



# CAEMaestro Evolve

## User Guide



### ***Proprietary Notice***

This document, including the information contained herein, is confidential and/or proprietary to CAE Inc., and shall not be reproduced or disclosed in whole or in part, or used for any purpose whatsoever without the prior written authorization of CAE Inc.

### ***Trademark Information***

Trademarks and/or registered trademarks of CAE Healthcare Inc. and/or its affiliates include but are not limited to: Apollo, Ares, AresAR, Aria, Athena, BabySIM, BluePhantom, Caesar, CathLabVR, EndoVR, HPS, ICCU, InfantSIM, iStan, Juno, LapVR, LearningSpace, Lucina, LucinaAR, Luna, Maestro, METIman, Müse, NeuroVR, PediaSIM, SimEquip, Simulex, StethoSym, SymDefib, SymEyes, UniSIM, Vimedix, VimedixAR and Vivo. All other brands and product names are trademarks or registered trademarks of their respective owners. All logos, tradenames and trademarks referred to and used herein remain the property of their respective owners and may not be used, changed, copied, altered, or quoted without the written consent of the respective owner. All rights reserved.

# CONTENTS

<b>System Requirements .....</b>	<b>1</b>
Software .....	1
Web Browser .....	1
Operating System .....	1
CAE Maestro Evolve Software .....	1
Hardware .....	2
<b>Introducing Maestro Evolve .....</b>	<b>3</b>
Login to Maestro Evolve .....	3
Step 1: Sign into CAE Digital Learning Solutions .....	3
Step 2: Obtain and Enter Verification Code .....	5
Step 3: Launch Maestro Evolve .....	8
<b>Using CAE Maestro Evolve.....</b>	<b>11</b>
CAE Maestro Application Overview .....	11
Simulation Mode Comparison .....	11
Run on the Fly .....	11
Simulated Clinical Experience (SCE) .....	12
Starting a Simulation .....	12
Run on the Fly Simulations .....	13
Run an SCE .....	14
Run Screen Features .....	16
Records .....	16
Checklists .....	18
Monitor Signals .....	19
Event Log .....	21
Reset an SCE .....	22
Changing Patient Status .....	23
Patient Status Parameters .....	23
Changing a Patient's Parameters .....	25
Applying Conditions and Interventions .....	27
Conditions .....	28
Medications .....	29
Treatments .....	33
Transitioning Scenario States .....	35
SCE Timeline Controls .....	36

Using Markers.....	37
<b>Patient Display.....</b>	<b>39</b>
Patient Status Display .....	39
Patient Controls .....	40
Change the Control Widget Layout .....	45
Alarm State .....	47
Markers .....	47
Editing Parameters.....	47
Onset, Read-Only, and Override Indicators .....	49
<b>Managing SCEs.....</b>	<b>53</b>
Review an SCE.....	54
View SCE Details .....	54
SCE Editor Navigation Tabs .....	54
SCE Editor Panels .....	55
Create a Custom SCE.....	55
Copy an SCE.....	55
Creating a New SCE .....	57
Import or Export an SCE .....	58
<b>Using the SCE Editor .....</b>	<b>61</b>
Patient Profile .....	62
Setting a Patient’s Baseline .....	64
Scenarios .....	64
Add, Modify or Delete Scenario States .....	66
Checklists .....	70
Patient Records.....	73
Upload Patient Records .....	74
Edit or Delete Patient Records .....	75
Runtime Configuration .....	76
<b>Virtual Equipment.....</b>	<b>79</b>
CAE Patient Monitor.....	79
Launch Patient Monitor .....	80
Select a Preconfigured Layout .....	83
Settings .....	84
Snapshot .....	89
12-Lead ECG .....	90
Patient Record.....	92



NIBP Cycling . . . . .	93
CAE Defibrillator and CAE AED . . . . .	94
Step 1: Set up the Patient for Electrotherapy . . . . .	94
Step 2: Set up the Defibrillator . . . . .	98
Step 3: Launch the Defibrillator . . . . .	102
Step 4: Set up the AED . . . . .	104
Step 5: Launch the AED . . . . .	108
CAE Ventilator and CAE Transport Ventilator . . . . .	109
Step 1: Set up the Patient . . . . .	110
Step 2: Set up the Ventilator . . . . .	114
Step 3: Launch the Ventilator . . . . .	117
Step 4: Set up the Transport Ventilator . . . . .	121
Step 5: Launch the Transport Ventilator . . . . .	125
CAE Anesthesia Machine . . . . .	129
Step 1: Set up the Anesthesia Machine . . . . .	130
Step 2: Launch the Anesthesia Machine . . . . .	133
<b>CAE Embody the Virtual Simulator . . . . .</b>	<b>145</b>
Using Embody . . . . .	145
Select the Simulator . . . . .	145
Launch the Virtual Simulator . . . . .	147
Selecting the Patient . . . . .	150
Embody Features . . . . .	154
Assessments . . . . .	154
Monitoring . . . . .	156
Equipment . . . . .	156
Treatments . . . . .	158
Change Patient View . . . . .	160
<b>Learning Modules . . . . .</b>	<b>161</b>
Import a Learning Module . . . . .	161
Delete a Learning Module . . . . .	162
Create a Learning Module . . . . .	163
<b>Administrative Tools . . . . .</b>	<b>165</b>
System Administration . . . . .	166
Select a Simulator . . . . .	168
Set the Default System Language . . . . .	169
Additional Administrative Tools . . . . .	170

SCE Management .....	170
Session History .....	170
<b>Sharing Maestro Evolve with Learners .....</b>	<b>173</b>
Planned Training Event .....	174
Invite Learners .....	174
Conduct Training Event .....	177
Share Virtual Equipment .....	180
<b>Appendix A - FAQ.....</b>	<b>183</b>
Maestro Evolve .....	183
Ventilator .....	185
Embody .....	186
Hardware Questions .....	187
<b>Appendix B- Defibrillator Controls and Display Options .....</b>	<b>189</b>
Facilitator Controls .....	189
Learner Controls .....	191
Learner Display .....	193
<b>Appendix C - AED Controls and Display Options .....</b>	<b>195</b>
Facilitator Controls .....	195
Learner Controls .....	195
Learner Display .....	196
<b>Appendix D - Ventilator Controls and Display Options .....</b>	<b>197</b>
Facilitator Controls .....	197
Learner Controls .....	200
Learner Parameters Displayed .....	202
Learner Display Options .....	204
Associated Maestro Preferences .....	204
<b>Appendix E - Transport Ventilator Controls and Display Options .....</b>	<b>205</b>
Facilitator Controls .....	205
Learner Controls .....	207
Learner Parameters Displayed .....	209
Learner Display Options .....	210
Associated Maestro Preferences .....	210
<b>Appendix F - Anesthesia Machine Controls and Display.....</b>	<b>211</b>
Facilitator Controls .....	211
Learner Controls .....	214
Learner Parameters Displayed .....	217

Learner Display Options .....	219
Associated Maestro Preferences .....	219
<b>Appendix G - Medications .....</b>	<b>221</b>
<b>Appendix H - Patient Parameters .....</b>	<b>225</b>

# SYSTEM REQUIREMENTS

The following tables list the software and hardware requirements for CAE Maestro™ Evolve.

## Software

### Web Browser

Minimum	
<b>Web Browser</b>	<ul style="list-style-type: none"> <li>• Google Chrome is required.</li> <li>• Google Chrome may be downloaded free at: <a href="http://www.google.com/chrome/browser/desktop/index.html">www.google.com/chrome/browser/desktop/index.html</a></li> </ul> <p><b>Note:</b> Other web browsers which support the WebGL platform utilized by Maestro may work but are not supported at this time.</p>

### Operating System

<b>Operating System</b>	<ul style="list-style-type: none"> <li>• Windows 10</li> <li>• MacOS 11</li> <li>• The operating system must be current and still supported by its manufacturer.</li> <li>• Linus, iOS and Android are not supported.</li> </ul>
-------------------------	--

Mac is a registered trademark of Apple Inc. Windows and Internet Explorer are registered trademarks of the Microsoft Corporation in the United States and/or other countries. Chrome is a registered trademark of Google Inc.

## CAE Maestro Evolve Software

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

Document	Document Version	Software Version
CAE Maestro Evolve User Guide	905K002252 v1.4	CAE Maestro Evolve v1.5

# Hardware

Minimum	Optimal
<ul style="list-style-type: none"> <li>• Two Intel Dual Core CPUs, 2.4 GHz</li> </ul>	<ul style="list-style-type: none"> <li>• Six Intel Dual Core CPUs, 2.4 GHz</li> </ul>
<ul style="list-style-type: none"> <li>• 1280x680 screen resolution</li> </ul>	<ul style="list-style-type: none"> <li>• 1920x1080 screen resolution</li> </ul>
<ul style="list-style-type: none"> <li>• 8 GB DDR3 RAM</li> </ul>	<ul style="list-style-type: none"> <li>• 16 GB DDR3 RAM</li> </ul>

Required	Recommended or Not Supported
<ul style="list-style-type: none"> <li>• Mouse</li> </ul>	<ul style="list-style-type: none"> <li>• Two monitors are recommended.</li> </ul>
<ul style="list-style-type: none"> <li>• Keyboard - when editing SCEs (Simulated Clinical Experiences).</li> </ul>	<ul style="list-style-type: none"> <li>• Touch screens are not supported.</li> </ul>
<ul style="list-style-type: none"> <li>• Graphics card capable of rendering WebGL applications. To determine if your graphics card is capable of rendering WebGL applications, go to: <a href="http://get.webgl.org/">http://get.webgl.org/</a></li> </ul>	
<ul style="list-style-type: none"> <li>• Internet connection at or above 15Mbps.</li> </ul>	

# INTRODUCING MAESTRO EVOLVE

Maestro Evolve is designed to highlight the power of Maestro for distance learning and to work with CAE Healthcare’s new Virtual Equipment and Virtual Patient products. Maestro Evolve is launched directly from the cloud, providing the convenience of accessing the simulation applications from wherever the instructor or learner is located.

## Login to Maestro Evolve

Follow the steps to login to Maestro Evolve.

Login Steps	
1	Sign into CAE Digital Learning Solutions
2	Obtain and Enter Verification Code
3	Launch Maestro Evolve

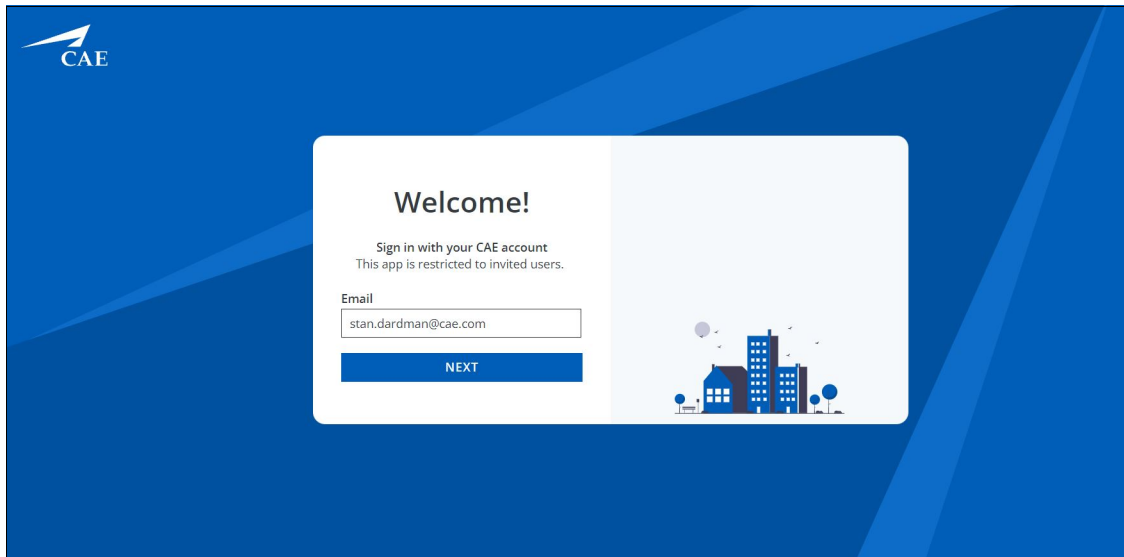
## Step 1: Sign into CAE Digital Learning Solutions

To sign into CAE Digital Learning Solutions, perform the following steps:

1. A one-time registration process is necessary when access to Maestro Evolve is requested from the CAE Sales Representative. In the event you do not have a Sales Representative, contact CAE Healthcare Customer Service at:  
<https://caehealthcare.com/contact-us/>
2. Open the email received from CAE and click the link:  
<https://cloud.caehealthcare.com>



