL MONITOR

5.1.1. Gaumard Vitals

The Gaumard Virtual Vital Signs Monitor simulates vital sign monitoring equipment. It offers participants the versatility of a bedside patient monitor. The vital signs are synchronized through a wireless connection between the facilitator's laptop and the virtual monitor.

Each trace can be customized independently; users can set alarms, time scales, boundaries and grid options. In addition, it allows the facilitator to display lab reports, x-rays, and other files on the Virtual Monitor screen for use by the provider.

- The control PC and the bedside virtual monitor PC automatically establish a wireless link at startup. The wireless connection allows Gaumard control software to transmit the vital signs information to the Gaumard Vitals software.
- Be sure both the control tablet that runs UNI and the virtual monitor that runs Gaumard Vitals are connected to the same WiFi network.
- After the wireless connection is established, double click or tap the Gaumard Vitals Icon on the desktop to start the vital signs software.
- To verify the wireless link between the two computers, click the WiFi icon on the desktop.

The wireless network name is configured at the factory and may differ from the one seen here.

- The Gaumard Vitals software is now ready to receive the vital signs information generated by the UNI 3 control software.
- For more details on using the UNI 3 software see the UNI 3 user guide.

Connecting UNI 3 and Gaumard Vitals

For information and steps pertaining how to connect UNI 3 to Gaumard Vitals, refer to 2.5's subsection titled "Connecting UNI 3 and Gaumard Vitals" on page 30.

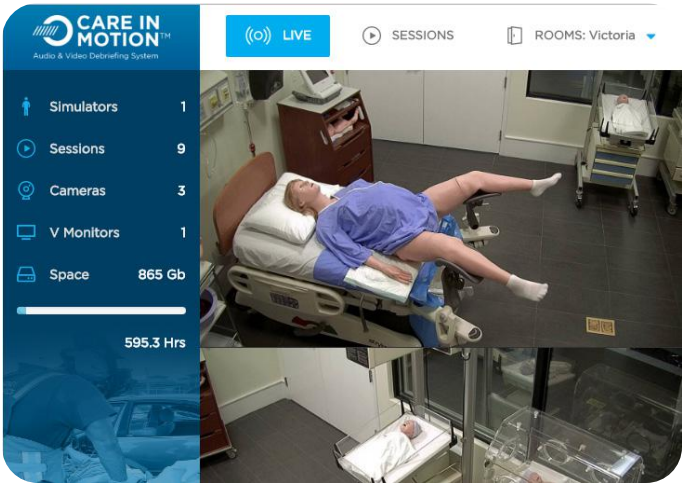
5.2 CARE IN MOTION™ GO!

Care in Motion™ GO! is only available at initial time of purchase.

Care in Motion™ GO! is a video recording and playback platform designed to maximize learning through video-assisted debriefing.

The Care in Motion™ GO! package consists of:

- Care in Motion Tablet PC
- 2 Battery-powered HD wireless cameras
- 2 adjustable camera grips
- Transport case
- One-Year Limited Warranty
- Extended service pans available.



6. Troubleshooting

6.1 CONNECTIVITY

Issue	Probable Cause	Solution
Battery indicator question mark	Pediatric HAL battery needs a charge.	Disconnect and reconnect battery charger and allow the simulator to charge fully.
Virtual monitor not connecting	Computers and tablets may not be matching in important network details.	Check that both computers/tablets are connected to the same Wi-Fi network, and check that firewalls are turned off on both computers/ tablets. Verify that the IP & Port numbers match from the UNI software on the Gaumard Monitors.

6.2 CO_2 NOT DETECTED

Issue	Probable Cause	Solution
CO_2 function on simulator is not correctly performing..	CO_2 tubing is not connected properly	Check the equipment set up and the cartridge's connection to the simulator, and adjust Lung CO_2 level in the UNI software.

6.3 PULSES NOT ACTIVATED ON TOUCH

Issue	Probable Cause	Solution
Pulses not activating when touched upon by fingers.	Blue Pulse line is not connected properly	Ensure that the connection with the blue pulse lines are secure within the left and right lower legs. It will be necessary to remove both lower legs from the upper thighs and reattach the blue pulse lines so that they remain secure.

7. Appendix

7.1 PARTS LIST

S2225 Part ID	Name	Description
S2225.010	Battery	Rechargeable battery
S2225.123L	Lower Left Arm Skin Cover	Lower Left Arm Skin Cover consumable
S2225.123R	Lower Right Arm Skin Cover	Lower Right Arm Skin Cover consumable
S2225.029R	I/O Leg Skin Cover	Skin cover for right leg tibia bone
S2225.031	I/O Tibia Bones	I/O leg tibia reservoir bones
S2225.037.R2	Simulated Cricothyroid Membrane	Simulated Cricothyroid Membrane consumable
S2225.112	Pneumothorax Insert	Pneumothorax Insert consumable
S2225.122	Trachea Skin Cover	Trachea Skin Cover consumable
S2225.080	Artificial Blood Concentrate	Simulated blood
S2225.181	Mineral oil	Oil-based mineral lubricant

7.2 GAUMARD SALES TERMS AND CONDITIONS

These Gaumard Scientific Company, Inc. (“Gaumard”) Sales Terms and Conditions (“Terms”) apply to the sale or use of Gaumard equipment (“Equipment”), Software (“Software” as defined in paragraph 13), and supplies (“Supplies”), collectively referred to as “Product” or “Products” between Gaumard and the entity named on the applicable Gaumard Purchase Order (“Customer”) (collectively, “Party” or “Parties”). The Parties, intending to be legally bound, agree as follows.