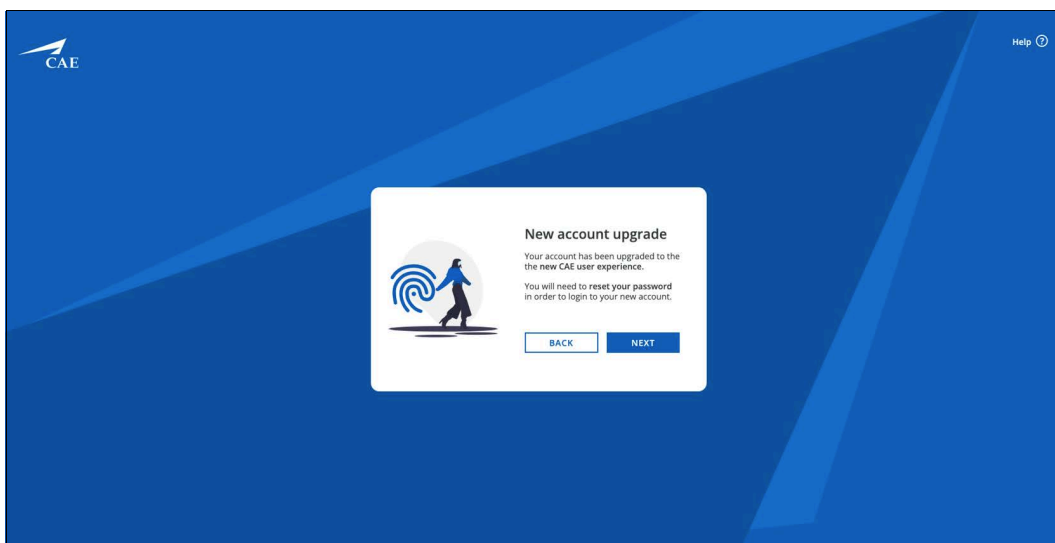
A browser window displaying the Welcome screen appears. Enter the email address where the access link was sent to begin a one-time registration process.



**Welcome Screen**

3. Click the **Next** button.

The New Account Upgrade message appears.



**New Account Upgrade Prompt**

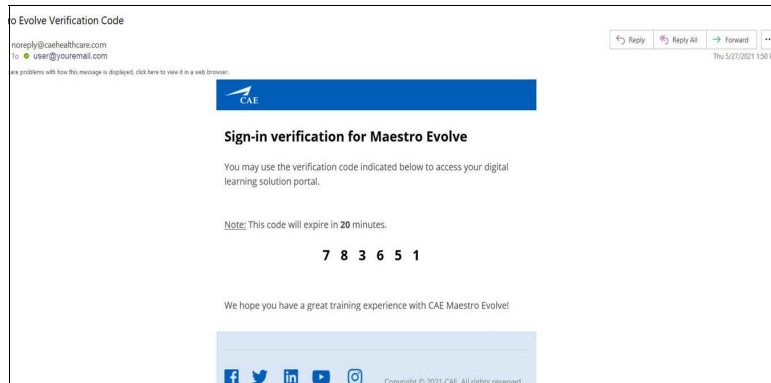
**Note:** New account registration is required for all users, including existing users, with the newest update to Maestro Evolve. After the new account registration is completed (in the following steps), the user will only see the Sign In window upon future login attempts.

4. Click **Next**. and leave the browser window open. A verification code is sent to the registered email address.

## Step 2: Obtain and Enter Verification Code

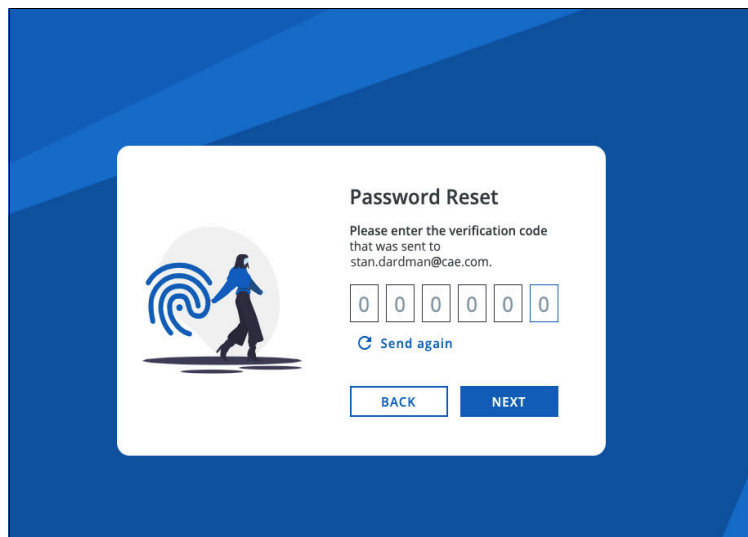
Upon completion of the previous steps, a verification code is sent to the email address that was entered at the Sign In window.

1. Open the email from *noreply@caehealthcare.com*.



**Verification Email**

2. Return to the browser and enter the verification code in the **Verification Code** field.



**Password Reset Screen**

3. Click the **Next** button.

The New Account screen appears.

CAE

Help

### New Account

Please validate your details to create a CAE account.

CAEPortal B2C

First Name  
Stan

Last Name  
Dardman

Email  
stan.dardman@cae.com

Password  
\*\*\*\*\*

At least 8 characters with 3 or more: uppercase letter, lowercase letter, number & symbol

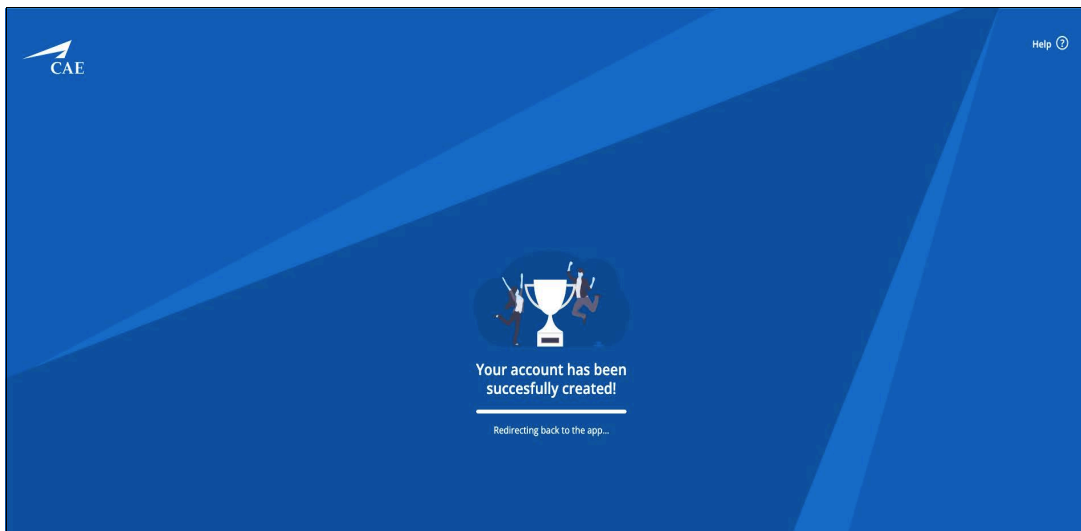
I agree to receive email communications and new product updates from CAE.

By clicking on Next, you agree to the [Terms of Use](#), [Privacy Policy](#) and [Cookie Policy](#).

NEXT

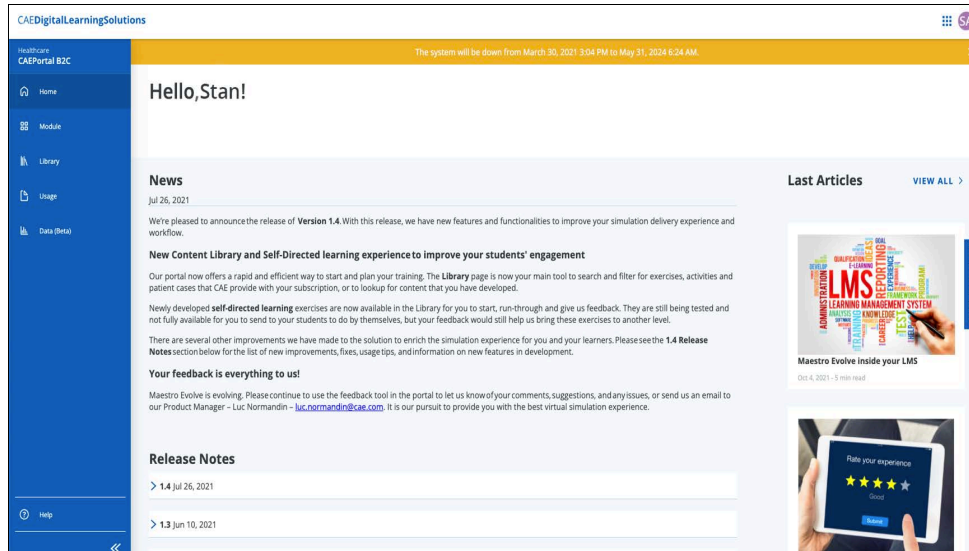
**New Account Screen**

4. Click **Next**.



**Account Successfully Created Screen**

The CAE Digital Learning Solutions window appears with the Maestro Evolve module available.



**CAE Digital Learning Solutions Screen**

On the Digital Learning Solutions screen, users find information regarding planned Maestro Evolve enhancements and new products, as well as information specific to the current version of Maestro Evolve.

Additional options on the CAE Digital Learning Solutions page are:

- **Module** - Displays available modules for the registered user
- **Library** - Displays the scenarios available for the registered user
- **Usage** - Maestro Evolve License information
- **Help** - Link to the CAE Healthcare website with support options

## Step 3: Launch Maestro Evolve

To launch the Maestro Evolve application:

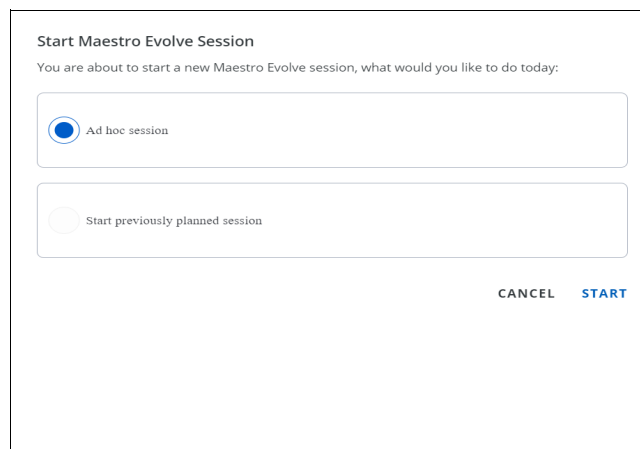
1. From the CAE Digital Learning Solutions window, on the CAEMaestro Evolve Module Menu, click **Start**.



**Maestro Evolve Module Menu - Start and Invite**

For more information on the “**Invite**” option, see the chapter in this guide *Sharing Maestro Evolve with Learners*.

The Start Maestro Evolve Session window appears.



**Start Maestro Evolve Session**

2. Verify **Ad hoc session** is selected and click **START**.

For more information on the “**Start Previously Planned Session**” option, see the chapter in this guide *Sharing Maestro Evolve with Learners*.

**Note:** In the event Maestro Evolve has previously been started, the following Open, Share, and Stop options will appear on the Maestro Evolve Module Menu.

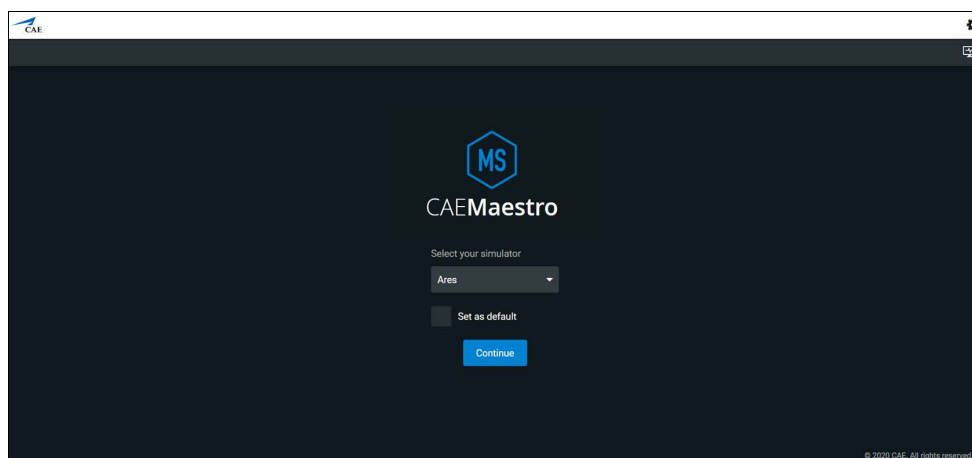


**Maestro Evolve Module Menu - Open, Share, and Stop**

- **Open** - Opens Maestro Evolve, bypassing the Start Maestro Evolve Session window.
- **Share** -
  - Allows the Instructor to share links to virtual equipment with the learner (see the chapter in this guide *Sharing Evolve with Learners*)
  - Allows access to Embody, CAE's virtual simulator
- **Stop** - Stops Maestro Evolve, returning to the Maestro Evolve Module Menu with Start and Invite options.

The Select Simulator window appears.

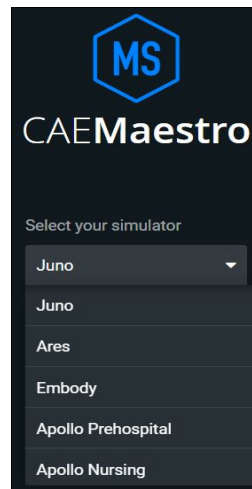
**Note:** For returning users, selecting a simulator may be bypassed if a simulator was previously chosen and set as the default. In this case, the Maestro Home screen appears.



**Select Simulator Window**



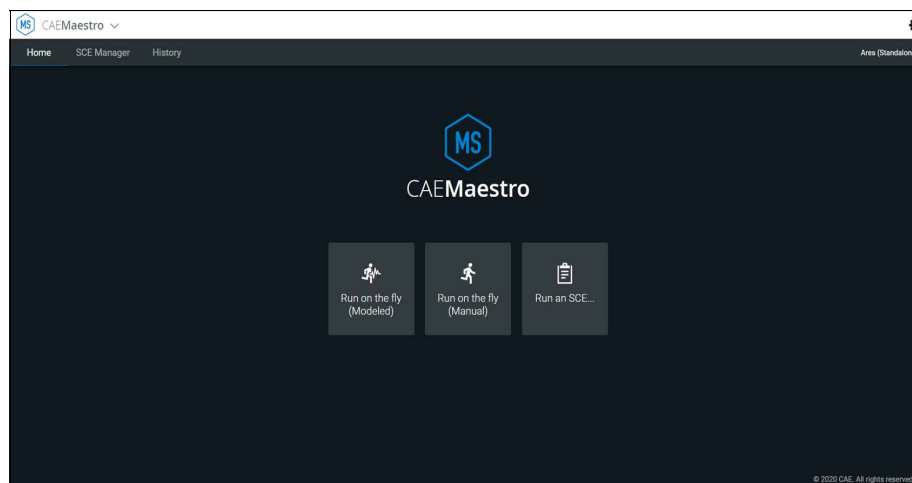
3. Click the drop-down list and select a simulator.



**Select Simulator Drop-Down List**

4. Click the **Continue** button.

The Maestro Home Screen appears.



**Maestro Home Screen**

There are three options to choose from on the Home screen:

- Run on the fly (Modeled)
- Run on the fly (Manual)
- Run an SCE

# USING CAE MAESTRO EVOLVE

Using the CAE Maestro Evolve software, you can create and run SCEs, assess learners, and adjust system controls.

**Note:** For optimal performance, no other software program should be open while Maestro is running.

## CAE Maestro Application Overview

Users have the following choices for managing their simulation in the CAE Maestro software:

- Run simulations “On the fly” in Manual mode
- Run simulations “On the fly” in Modeled mode using CAE Physiology
- Run preconfigured simulations using Simulated Clinical Experiences (SCEs) in Manual or Modeled mode

## Simulation Mode Comparison

### *On the Fly vs. SCE*

There are two ways to run a simulation in Maestro: On the fly and Simulated Clinical Experience (SCE). Users can start a simulation or choose to design content for the simulation and save it as an SCE.

When operating On the fly, no content is authored ahead of time and the simulation is simply controlled in real-time by the instructor.

With an SCE, some details of the simulation are defined ahead of time (e.g. states, patient profile, and other scenario background information). During an SCE, users can also make changes On the Fly as needed.

## Run on the Fly

Running simulations on the fly includes no predetermined scenarios or intended progression of events, and provides facilitators with a simple way to run a simulation with no advanced programming. You can run on the fly in Manual or Modeled mode.

In Manual mode, the user drives all changes to the patient’s condition and responses to interventions by making manual selections in the software.

In Modeled mode, the simulation is automatically driven by CAE Physiology (a computational model of human physiology). This model controls patient status, progression of clinical signs, and response to interventions. Modeled mode also allows the instructor to override the model’s output with manual inputs.

The following virtual equipment requires Modeled mode:

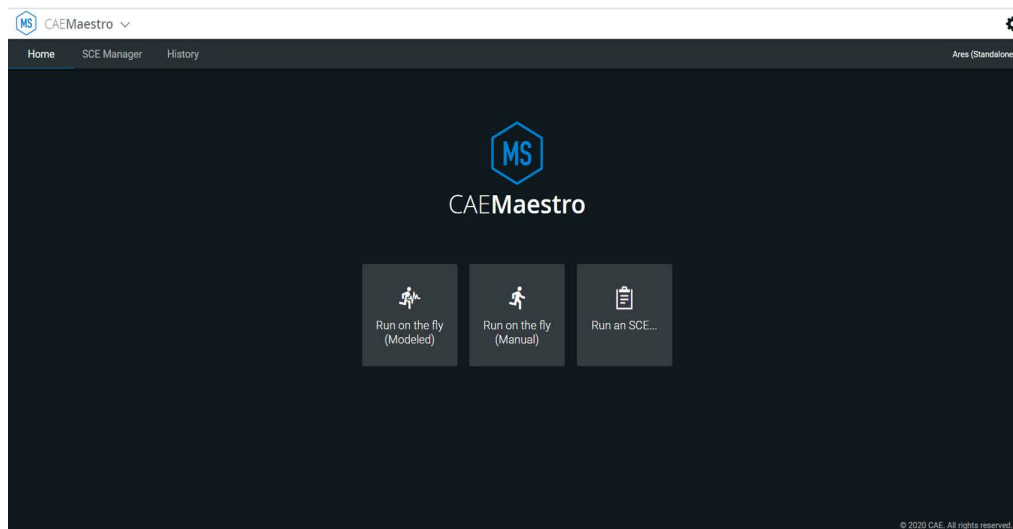
- Ventilator
- Transport Ventilator
- Anesthesia Machine

## Simulated Clinical Experience (SCE)

Simulated Clinical Experiences (SCEs) are process tools that let facilitators execute a learning strategy using simulation. Preconfigured CAE SCEs provide an extensive overview and outline of the learning exercise, and require minimal additional faculty development time for use. Each SCE is typically comprised of a patient and a scenario.

## Starting a Simulation

Upon launching the CAE Maestro app, the Home Screen appears and users have the option to choose one of the following simulation types: Run on the fly (Modeled), Run on the fly (Manual), or Run an SCE.



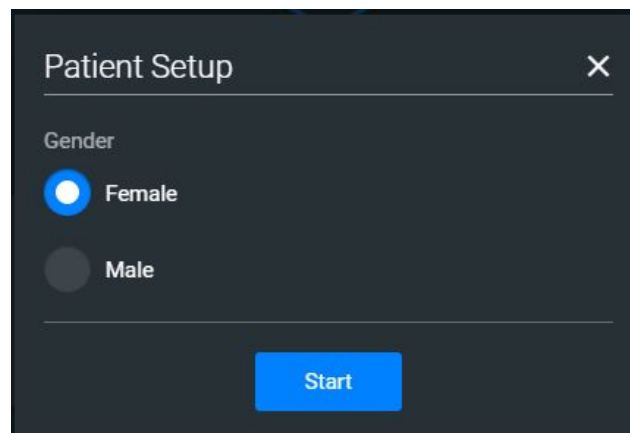
**CAEMaestro Home Screen**

## Run on the Fly Simulations

The Run on the fly (Manual or Modeled) simulation starts a simulation without an SCE.

To begin a Run on the fly simulation:

1. From the Home Screen, click on the **Run on the fly** button.
2. Select the patient's gender.



**Start Screen - Select Gender**

3. Click on **Start** to begin the simulation.

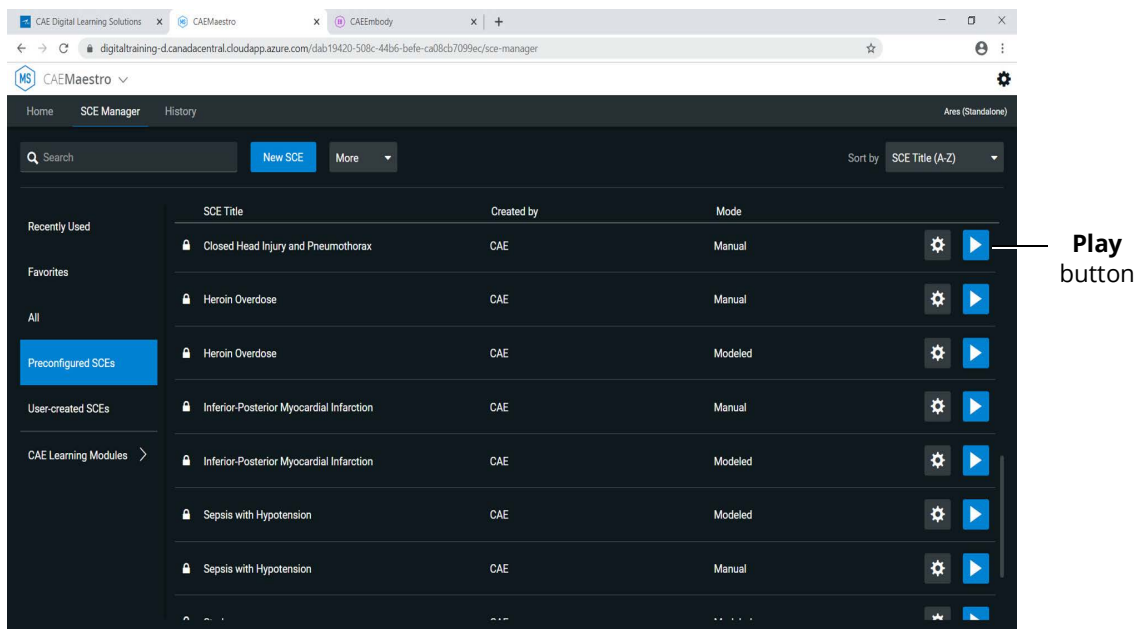
From the Run Screen, you can manually alter the patient's status and adjust parameters as needed for specific situations. The functionality in this mode is described in the *Run an SCE* section of this user guide.

## Run an SCE

From the SCE Manager, various simulations are available.

To run an SCE:

1. From the Home Screen, click on **Run an SCE**.  
The **SCE Manager** tab is selected by default.
2. Click on the **Preconfigured SCEs** tab to view the list of preloaded SCEs.