1. Agreement. Customer agrees to purchase from Gaumard the Products set forth in quotes and purchase orders accepted by both Customer and Gaumard from time-to-time. These Terms, along with any Exhibits, any applicable Gaumard Purchase Order documents, Gaumard Warranty documents, Gaumard Cares Service Plan documents, and any other purchasing or service documents executed by the Parties constitute the complete and entire agreement between Gaumard and Customer (collectively referred to herein as the “Agreement”). This Agreement will supersede all other quotations, agreements, understandings, warranties, and representations (whether written or oral) between the Parties with respect to the subject matter set forth in the Agreement. Any Customer documentation (including Customer’s purchase order terms and conditions) that conflicts with or attempts to modify the Agreement in any way is hereby rejected and of no effect unless specifically agreed to in writing and signed by the Parties. No provision of this Agreement shall be waived, amended, modified, superseded, canceled, terminated, renewed, or extended except in a written document signed by both Parties or signed by the Party against whom the modification is sought to be enforced. This agreement can be terminated by Gaumard without cause by giving thirty (30) days prior written notice to Customer.

2. Prices. Prices, fees, and charges for Products and services (including maintenance, installation, and training as described in the applicable Gaumard Purchase Order documents, Gaumard Warranty documents, Gaumard Cares Service Plan documents) (“Service” or “Services”) are payable in United States (U.S.) Dollars only, and do not include any applicable taxes or shipping charges. If Customer claims any tax exemption, it must furnish a valid tax exemption certificate before shipment of Products. Unless such certificate is furnished, Customer agrees to pay at its sole expense all applicable taxes, assessments, fees, penalties, import duties, and merchandise processing fees that may be levied or assessed upon Customer or Gaumard with respect to this Agreement, the Products, or any interest thereon. Gaumard reserves the right to increase prices on thirty (30) days written notice to Customer.

3. Payment. Unless otherwise agreed to in writing by Gaumard, Customer shall pay invoices net twenty (20) days from the invoice date. A late charge will be due on any unpaid balance at a rate of 1.0% per month or the maximum rate otherwise permitted by law, whichever is lower. Gaumard may charge interest at the maximum rate permitted by law on all amounts not paid by the invoice due date. Gaumard retains a purchase money security interest in all Products sold to Customer to secure payment of the total purchase price thereof. Customer hereby grants Gaumard the right to file a copy of this Agreement with any appropriate authorities to evidence this security interest. Customer agrees to execute and deliver such other documents as Gaumard may request in connection therewith. Gaumard shall not be obligated to deliver any Product or perform any Service during any period when Customer payment is past due. Customer will be responsible for all costs (including reasonable attorneys’ fees) incurred by Gaumard to collect overdue payments and/or to take possession or otherwise dispose of Products for which payment is overdue.

4. Product Shipment and Risk of Loss. Unless otherwise agreed to in writing by Gaumard, all Products will be shipped F.O.B. Origin, regardless of any provisions for payments of freight, insurance, the form of shipping documents, or selection of carrier by Gaumard. F.O.B. Origin means title to the Products passes to the Customer at the shipping dock of Gaumard or Gaumard’s supplier or authorized agent. Customer is responsible for shipping charges and for the cost of insurance paid to cover any losses from Gaumard’s shipment point to Customer’s receipt. Gaumard will assist Customer in processing any loss claims. Gaumard shall use reasonable efforts to meet the specified delivery dates. If Gaumard fails to make delivery within a reasonable time for reasons other than Customer’s fault or circumstances beyond Gaumard’s reasonable control, then Customer’s only remedy is the right to terminate the applicable Purchase Order, whereupon Gaumard will refund any prepayments received from Customer relating to such Purchase Order.

5. Installation and Acceptance. Product orders are subject to 1) written acceptance by Gaumard, 2) receipt of specified deposits, as applicable and 3) continuing credit approval. If applicable, Gaumard will install Equipment at an agreed upon location ("Installation"). Installation shall be complete upon Gaumard's demonstration that the Equipment meets Gaumard's then-current operating specifications ("Installation"). Installation

is subject to Customer cooperating in preparing and maintaining the site in compliance with Gaumard specifications, including but not limited to, applicable electrical and other connection regulations and all environmental conditions. If Customer fails to accept shipment of Products other than for breach of warranty, Customer shall immediately pay the full purchase price as if shipment and Installation had occurred. If Customer fails to accept Products and if Gaumard decides to store ordered Products, Customer shall be responsible for Gaumard's reasonable insurance, handling, and storage charges. If Gaumard elects not to store ordered Products, Gaumard may arrange shipment and storage in a bonded warehouse at Customer's sole risk and expense.

6. Delay of Performance. The Parties' obligations under this Agreement are subject to force majeure, including but not limited to, civil insurrection, terrorism, fire, flood, labor disputes, shortages, delays of suppliers or contractors, or government priority systems, actions taken or threatened by any governmental agencies, acts of God or other contingencies or acts not within the sole control of the Parties. Gaumard reserves the right during any shortage period to (a) make Supplies available to Customer (as it sees fit) without any liability to Customer, and (b) to make substitutions and modifications in the specification of any Products, provided such substitutions or modifications do not materially affect the performance of Products.

7. WARRANTIES. Gaumard warrants that if a Product proves to be defective in material or workmanship within one year from the date on which title to the Product passes to the Customer ("Warranty Period"), Gaumard will, at Gaumard's option, repair or replace the Gaumard product. This limited warranty covers all defects in material and workmanship in the Gaumard product, except: (a) Damage resulting from accident, misuse, abuse, neglect, or unintended use of the Gaumard product; (b) Damage resulting from failure to properly maintain the Gaumard product in accordance with Gaumard product instructions, including failure to properly clean the Gaumard product; and (c) Damage resulting from a repair or attempted repair of the Gaumard product by anyone other than Gaumard or a Gaumard representative. Replacement parts are warranted for the remainder of the Warranty Period or ninety (90) days from shipment, whichever is longer. Services are warranted to be supplied in a workman-like manner. Gaumard does not warrant that use of the Products will be uninterrupted or error-free, or that the Products will operate with non-Gaumard authorized third-party products. THE FOREGOING WARRANTIES ARE IN LIEU OF AND EXCLUDE ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED BY OPERATION OF LAW OR OTHERWISE, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT. SUCH LIMITED WARRANTY IS GIVEN SOLELY TO THE ORIGINAL CUSTOMER AND IS NOT GIVEN TO ANY THIRD PARTY INCLUDING, WITHOUT LIMITATION, SUBSEQUENT PURCHASERS OR USERS OF THE PRODUCTS OR CUSTOMERS OF THE CUSTOMER. THIS WARRANTY IS VOID UPON TRANSFER OF PRODUCT BY CUSTOMER TO ANY OTHER ENTITY. SOME STATES DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES SO THE ABOVE EXCLUSIONS MAY NOT APPLY TO CUSTOMER. These warranties do not apply to any Products that are supplied on a pre- release or "as-is" basis.

8. Warranty Claims and Remedies. In the event of any warranty claim, Gaumard will replace with new or repaired items any Product part or component that is in breach of the above limited warranties. Alternatively, Gaumard may elect to repay or credit to Customer an amount equal to the purchase price of the defective Product. Items replaced shall become Gaumard property. All claims shall be initiated by contacting Gaumard within the applicable Warranty Period and within thirty (30) days after discovery of the non- conformity. If Customer has failed to notify Gaumard within the Warranty Period, then Customer shall be barred from instituting any action thereafter. Customer shall not return the Product to Gaumard without prior authorization from Gaumard. If the necessary repairs to the Product are covered by this limited warranty, then Customer will pay only the incidental expenses associated with the repair, including any shipping, handling, and related costs for sending the product to Gaumard and for sending the product back to the first purchaser. However, if the repairs are not covered by this limited warranty, then Customer will be liable for all repair costs in addition to costs of shipping and handling. Upon request, Gaumard must be given access to and an opportunity to inspect the Product and any working areas and storage areas. These remedies shall comprise Gaumard's entire liability and Customer's exclusive remedy for breach of warranty and are in lieu of any other remedies at law or equity.

9. LIMIT OF LIABILITY. GAUMARD SHAL®L NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL, PUNITIVE, EXEMPLARY, OR CONSEQUENTIAL LOSSES, DAMAGES, OR EXPENSES (INCLUDING BUT NOT LIMITED TO LOSS OF PROFITS, DATA, OR USE), DIRECTLY OR INDIRECTLY ARISING FROM THE SALE, HANDLING, SERVICE, OR USE OF PRODUCT OR SERVICES ORDERED OR FURNISHED, OR FROM ANY CAUSE RELATING THERETO. EXCEPT FOR PERSONAL INJURY OR DEATH TO THE EXTENT RESULTING FROM GAUMARD'S NEGLIGENT OR INTENTIONALLY WRONGFUL ACTS OR OMISSIONS, IN NO EVENT SHAL®L GAUMARD BE LIABLE UNDER ANY LEGAL THEORY OR FOR ANY CAUSE RELATED TO A PRODUCT OR

SERVICE, WHETHER BASED UPON WARRANTY, CONTRACT, TORT, NEGLIGENCE, OR OTHER THEORY, EVEN IF ADVISED OF THE POSSIBILITY THEREOF, FOR ANY AMOUNT IN EXCESS OF THE PRICE, FEE, OR CHARGE RECEIVED BY GAUMARD FOR SUCH PRODUCT OR SERVICE.