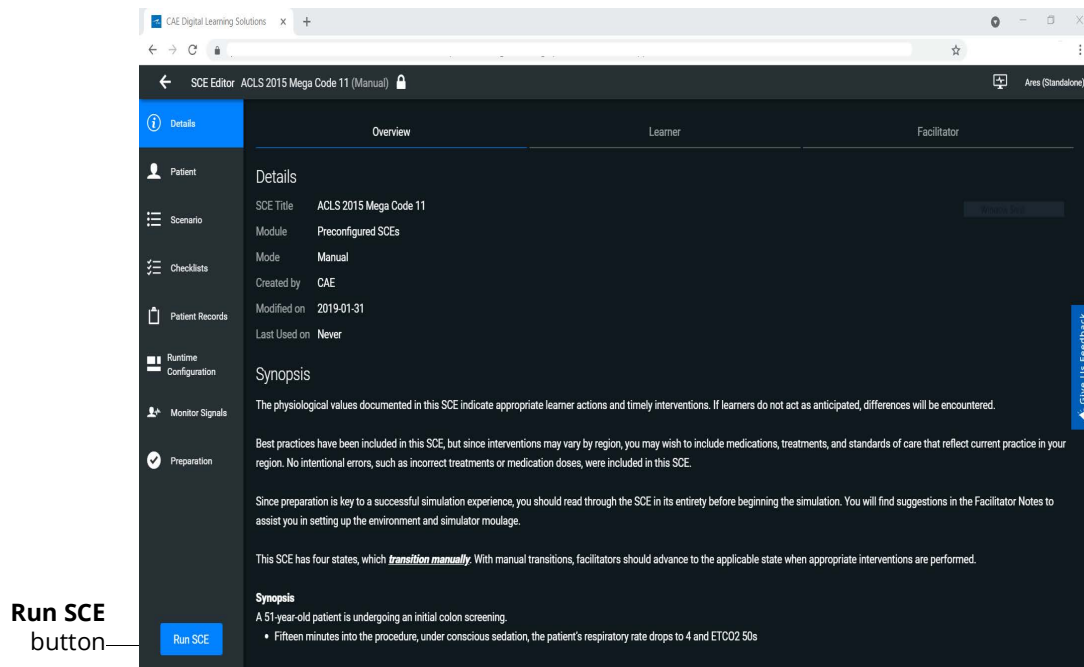


### *SCE Manager Screen - Preconfigured SCEs*

There are two ways to start an SCE:

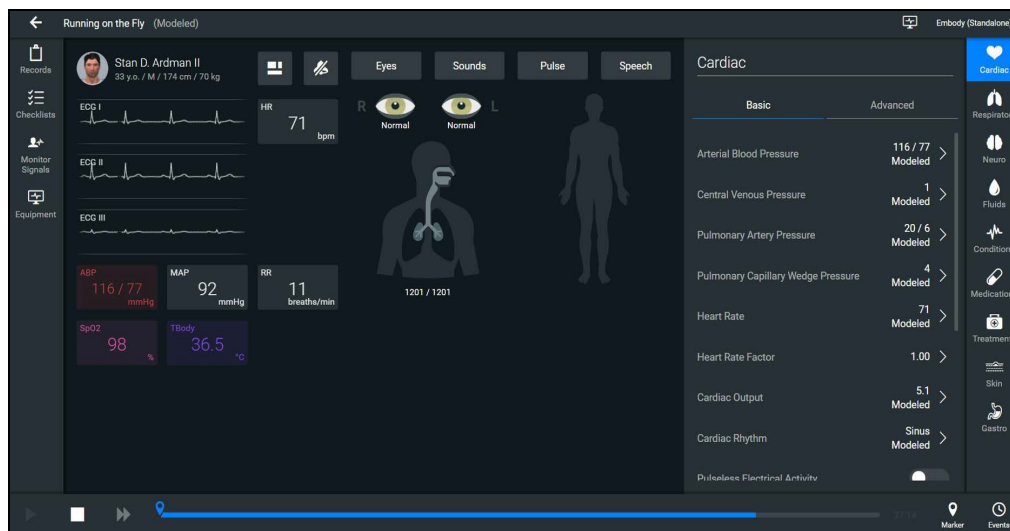
- Click on the **Play** button,
- OR
- Click on the SCE title to view SCE details before launching.

3. Click on the **Run SCE** button to start an SCE.



**SCE Manager Details Screen - Run SCE Button**

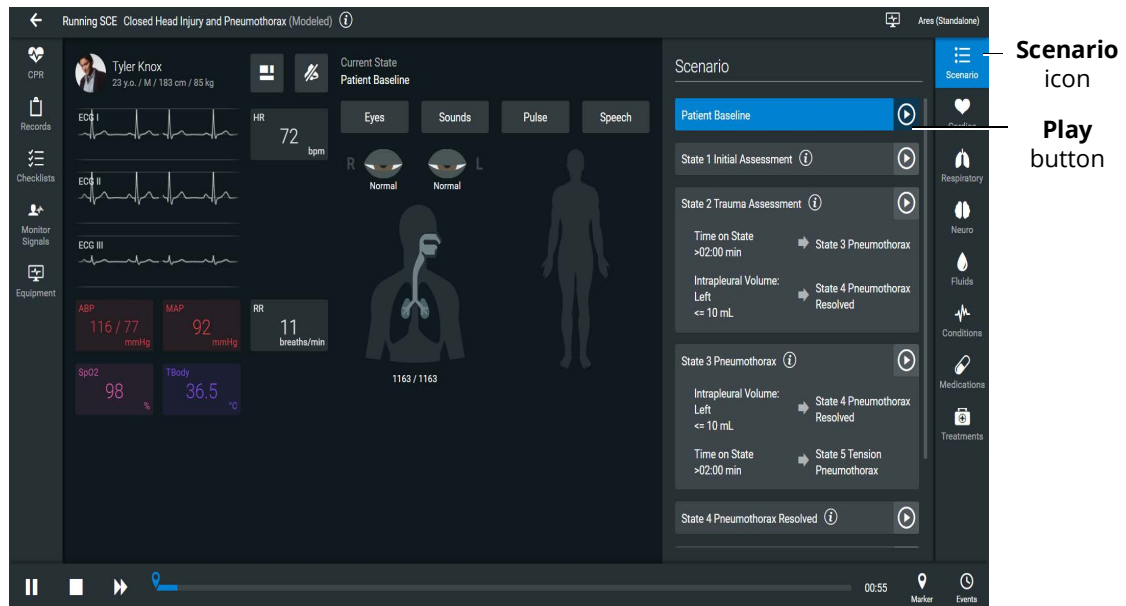
The Run Screen appears and displays the Patient Baseline state.



**SCE Run Screen**



- Click on the **Scenario** icon in the upper-right corner of the Run Screen.



*SCE Run Screen with Scenario States*

The list of scenario states appears. A scenario will remain in the Patient Baseline until the **Play** button is selected in another state.

- Click on the **Play** button to apply a state to the running SCE.

## Run Screen Features

When an SCE is started or when running on the fly, the Run Screen appears and displays a series of panels that group related controls and information. The content for each control is dynamic and varies whether you run scenarios on the fly or as an SCE. Users can adjust the status of the patient while they proceed through a simulation using these controls. When running an SCE, some panels contain additional controls.

## Records

You can display patient records while an SCE is running.

To display a patient record:

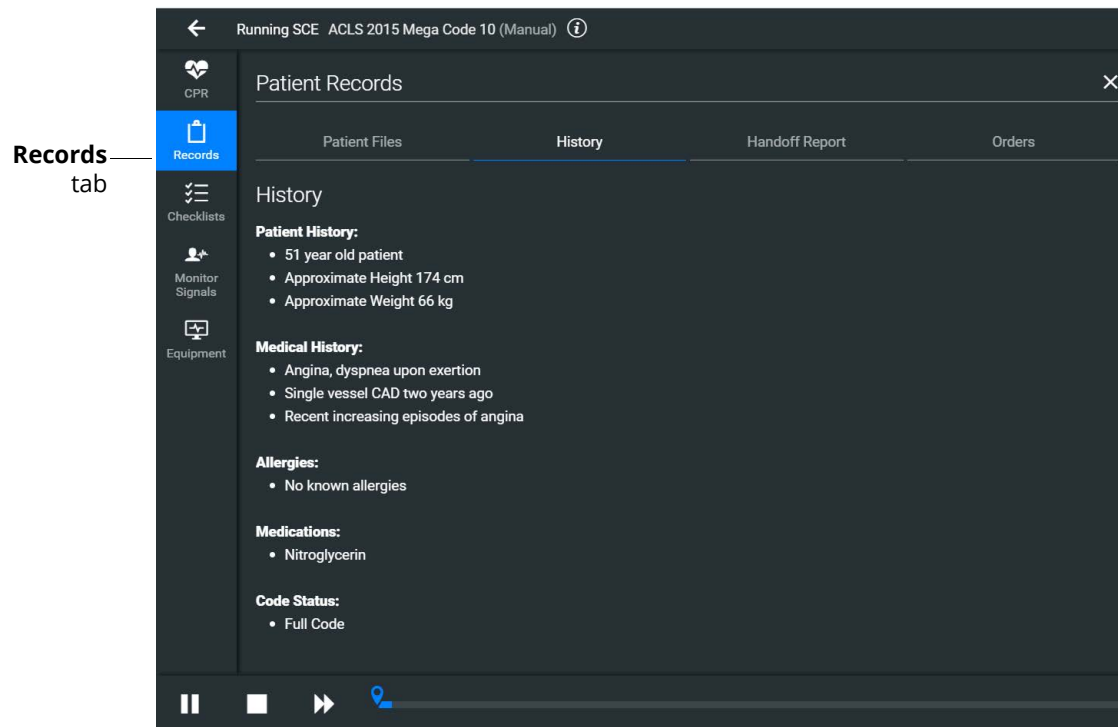
- From the Maestro Run screen, select **Records**.

The Patient Files tab displays by default.

To view patient files, select **Show Library** button.

The list appears with all available patient records appears.

To view the Patient's history, select **History** tab.



*Patient Records - History*

- (Optional) To preview a patient record before sending to the Patient Monitor, select the record and click on the **Preview** button.
- Select a patient record and click on **Send to Patient Monitor**.

The patient record opens in CAE Patient Monitor.

**Note:** Only one patient record displays at a time.

To stop displaying a patient record in the Patient Monitor, on the patient record click on **Remove from Patient Monitor**.

To close the Patient Record list, click on **Records**.

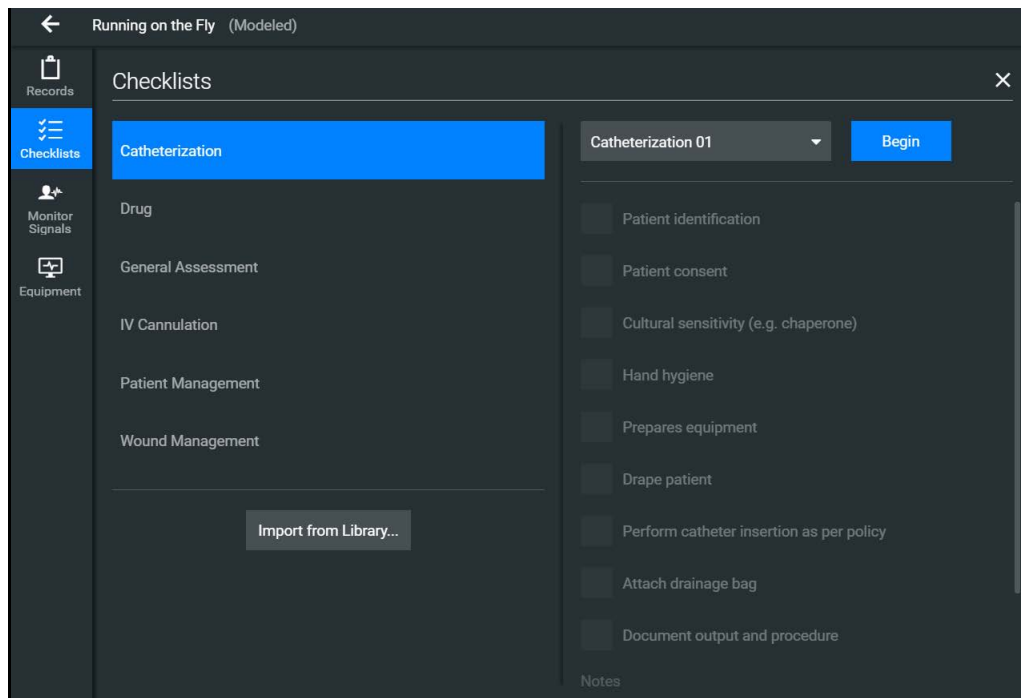
## Checklists

To access learner checklists:

1. Click on the **Checklist** tab.

When a checklist is selected it is highlighted in blue and the content of the checklist is displayed in the right panel.

2. Click on **Begin** to launch the first checklist and start verifying steps performed by learner.



***The Checklists Popup Screen***

3. After a checklist has been completed, click on **New Instance** to begin another checklist for the next learner.

The Checklist drop-down list displays each instance completed, numbered 01 as first instance, 02 as second instance, etc. within each state.