10. Governmental Authorizations. Customer is responsible for compliance and costs associated with all required licenses, permits, or other governmental authorizations, including but not limited to, any license or certification needed for Customer to use the Product, and any export or import license, exchange permit, or the like ("Licenses"), even if applied for by Gaumard on Customer's behalf. If any authorization is delayed, denied, revoked, restricted, or not renewed, Gaumard shall not be liable, and Customer is not relieved of its obligations. Customer represents and agrees that it will handle all Product and technical data related to the Licenses so that it conforms to all applicable U.S. laws and regulations, including U.S. export licensing laws and the U.S. Foreign Corrupt Practices Act. Customer shall not trans-ship, divert, re-export or otherwise dispose of any U.S. origin goods or technology obtained from Gaumard except as U.S. laws and regulations expressly permit.

11. Indemnity.

a. Gaumard agrees to indemnify, defend and hold Customer, its officers, directors, employees, agents and contractors harmless from and against all loss, damage, liability, cost and expense (including reasonable attorneys' fees and expenses) by reason of any claims or actions by third parties against Customer for (1) bodily injury or death, and damage, loss or destruction of any real or tangible personal property, which third party claims arise out of or relate to Gaumard's gross negligence or willful misconduct or (2) infringement or misappropriation by Gaumard of any intellectual property rights under this Agreement.

b. Customer agrees to indemnify, defend and hold Gaumard, its officers, directors, employees, agents and contractors harmless from and against all loss, damage, liability, cost and expense (including reasonable attorneys' fees and expenses) by reason of any claims or actions by third parties against Gaumard for (1) bodily injury or death or damage, loss or destruction of any real or tangible personal property, which third party claims arise out of or relate to Customer's gross negligence or willful misconduct; (2) infringement or misappropriation by Customer of any intellectual property rights; or

(3) Customer's or its customer's use of the Products or Services, including without limitation, defamation, libel, slander, obscenity, pornography, or violation of the rights of privacy or publicity, or spamming or any other tortious or illegal conduct.

12. Software License. For purposes of these Terms, the term "Software" includes all Gaumard computer software, firmware, and associated documentation, whether in printed or machine-readable form, supplied by reason of this Agreement or for use in connection with Equipment or Services. To the extent the Product includes Software, Customer's use of the Software is governed by the Gaumard End User License Agreement attached as Exhibit A to these Terms.

13. Confidential Information. Customer shall maintain the confidentiality of any information provided or disclosed by Gaumard relating to the Software (as defined above), business or customers of Gaumard, as well as this Agreement and its terms (including the pricing and other financial terms under which the Customer will be obtaining the Services hereunder). Customer shall use reasonable care to protect the confidentiality of Gaumard's information disclosed, but no less than the degree of care it would use to protect its own confidential information, and shall only disclose Gaumard's confidential information to its employees and agents having a need to know this information and who are subject to confidentiality agreements having terms at least as restrictive as those contained herein. The obligations of confidentiality set forth herein shall not apply to any information in the public domain at the time of disclosure.

14. Intended Uses. Products are only intended for the uses described in the applicable user's manual or instructions for use. Customer assumes all risks associated with non-listed uses of Products and hereby indemnifies and holds Gaumard harmless from any claim associated with such non-listed uses.

15. Compliance with Laws. Gaumard and Customer agree to comply with all federal and state laws that govern the enforceability and performance of this Agreement.

16. HIPAA Compliance. As of the Effective date, the Parties are not planning to transfer any personal patient information between them. However, the Parties understand and agree that this Agreement may become subject to the Health Insurance Portability and Accountability Act of 1996 as amended ("HIPAA"), the privacy and security regulations promulgated thereunder, including 45 C.F.R. 160, 162 and 164, as amended (the "HIPAA Regulations"), and Title XIII of Division A and Title IV of Division B (the "Health Information Technology for Economic and Clinical Health Act ("HITECH"), part of the American Recovery and Reinvestment Act of 2009 (Pub. L. 111-5) ("ARRA"). The Parties agree to strictly comply with HIPAA

and to execute any documents that may be required by HIPAA, HITECH, and any other applicable federal or state privacy laws and regulations. The Parties agree that if they directly or indirectly gain access to Protected Health Information ("PHI") held by the other Party during any interaction, the receiving Party will keep the PHI confidential under the terms of this Agreement

17. State Reporting and Disclosure Laws. Unless otherwise noted in this Agreement, the cost of any Product training provided by Gaumard shall be included in the purchase price of the Product where applicable. Customer acknowledges and agrees that state reporting laws may require Gaumard to disclose certain aspects of this arrangement.

18. Fraud and Abuse. Gaumard hereby certifies that it is not currently a listed vendor in the: (a) Federal General Services Administration's "List of Parties Excluded from Federal Procurement or Nonprocurement Programs" in accordance with Presidential Executive Orders 12549 and 12689 "Debarment and Suspension;" and (b) in the Office of the Inspector General of the Department of Health and Human Services' "List of Excluded Individuals/Entities." Any discounted pricing terms offered under this Agreement may be a "discount or other reduction in price" under the Federal Anti-Kickback Statute, 42 U.S.C. § 1320a-7b(b). Customer shall take all actions necessary to comply with the Anti-Kickback Statute discount safe harbor regulations, 42 C.F.R. § 1001.952(h), including but not limited to, (1) maintaining accurate records reflecting the pricing terms of items and Services purchased under this Agreement, (2) fully and accurately report any discount received under this Agreement if applicable, and (3) make available information provided to Customer by Gaumard concerning cost reports and other filings with the government, including but not limited to, the Secretary of the U.S. Department of Health and Human Services or other state agencies.

19. Bankruptcy. Except as may be prohibited by applicable bankruptcy laws, a Party to this Agreement may elect to terminate this Agreement (including any Purchase Orders) if any of the following situations arise: (1) the other Party becomes insolvent or is unable to pay debts as they become due; (2) a voluntary or involuntary bankruptcy proceeding is instituted by or against a Party hereto; or (3) an appointment of a receiver or assignee for the benefit of creditors occurs on behalf of a Party hereto.

20. Waiver and Severability. If either Party fails to perform obligations under this Agreement, such nonperformance shall not affect the other Party's right to enforce performance at any time. Waiver of any remedy or material breach of any subject matter contained in this Agreement shall not be viewed as a waiver unless agreed to by the Parties in writing. Each provision of this Agreement is separate and independent of one another, and the unenforceability of any provision will not affect the enforceability of any other provision. If any provision is held to be excessively broad or unenforceable, such provision shall be modified so that it is enforceable to the fullest extent possible by law.

21. Assignment. Customer shall not assign this Agreement without the prior written consent of Gaumard, which consent shall not be unreasonably withheld or delayed. Subject to the foregoing, the rights and obligations herein will be binding upon the successors and assigns of Customer.

22. Notices. Any required notices will be given in writing to Gaumard as set forth in the applicable Gaumard Purchase Order or other purchasing document.

23. Governing Law. Upon execution, this Agreement shal®l be governed and viewed under the laws of the State of Florida without reference to its conflict of laws provisions. Customer and Gaumard specifically agree that any action relating to the relationship between the Parties, the Agreement, or Products provided, purchased or licensed hereunder, shall be brought and tried in the Courts of Dade County, Florida. Customer waives all objections to, and consents to the jurisdiction of such Courts.

24. Miscellaneous. See applicable Gaumard Purchase Order documents, Gaumard Warranty documents, and Gaumard Cares Service Plan documents for other terms and conditions, which may include, but are not limited to: Term, Termination, Customer Training and Support, and Product Repairs and Tune Ups.

7.3 END USER LICENSE AGREEMENT

GAUMARD END USER LICENSE AGREEMENT

This End User License Agreement ("EULA") sets forth the respective rights and responsibilities between the entity named in the Purchase Order associated with this EULA ("End User") and Gaumard Scientific Company, Inc., a Florida corporation ("Gaumard"), relative to the Gaumard Software (as defined below). This EULA is effective as of the date Gaumard accepts and confirms the Purchase Order (the "Effective Date"). BY USING THE GAUMARD SOFTWARE, END USER IS AGREEING TO BE BOUND BY THE TERMS OF THIS EULA. IF END USER DOES NOT AGREE, END USER MAY NOT USE THE GAUMARD SOFTWARE.

1. Definitions.

1.1 “Gaumard Documentation” means the Gaumard user and operations manuals, guides, and related materials provided by Gaumard to End User to facilitate use of the Gaumard Products.

1.2 “Gaumard Equipment” means Gaumard hardware components for medical simulation and training, including manikins and associated instrumentation, and other hardware and tangible products sold by Gaumard to End User.

1.3 “Gaumard Products” means Gaumard Software licensed and Gaumard Equipment sold or otherwise made available by Gaumard to End User currently or in the future.

1.4 “Gaumard Software” means the object code form of computer programs and Gaumard Documentation owned by Gaumard or its licensors and licensed to End User in accordance with this EULA. Gaumard Software includes (a) computer programs embedded in firmware in the Gaumard Equipment; (b) computer programs embedded in a separate medium (such as CD or flash drive) for use in conjunction with the Gaumard Equipment; (c) computer programs downloaded or received via mail from Gaumard; (d) computer programs used on servers storing or processing data related to the Gaumard Products; and (e) computer programs used to create and manage a network for the Gaumard Equipment, interface with the components of the Gaumard Equipment, manage and compute location information related to the Gaumard Equipment, and monitor health of the Gaumard Equipment.

2. Software License and Restrictions.

2.1 License. Subject to End User’s compliance with the terms and conditions of this EULA, the Gaumard Sales Terms and Conditions, the Purchase Order, and the Gaumard Cares Service Plan Agreement, Gaumard grants End User a non-exclusive, non-transferable (except as otherwise set forth herein), personal license to execute and use the Gaumard Software for End User’s internal purposes, but only so long as the Gaumard Software is installed on the Gaumard Product on which it was originally installed. End User may not, directly or indirectly, sell, sublicense, display, timeshare, loan, lease, distribute, or create derivative works of the Gaumard Software.

2.2 Ownership. All rights, title, and interest in and to the Gaumard Software, and any derivative works thereof, whether created by Gaumard, End User, or a third party, will remain at all times solely and exclusively owned by Gaumard. Nothing in this EULA or the Purchase Order will be construed to grant End User any rights of any kind with respect to the Gaumard Software, except as expressly set forth in this EULA.