4. Click on the **X** to close the Checklist panel.

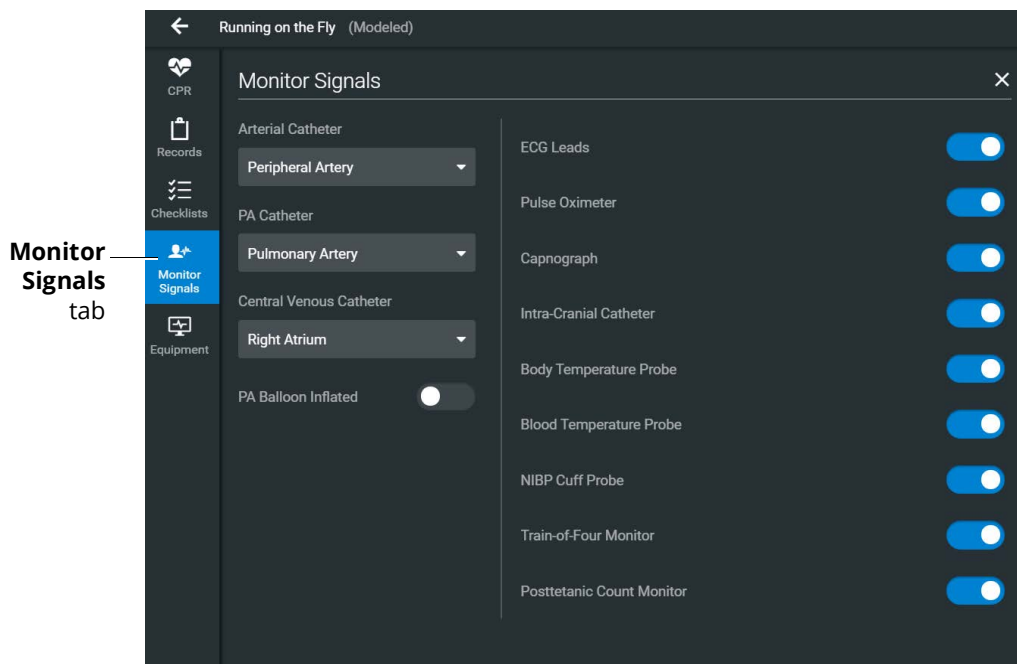
# Monitor Signals

The Monitor Signals tab gives the users control over the values and signals that appear on the simulated Patient Monitor.

Click on the **Monitor Signals** icon to define which patient indicators will be monitored.

Use the drop-down menus to define which patient parameters will be visible for learners viewing the patient monitor.

Use the toggles to turn the various values and signals on and off.



**Monitor Signals**

By default, all probes are on. When probes are turned off, it impacts different waveforms and numerical values on the patient monitor.

Probe Turned Off	Impact
<b>ECG Leads</b>	Hides the ECG waveform and HR value
<b>Pulse Oximeter</b>	Hides the PLETH waveform and SpO2 value
<b>Capnograph</b>	Hides the CO2 waveform and EtCO2 value
<b>Intra-Cranial Catheter</b>	Hides the Intra-Cranial Catheter values
<b>Body Temperature</b>	Hides the TBody values
<b>Blood Temperature</b>	Hides the TBlood values
<b>NIBP Cuff Probe</b>	Toggles off the Blood Pressure cuff on Embody. After launching Embody, the Blood Pressure Cuff may be toggled back on from Embody Monitoring options.

Setting the catheter placement to Atmosphere causes a flat line to appear, even when an override is used. Available catheters include:

- Arterial Catheter
- PA Catheter
- Central Venous Catheter

If the catheter placement is *None*, no trace appears at all.

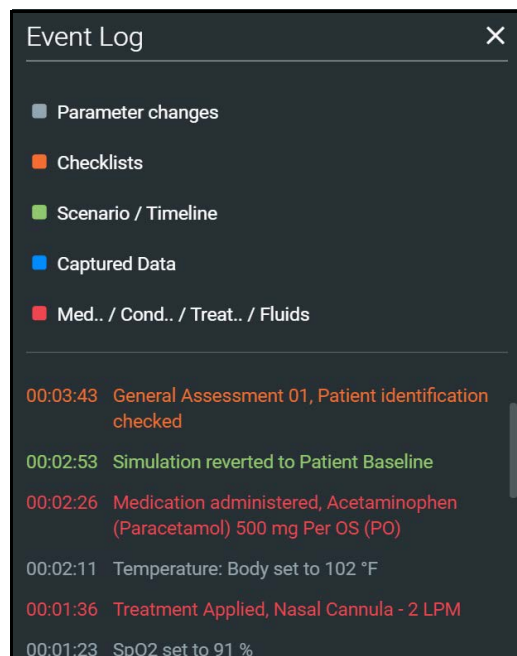
Click on the **PA Balloon Inflated** toggle to inflate the patient's PA Balloon. Click on it again to deflate.

## Event Log

During an SCE, all changes (manual or detected by the system) to simulation settings, learner actions, and checklist results are recorded in the Event Log.

To access the Event Log, click on the **Events** button in the bottom-right corner of the Run Screen.

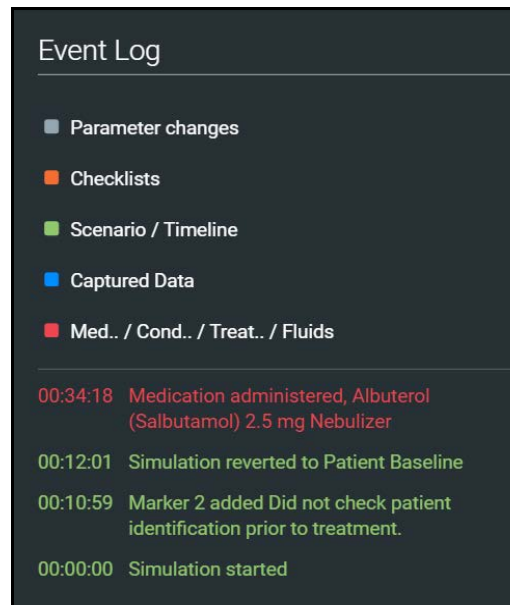
The event log records the time and details of instructor and learner actions, which are color coded by category.



**Event Log**



In Manual SCEs, the administered medication information tracked in the Event Log does not have an automatic effect on patient physiology.



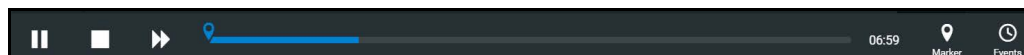
*Medication Information in Event Log*

## Reset an SCE

Resetting an SCE brings the patient's initial status data back to its original status. The SCE time is unaffected. Reset data appears in the Event Log.

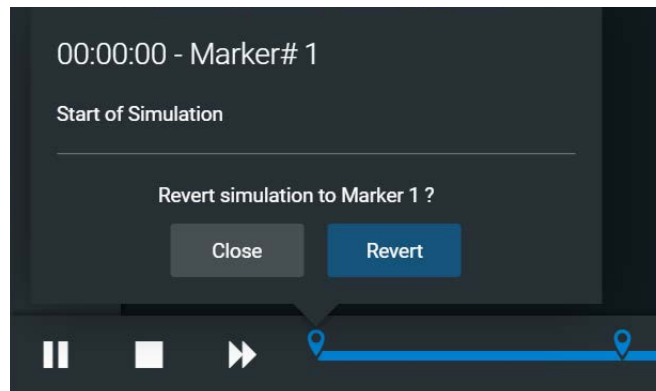
To reset patient data:

1. While running an SCE, select the first marker on the timeline.



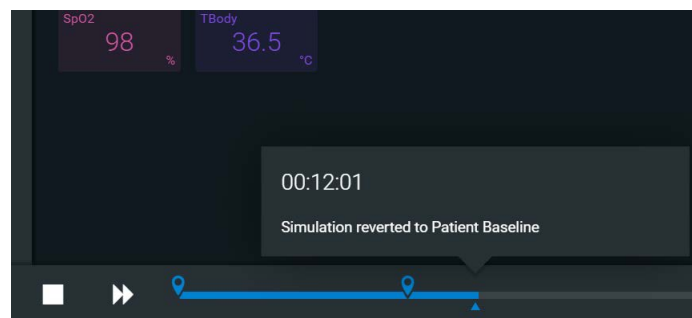
*Timeline*

2. Click on **Revert**.



**Revert to Marker**

The patient returns to the Baseline state. The patient reset is indicated on the SCE timeline bar and in the Event Log.



**Reset Notification**

## Changing Patient Status

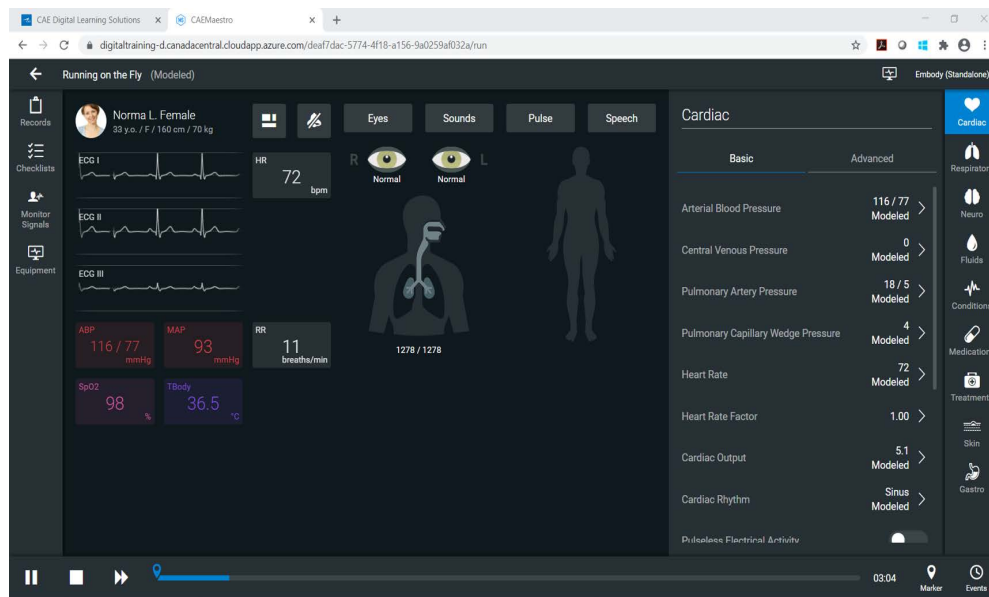
You can adjust the patient status when running on the fly or running an SCE by:

- Using one of the parameter panels on the Run Screen to modify parameters. For more information, see *Patient Status Display* section of this user guide
- Applying a Condition, Treatment, or Medication
- Applying a Scenario state

## Patient Status Parameters

From the Run Screen, select a parameter icon to display the associated parameters panel for various body systems and features. To access a parameters panel, click on the appropriate icon or button on the right side of the Run Screen for:

- Cardiovascular
- Respiratory
- Neurological
- Fluids
- Conditions
- Medications
- Treatments
- Skin (available with Embody)
- Gastro (available with Embody)



*Maestro SCE Run Screen with Embody Cardiac Parameters*

## Types of Parameters

There are two types of parameters: numeric and discrete.

Once a parameter is selected and set, the patient's physiology changes according to the model for that parameter.

## Numeric Parameters

To change numeric parameters, click in the relevant field and enter a new value in place of the existing one. Or, use the slider to move through the range of parameter values until the numeric value is established.

In Run on the fly Modeled mode, there are a larger set of parameters that are either monitored patient values, or physiological model inputs. When users set or modify monitored patient values, it overrides the output of the physiological model. To return to a physiologically modeled value, click on the **Modeled** button and click **Accept**.

Changing physiological model inputs indirectly impacts the output of the physiological model. When a modeled input is called a Factor, it acts as a multiplier. For example, Heart Rate Factor 2.0 is two times the baseline Heart Rate.

## Discrete Parameters

Discrete parameters let users choose the appropriate option from a drop-down menu or toggle switch.

The following image shows the Bronchial Occlusion controls in the Respiratory parameter. The Bronchial Occlusion control is set using a discrete parameter switch that toggles between **OFF** and **ON**.



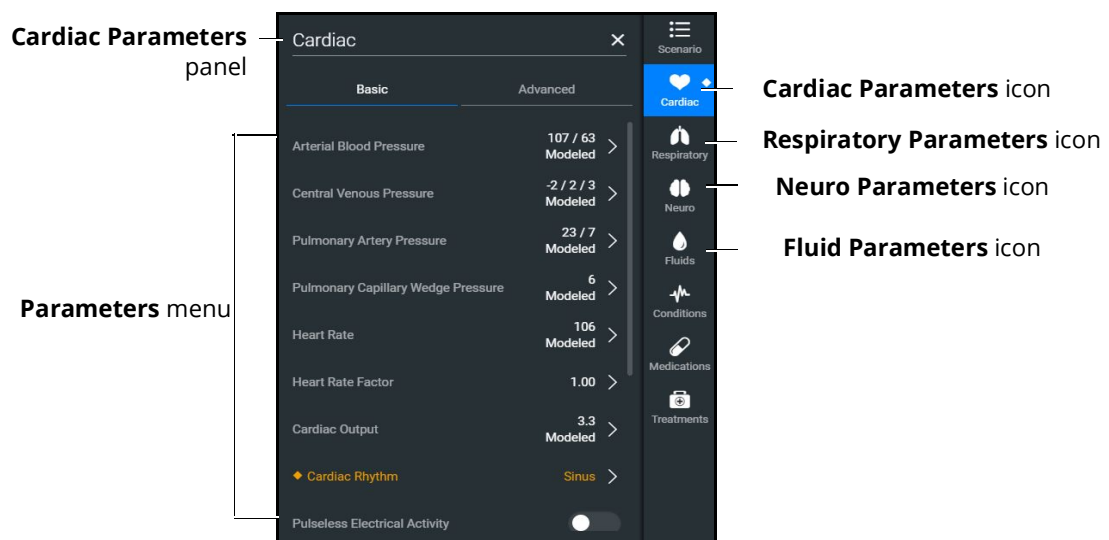
**Bronchial Occlusion Parameter**

Some parameters have two toggle switches or buttons, one for each side of the manikin.

## Changing a Patient's Parameters

To change a patient's parameters:

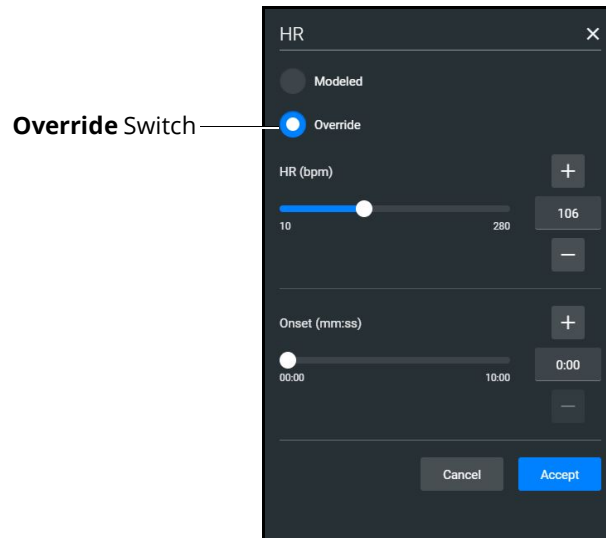
1. Click on the appropriate parameters icon to view the parameter panel.



**Cardiac Parameters Panel**

If running on the fly or running an SCE in Modeled mode, the parameters will display the physiological responses in real-time.

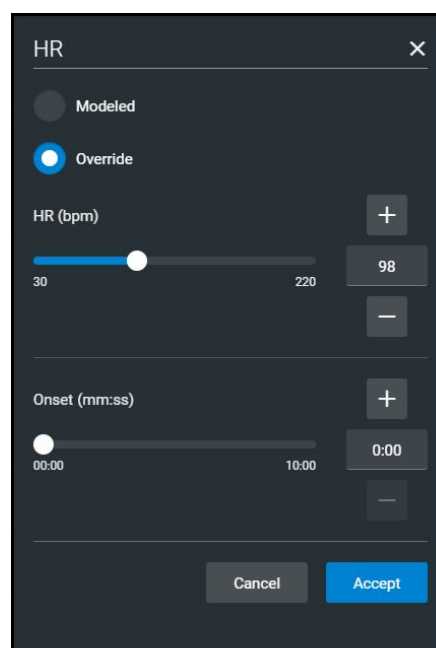
**Note:** Patient status parameters can be toggled between modeled and override modes. Click on the arrow next to a parameter to open the control menu on the right side of the screen. Turn on the Override switch to adjust settings as desired, then click on **Accept**.



**Override Controls**

When you override a setting, an orange diamond-shaped indicator will appear at the upper-right corner of that parameter icon to show it is no longer driven by the model. The same indicator will also appear on the parameter widget and associated waveforms.

2. Select the desired parameter. The Parameter Controls screen appears.



**Heart Rate Parameter Controls**

3. Set the new value and click **Accept**.

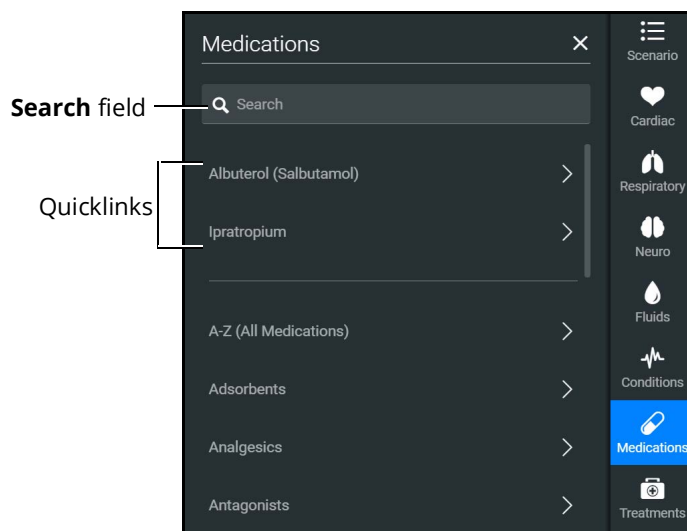
## Applying Conditions and Interventions

Conditions or interventions, such as medications and treatments, may be applied during simulation. Once applied, conditions are reflected in the patient's physiology (if in Modeled mode) and logged. All medications and other interventions are also logged, and most also affect the patient's physiology (in Modeled mode only).

When programming an SCE, conditions, medications, and treatments likely to be used in a given simulation case can be set up as Quicklinks, which will appear in alphabetical order at the top of the panel for quick access.

**Note:** Quicklinks can only be added when creating or editing an SCE.

To learn more about setting up Quicklinks, see *Runtime Configuration* in *Using the SCE Editor* section of this user guide.



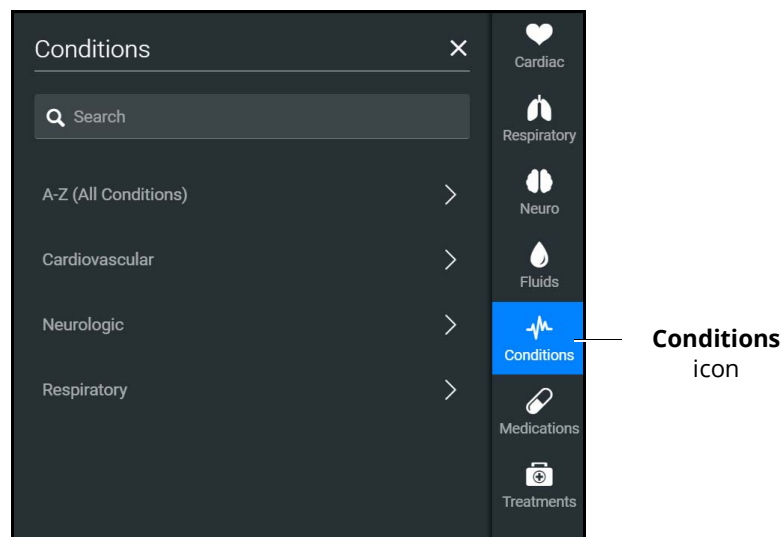
**Medications Panel - Quicklinks**

**TIP:** Click on the appropriate icon to collapse or expand the control.

## Conditions

Conditions are preprogrammed pathophysiological states that incorporate one or more physiological parameters and are designed to enable multiple physiological changes more easily. Conditions are similar to scenario states in that they can contain multiple parameter changes that make it easy to quickly adjust the patient's status.

Conditions are especially useful when programming in Modeled mode, where they continuously interact with the modeled physiology and any interventions to ensure appropriate changes for the condition.



**Conditions Panel**

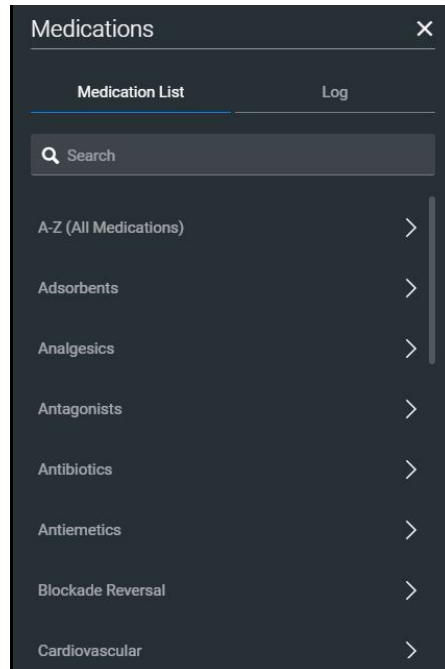
To apply a condition:

1. In the **Conditions** panel, click on a Quicklink, if available, or select a condition from within the listed categories or by clicking on **A-Z (All Conditions)**. You can also use the Search feature to quickly find a specific condition.
2. Click on the name of the desired condition and select a severity, if available.
3. Click on **Apply condition**.

# Medications

To choose a medication:

1. In the **Medications** panel, click on one of the Quicklinks, or from the Medications list, click on **A-Z (All Medications)** to browse all medications in alphabetical order, or use the Search feature to quickly find a specific medication. Medications are also grouped by category below the **A-Z (All Medications)** list option.



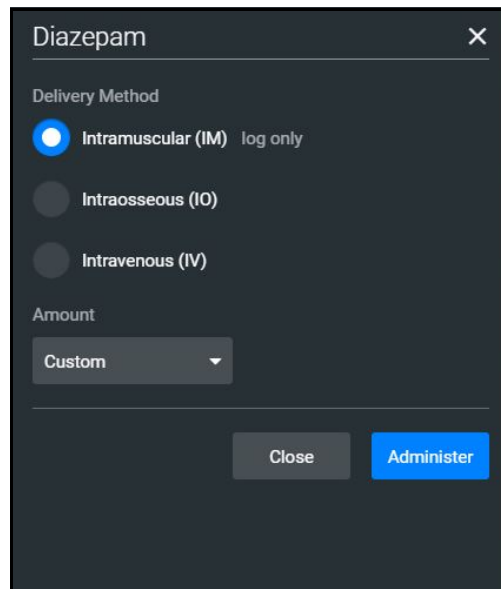
**Medications Panel**

A menu appears and shows the available medications.

2. Click on on a specific medication to choose a dose and route of administration.



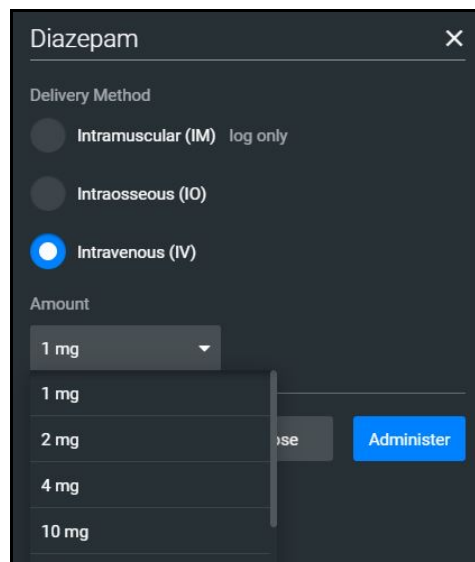
The medication controls appear. The delivery method and amount options, which include pre-defined doses and custom dose options, are displayed.



**Medication Controls**

Under **Delivery Method** options, click on the desired route of administration.

In the **Amount** drop-down menu, select a pre-defined dose or choose Custom to enter a custom dose.



**Custom Dose**

3. Click on **Administer**.

**Note:** All administered medications are added to the **Event** log.

In Manual mode, administered medications do not affect the patient’s status. Any associated changes to the vital signs or other parameters must be manually adjusted. For more information, see *Changing Patient Status* section of this user guide.

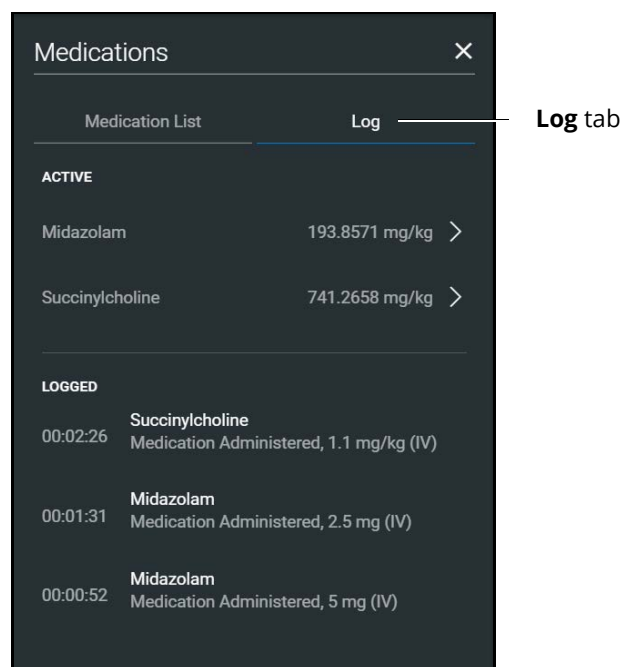
In Modeled mode, medications affect the patient's status unless labeled *log only*. Medications are also logged in the **Log** tab on the **Medications** panel.