2.3 Reverse Engineering and Other Restrictions. End User will not, and will not allow any third party to, tamper with, modify, decompile, disassemble, derive the source code of, reverse engineer, or attempt to obtain the internal design of the Gaumard Software or Gaumard Products for any purpose whatsoever (collectively, “Restricted Acts”). If applicable law permits End User to take any of the Restricted Acts notwithstanding the previous prohibition, and End User wishes to take any Restricted Act notwithstanding the previous prohibition, End User will first provide Gaumard with thirty (30) days prior written notice. Gaumard may terminate this EULA at any time during such notice period without liability arising from such termination. The parties agree that all information needed for interoperability is available from Gaumard in accordance with applicable government directives.

2.4 Updates. From time to time Gaumard may develop new versions or updates for the Gaumard Software that may be made available to the End User as agreed under the terms of the Gaumard Sales Terms and Conditions, Gaumard Purchase Order documents, Gaumard Warranty documents, or Gaumard Cares Service Plan documents. Unless otherwise agreed to by Gaumard, End User shall be responsible for installing the provided new versions or updates for the Gaumard Software.

2.5 Proprietary Notices. End User agrees to maintain and reproduce on all copies of the Gaumard Software, any names, logos, copyright notices, trademarks, other proprietary markings, and legends that appear on the Gaumard Software.

2.6 Control of Duplication. End User will not, nor will it allow any third party to, circumvent the protection controlling the duplication or use of the Gaumard Software, for example and without limitation, any software lock controlling the number of copies End User may make of the Gaumard Software.

2.7 No Source Code. End User acknowledges and agrees that its rights under this EULA do not include rights to source code. In its exercise of the rights granted under this EULA, End User agrees not to take any action that would result in any requirement to disclose or make available to other parties the Gaumard Software in source code format.

2.8 Certification. Upon thirty (30) days written notice to End User from Gaumard, End User shall certify End User’s compliance with the restrictions and obligations in this EULA. Such requests will not occur more frequently than once per calendar year. If End User has used the Gaumard Software in violation of this EULA, End User shall, in addition to any other remedies Gaumard may have, pay Gaumard additional fees for the excess use according to Gaumard’s then-current price list and policies, plus a late payment charge of one percent (1.0%) per month (or the highest amount allowed by applicable law, if lower) for each month of excess use from the date of initial excess use.

2.9 Privacy and Recordings. End User will comply with all applicable laws, rules and regulations related to privacy, publicity and data protection related to use of the Gaumard Products. End User shall not use the Gaumard Software to record or collect personal data from any person in violation of End User’s policies or privacy statements. End User shall receive express consent from all persons recorded by the Gaumard Software sufficient for End User’s use, storage, and distribution of such recordings.

3. Term and Termination

3.1 Term. This EULA commences on the Effective Date and continues perpetually, unless terminated earlier in accordance with the terms hereof.

3.2 Termination for Cause. This EULA is automatically terminated by Gaumard if the other party materially breaches this EULA, the Gaumard Sales Terms and Conditions, the Purchase Order, or the Gaumard Cares Service Plan Agreement. In addition, Gaumard may terminate this EULA if (a) End User becomes insolvent or makes an assignment for the benefit of End User’s creditors; or (b) a receiver is appointed or a petition in bankruptcy is filed with respect to End User and such petition is not dismissed within thirty (30) days.

3.3 Effect of Termination. Upon the termination of this EULA for any reason, all licenses granted in Section 2 above will immediately cease and terminate. Upon termination, End User will immediately cease using the Gaumard Software.

3.4 Survival. Sections 3 through 6 will survive the termination of this EULA.

4. Confidential Information; Trademarks.

4.1 Confidential Information. End User acknowledges and agrees that the Gaumard Software is confidential information and contains trade secrets of Gaumard. End User agrees to (i) hold the Gaumard Software in the strictest confidence, (ii) not disclose the Gaumard Software to any third party for any purpose, and (iii) use at least the same security measures as End User to protect its own confidential and trade secret information but no less than reasonable measures to protect the confidentiality of the Gaumard Software. End User agrees and acknowledges that any breach of the provisions regarding ownership or confidentiality contained in this Agreement shall cause Gaumard irreparable harm and Gaumard may obtain injunctive relief without the requirement to post a bond as well as seek all other remedies available to Gaumard in law and in equity in the event of breach or threatened breach of such provisions.

4.2 Trademarks. End User may not use Gaumard’s trademarks, logos, service marks, or names in press releases, web sites, marketing, or other forms

of public materials without the prior written consent of Gaumard. All use of the Gaumard trademarks and all goodwill associated with them will inure solely to the benefit of Gaumard.

5. Disclaimer; Limitation of Liability; Infringement Indemnification

5.1 Warranty and Disclaimer. For a period of twelve (12) months from the Effective Date, Gaumard will (a) provide all updates to the Software that are made available generally, and (2) use reasonable efforts to fix or provide a workaround for any Gaumard Software defect or bug which prevents operation in substantial conformity with the Gaumard Documentation. Other than the above, the Gaumard Software is provided "as- is," with no express or implied warranties of any kind, including the warranties of merchantability, fitness for a particular purpose, or non-infringement.