## The Medications Log

The Medications Log, present in Modeled mode only, tracks the administered medications. If applicable, the infusion rate of the medication is also displayed.

To view the Medications Log:

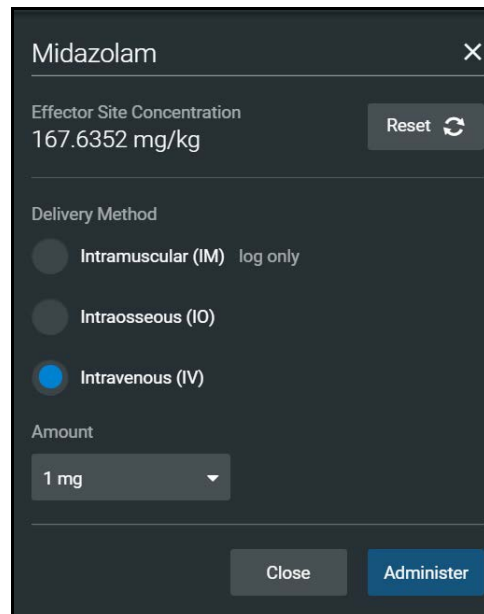
1. From the Run Screen, click on the **Medications** control.
2. Click on the **Log** tab.



**Medications Log**

The medications that have previously been administered appear in the *Logged* section of the screen. Medications that are currently impacting the patient physiology appear in the *Active* section of the screen.

Click on an active medication to display medication information.



The screenshot shows a dark-themed dialog box titled "Midazolam" with a close button (X) in the top right corner. Below the title, the "Effector Site Concentration" is displayed as "167.6352 mg/kg" next to a "Reset" button with a circular arrow icon. Underneath, the "Delivery Method" section has three radio button options: "Intramuscular (IM) log only", "Intraosseous (IO)", and "Intravenous (IV)", with the latter being selected. The "Amount" section features a dropdown menu currently set to "1 mg". At the bottom of the dialog, there are two buttons: "Close" and "Administer".

### ***Medication Information***

The normalized effector site concentration is shown next to each medication listing. This represents the amount of medication that is affecting the patient physiology.

### ***Reset a Medication***

To reset a medication:

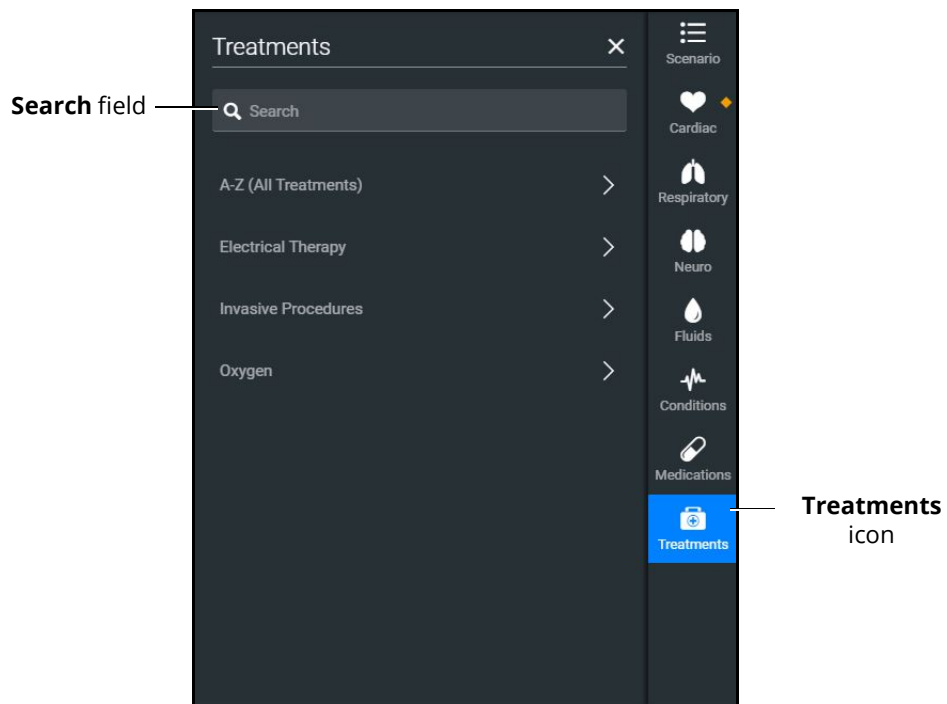
1. From the Medications Log, select an active medication.
2. From the medication information, click on **Reset**.
3. When the Reset Effector Site Concentration prompt appears, click on **Reset**.

The medication is cleared from the Active list. The original administration information remains in the Medications Log, however, and the **Events** Log reflects both the administration and resetting of the medication.

# Treatments

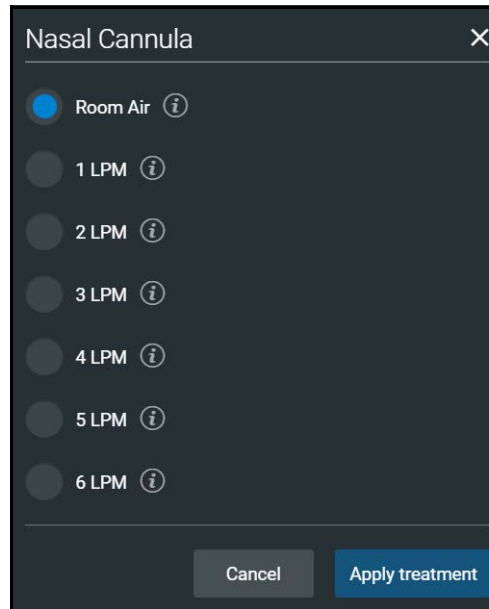
To apply a treatment:

1. Click on the **Treatments** icon and select a treatment from the Quicklinks, or select a category to see treatments organized by type, or click on **A-Z (All Treatments)**. You can also use the Search function. Navigate through the menus to locate the desired treatment.



*Treatments Panel*

Make further selections as needed, such as the Room Air or LPM of oxygen for the nasal cannula.



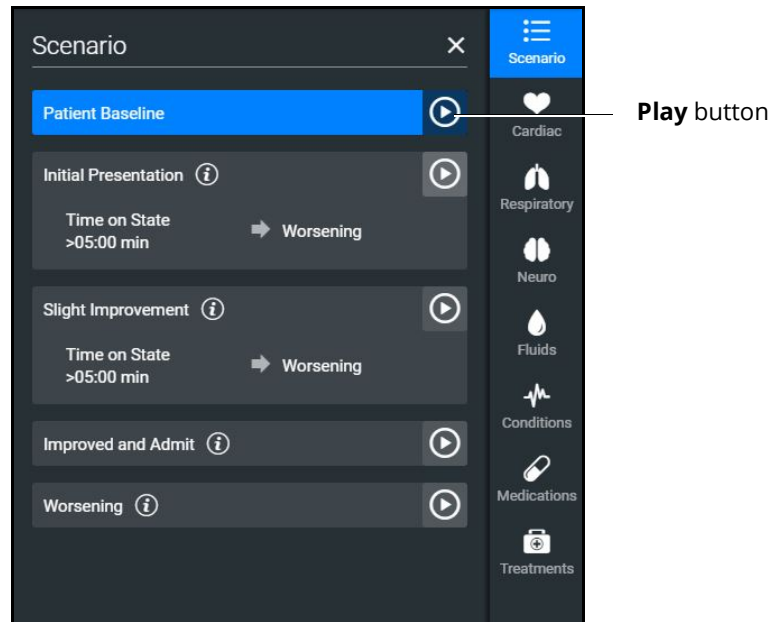
*Treatments Menu*

2. Select a treatment and click on **Apply treatment**.

# Transitioning Scenario States

To move between scenario states from the Run Screen:

1. Click on the **Scenario** icon to expand the scenario panel.



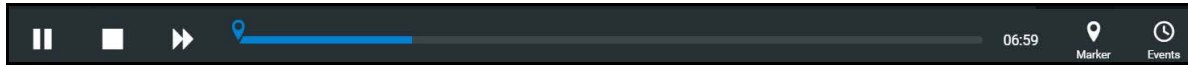
**Scenario Management Panel**

2. Click on the **Play** button in the desired state to advance from the current state to the desired state.

To pause or continue a scenario, click on the **Pause** or **Play** button from the Scenario Management menu.

## SCE Timeline Controls

The SCE timeline controls are located at the bottom of the Run Screen.



### *Timeline*

- The **Timeline** bar shows the amount of time that has elapsed and markers that have been created.
- The **Marker** button places a marker at the current point in the SCE. The marker can be used to annotate, or to reset the patient's physiology to what it was when the marker was placed. For more information, see *Using Markers* section of this user guide.
- The **Fast-Forward** button accelerates the SCE time to a 4x or 8x speed. This feature is optimal to obtain monitor readings for the learners to reference during scenarios, as well as advance the states and programmed physiology in a shorter amount of time.
- The **Pause/Play** button pauses the SCE (and the simulator) or starts the SCE if it has been paused. The **Pause/Play** button also returns the SCE time to normal speed after **Fast-Forward** has been selected.

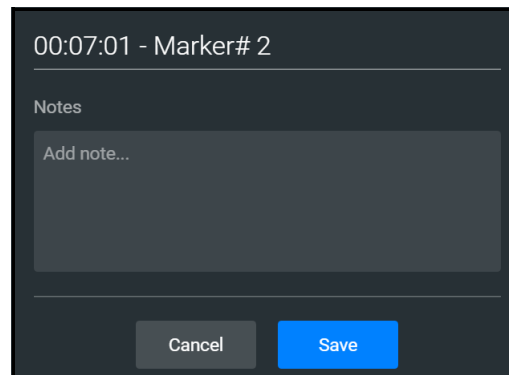
# Using Markers

To annotate the timeline, click the white **Marker** button to the right of the timeline.



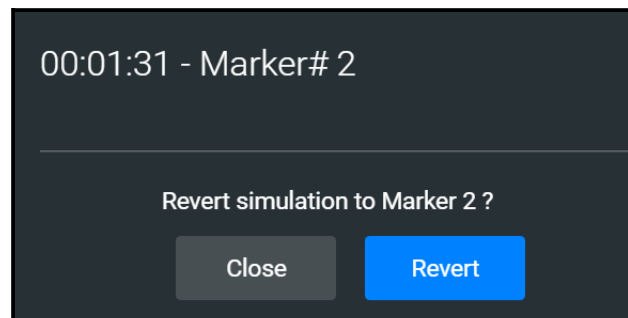
*Timeline with Markers*

A blue marker appears on the timeline bar and the Marker panel appears. Notes or comments may be added as needed. click **Save**.



*Marker Panel*

To return to the patient status at the time a marker was created, click the marker on the timeline, then click **Revert**.



*Revert to Marker #2*

The patient's status returns to the selected point in the timeline.

**Note:** When running an SCE, the SCE time continues moving forward and does not reset to the marker time.



THIS PAGE INTENTIONALLY LEFT BLANK

# PATIENT DISPLAY

The Patient Status appears when running on the fly or running an SCE.

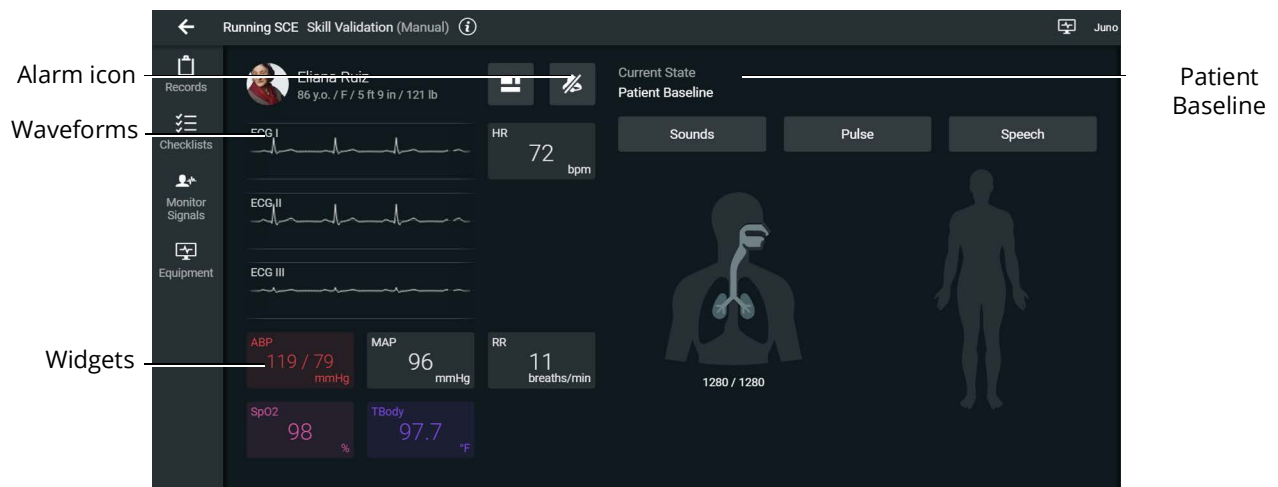
The Patient Status displays the same information except when running an SCE:

- the Current State (e.g. Patient Baseline) appears
- the Scenario icon appears at the upper-right of the Run screen

## Patient Status Display

Patient Status display appears in the main frame on the Run Screen when running on the fly or running an SCE.