5.2 Limitation of Liability. THE TOTAL LIABILITY, IF ANY, OF GAUMARD TO END USER OR ANY THIRD PARTY FOR ALL DAMAGES BASED ON ALL CLAIMS, WHETHER ARISING FROM BREACH OF CONTRACT, BREACH OF WARRANTY, NEGLIGENCE, INDEMNITY, STRICT LIABILITY, TORT, OR OTHERWISE, ARISING FROM THE GAUMARD PRODUCTS IS LIMITED TO ONE HUNDRED DOLLARS. IN NO EVENT WILL GAUMARD BE LIABLE TO END USER OR ANY THIRD PARTY FOR ANY SPECIAL, INDIRECT, CONSEQUENTIAL, OR PUNITIVE DAMAGES, INCLUDING BUT NOT LIMITED TO, LOSS OF REVENUES, LOSS OF PROFITS, OR LOSS OF DATA, EVEN IF SUCH PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

5.3 Infringement Indemnification. Gaumard will, as further described below, indemnify, defend, and hold End User harmless, at its expense, against any claim or suit brought by a third party against End User alleging that any Gaumard Software furnished under this EULA infringes the United States patent, trademark, copyright or other intellectual property right of a third party. Gaumard will pay all settlements entered into or damages finally awarded, including attorneys' fees and costs, based on any such claim or suit; provided that End User gives Gaumard prompt written notice of such claim and gives Gaumard information, reasonable assistance ,and sole authority to defend or settle the claim. In defense or settlement of the claim, Gaumard may obtain for End User the right to continue using the Gaumard Software, replace or modify the Gaumard Software so that it becomes non-infringing, or, if such remedies are not reasonably available, grant End User a refund for the associated Gaumard Products (depreciated over three years) and accept their return. Gaumard will not have any liability if the alleged infringement is based upon (a) the use or sale of the Gaumard Software in combination with other products or devices not furnished by or approved by Gaumard; (b) the use of the Gaumard Software in a manner for which they were not designed as described by the Gaumard Documentation; (c) any modification of the Gaumard Software not performed by or authorized by Gaumard;

(d) any use of Gaumard Software by End User after End User learns of such allegation of infringement; or (e) any failure by End User to utilize a non-infringing version of the Gaumard Software made available by Gaumard along with notice that such update is non-infringing. The obligations set forth in this Section 5.3 are Gaumard's sole obligations, and End User's sole and exclusive remedy, for the Gaumard Software infringing third party intellectual property rights.

6. Miscellaneous.

6.1 Binding Effect; Assignment. This EULA will be binding upon, and inure to the benefit of, End User's and Gaumard's respective permitted successors and permitted assigns. Neither party may assign or transfer this EULA or any of the rights, privileges, duties or obligations under this EULA without the prior written consent of the other party, except that either party may assign this Agreement to any entity controlled by, controlling, or under common control with such party at such time, as well as in connection with the sale, transfer, merger, or acquisition, whether by operation of law or otherwise, of substantially all of the assets of such party. In addition, if End User transfers the Gaumard Product on which the Gaumard Software is installed to a third party, End User may assign this EULA to such third party, provided that the third party agrees in writing with Gaumard to be bound by this EULA.

6.2 Notices. Any written notice required by this EULA will be deemed made (a) when delivered by personal service, (b) one (1) business day after being sent by recognized international overnight courier service (such as FedEx), or (c) when received, if sent by certified or registered mail, postage prepaid, return receipt requested. Any such notice given to a party sHAL®l be sent to the addresses on the attached Purchase Order. By giving to the other party written notice thereof, the parties hereto and their respective permitted successors and assigns will have the right from time to time to change by written notice their respective addressee or address for notices.

6.3 Applicable Law. The validity of this EULA and the rights, obligations and relations of the parties hereunder sHAL®l be construed and determined under and in accordance with the substantive laws of the State of Florida. All disputes arising under or related to this EULA sHAL®l be resolved exclusively in the State or Federal Courts located in Dade County, Florida. The parties consent to the jurisdiction and venue of such courts and waive any claims as to inconvenient forum. The judgments of such courts may be enforced in any court of competent jurisdiction.

6.4 Export Control. End User will not export or re-export the Gaumard Software, including any technical data, except as authorized and permitted by, and in compliance with, the laws and regulations, including but not limited to all export and re-export laws and regulations, of the United States.

6.5 Severability. If any provision of this EULA is invalid or unenforceable in any circumstances, it will be interpreted as much as possible to reflect the intent of the parties, and its application in any other circumstances and the remaining provisions of this EULA will not be affected thereby.

6.6 Entire Agreement. This EULA constitutes the entire agreement and understanding of the parties relating to the subject matter thereof. This EULA supersedes all prior written and oral agreements and all other communications between End User and Gaumard (or a Gaumard distributor) regarding the subject matter hereof. No contradictory terms and conditions of any purchase order, invoice, or other document issued by End User relating to the subject matter of this EULA sHAL®l be binding, unless agreed by the parties.

6.7 Waiver of Breach. No waiver by a party of any breach of this EULA will constitute a waiver of any other breach of the same or other provisions of this EULA. No waiver by a party will be effective unless made in a record signed or otherwise authenticated by an authorized representative of such party.

6.8 Relationship of the Parties. The parties are independent contractors. Nothing in this EULA or in the activities contemplated by the parties will be deemed to create an agency, partnership, employment or joint venture relationship between the parties. Neither party will have any responsibility nor liability for the actions of the other party except as expressly provided in this EULA. Neither party will have any right or authority to bind or obligate the other party in any manner or make any representation or warranty on beHAL®f of the other party. This EULA is made and entered into for the sole protection and benefit of Gaumard, its licensors and suppliers, and End User, and no other person or entity sHAL®l be a direct or indirect beneficiary of or sHAL®l have any direct or indirect cause of action or claim arising from this EULA.

ACKNOWLEDGMENT

By installation of this software, you acknowledge that you have read and understand the foregoing and that you agree to be bound by its terms and conditions. You also agree that this agreement is the complete and exclusive statement of agreement between the parties and supersedes all proposed or prior agreements, oral or written, and any other communications between the parties relating to the license described herein.

7.4 EXCLUSIVE ONE-YEAR LIMITED WARRANTY

Gaumard warrants that if the accompanying Gaumard product proves to be defective in material or workmanship within one year from the date on which the product is shipped from Gaumard to the customer, Gaumard will, at Gaumard's option, repair or replace the Gaumard product.

This limited warranty covers all defects in material and workmanship in the Gaumard product, except:

- Damage resulting from accident, misuse, abuse, neglect, or unintended use of the Gaumard product;
- Damage resulting from failure to properly maintain the Gaumard product in accordance with Gaumard product instructions, including failure to properly clean the Gaumard product;
- Damage resulting from a repair or attempted repair of the Gaumard product by anyone other than Gaumard or a Gaumard representative.

This one-year limited warranty is the sole and exclusive warranty provided by Gaumard for the accompanying Gaumard product, and Gaumard hereby explicitly disclaims the implied warranties of merchantability, satisfactory quality, and fitness for a particular purpose. Except for the limited obligations specifically set forth in this one-year limited warranty, Gaumard will not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory regardless of whether Gaumard has been advised of the possibilities of such damages. Some jurisdictions do not allow disclaimers of implied warranties or the exclusion or limitation of consequential damages, so the above disclaimers and exclusions may not apply and the first purchaser may have other legal rights.

This limited warranty applies only to the first purchaser of the product and is not transferable. Any subsequent purchasers or users of the product acquire the product "as is" and this limited warranty does not apply.

This limited warranty applies only to the products manufactured and produced by Gaumard. This limited warranty does not apply to any products provided along with the Gaumard product that are manufactured by third parties. For example, third-party products such as computers (desktop, laptop, tablet, or handheld) and monitors (standard or touch-screen) are not covered by this limited warranty. However, third-party products are covered by the warranties provided by the respective third-party manufacturers and such warranties are transferred from Gaumard to purchaser upon purchase of the Gaumard product. Defects in third-party products are covered exclusively by the warranties provided by the third-parties. Gaumard does not provide any warranty, express or implied, with respect to any third-party products. Please contact the third-party manufacturer for information regarding the availability of extended warranties for third-party products.

Any waiver or amendment of this warranty must be in writing and signed by an officer of Gaumard.

- In the event of a perceived defect in material or workmanship of the Gaumard product, the first purchaser must:
- Contact Gaumard and request authorization to return the Gaumard product. Do NOT return the
- Gaumard product to Gaumard without prior authorization.
- Upon receiving authorization from Gaumard, send the Gaumard product along with copies of (1) the original bill of sale or receipt and (2) this limited warranty document to Gaumard at 14700 SW 136 Street, Miami, FL, 33196-5691 USA.

If the necessary repairs to the Gaumard product are covered by this limited warranty, then the first purchaser will pay only the incidental expenses associated with the repair, including any shipping, handling, and related costs for sending the product to Gaumard and for sending the product back to the first purchaser. However, if the repairs are not covered by this limited warranty, then the first purchaser will be liable for all repair costs in addition to costs of shipping and handling.

Extended Warranty

In addition to the standard one year of coverage we offer a range of service plans through our Gaumard Cares program. For more information about Gaumard Cares service planes please contact customer service.

7.5 CONTACT TECHNICAL SUPPORT

Before contacting Technical Support, please make sure to have the following:

1. Your simulator's serial number
2. Access to the simulator for possible troubleshooting as needed

Technical Support

Email: support@gaumard.com
USA: 800-882-6655
INT: 01-305-971-3790

7.6 GENERAL INFORMATION

Sales and Customer Service

E-mail: sales@gaumard.com
USA: 800-882-6655
INT: 01-305-971-3790
Fax: 305-252-0755

Post

Gaumard Scientific
14700 SW 136 Street
Miami, FL 33196-5691
USA

Office Hours

Monday-Friday, 8:30am - 7:30pm EST (GMT-5)