The status includes numeric data and waveforms, as well as the Patient Baseline if running an SCE.



***Patient Status Display***

From this screen, users can:

- Click on the Alarm icon to mute or unmute alarm sounds.
- Click on waveforms, numeric widgets, and other parameters to adjust them.
- edit a layout.

## Patient Controls

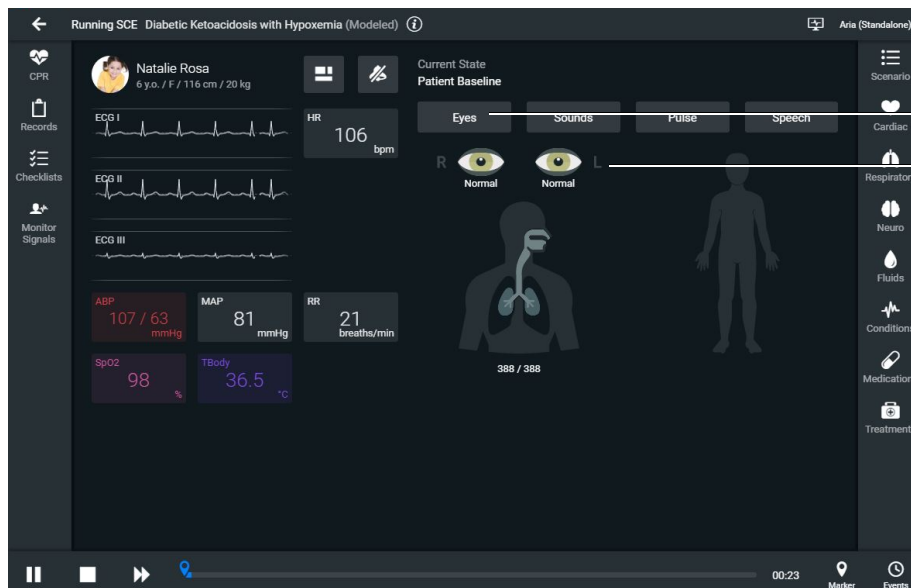
The patient's current state is shown on the Patient Status Display, allowing users to easily adjust parameters and patient states. The following controls are available whether running on the fly or running an SCE:

- Sounds
- Pulse
- Speech
- Respiratory

### Eyes

To change Eye states:

1. From the Patient Status Display panel, tapclick on the Eyes button or the eyes illustration.

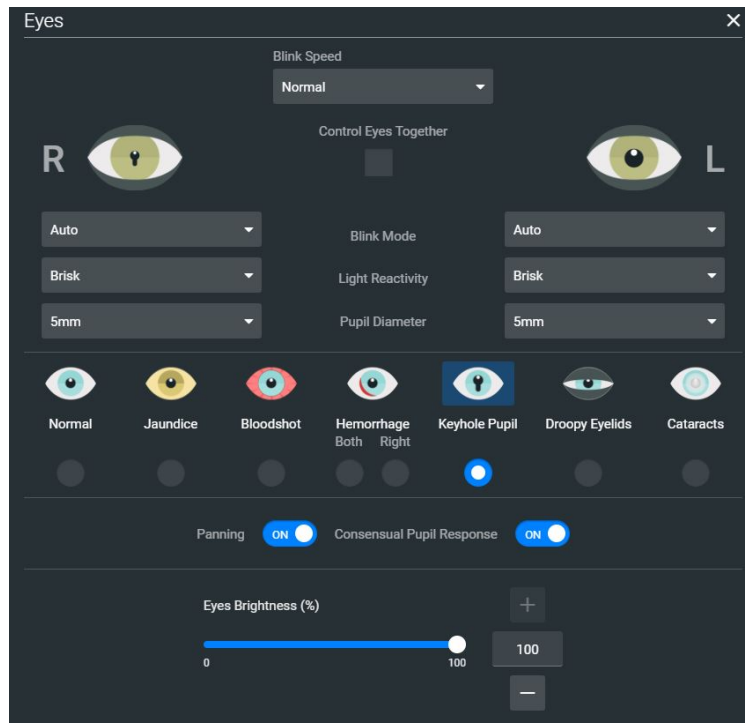


Eyes  
button

Eyes  
illustration

***Patient Baseline - Eyes Button and Illustration***

The Eye states panel appears.



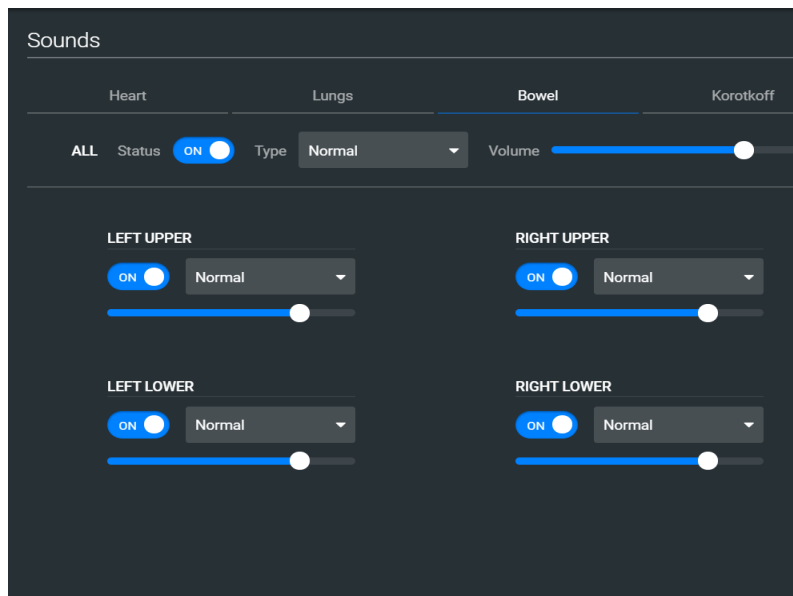
***Eye States Panel***

2. Adjust eye states including blink speed, blink mode, light reactivity, pupil diameter, and pupil states as desired by using the drop-down menus and toggles. Close the panel (by clicking the **X**) to apply the changes.

## Sounds

To change Sounds:

1. From the Patient Status Display screen, click on the **Sounds** button.
2. Adjust Sounds including heart, lung, bowel (non-gravid patient), and Korotkoff sounds by choosing each sound tab and using the drop-down menus, toggles, and sliders as desired. Close the panel (by clicking the **X**) to apply the changes.



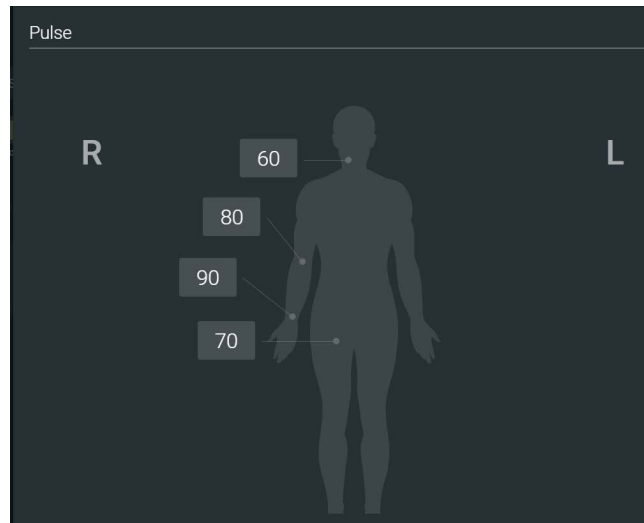
*Patient Baseline - Sounds States Panel*

## Pulse

To change pulse parameters:

1. From the Patient Status Display screen, click on the **Pulse** button.

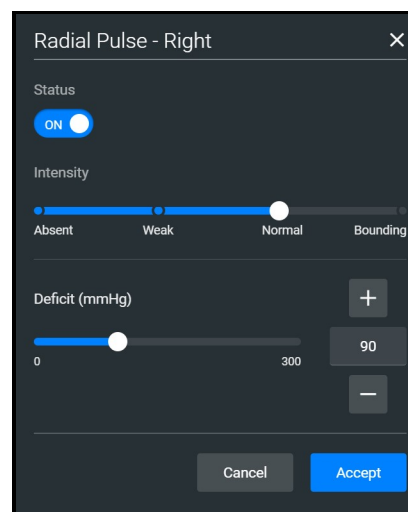
The Pulse panel appears.



**Pulse Deficit Default Values**

The numeric widgets display the *pulse deficit value* for each associated location on the patient body diagram. This is the value at which the pulse will disappear if the systolic blood pressure drops below that value. The pulse deficit values default settings are the accepted clinical values, but these may be modified using the controls, if desired.

2. Click on a numeric widget, and the associated pulse parameter control window will open allowing you to adjust the pulse parameter controls.



**Pulse Parameter Controls**

3. Click on the **Accept** button to apply the changes.

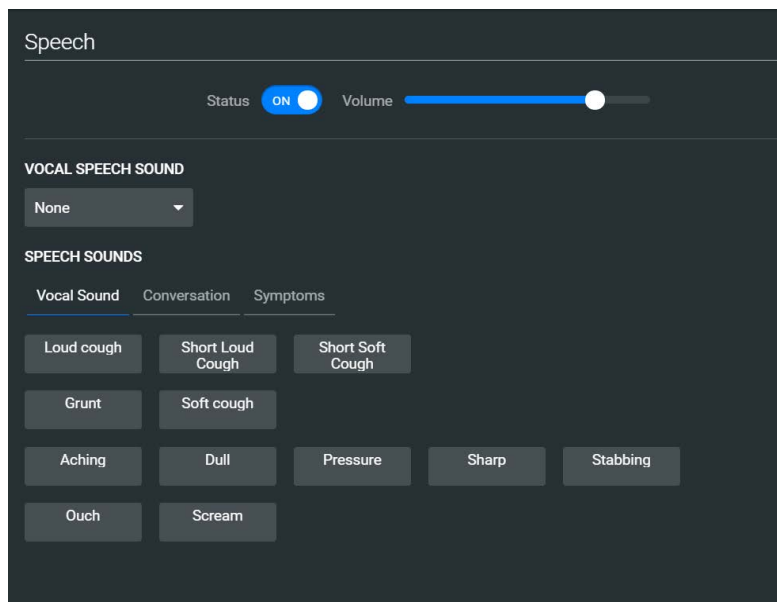
## Speech

Embody comes equipped with many speech options and vocal speech sounds. Speech can be turned on or off and volume can be adjusted.

To choose speech and vocal speech sounds:

1. From the Patient Status Display screen, click on the **Speech** button.

The Speech panel appears.



**Speech Panel**

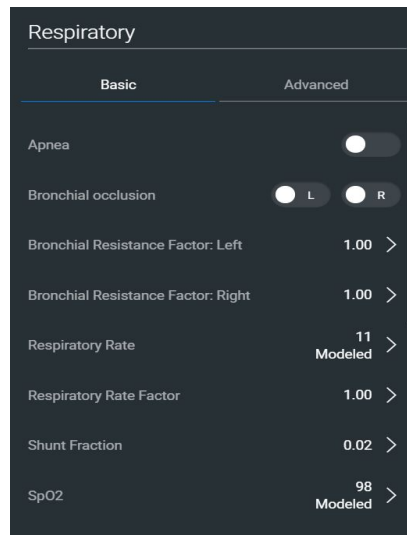
2. To turn the speech on or off, click on the **Status** toggle. Adjust the slider next to the Status toggle to control the speech volume.
3. Click on the **Vocal Speech Sound** drop-down box to open the menu and select an option as desired.
4. Click on **Vocal Sound**, **Conversation**, or **Symptoms** to view the list of speech options. Click on a speech option as desired.

## Respiratory

To adjust respiratory parameter controls:

1. From the Patient Status Display screen, click on the airway avatar.

The Respiratory Parameter Controls panel appears.



**Respiratory Parameter Controls**

2. Adjust the controls as desired. Close the panel (by clicking the **X**) to apply the changes.

## Change the Control Widget Layout

You can change the layout of the patient vitals display and save parameters as part of the layout.

To change the control widget layout:

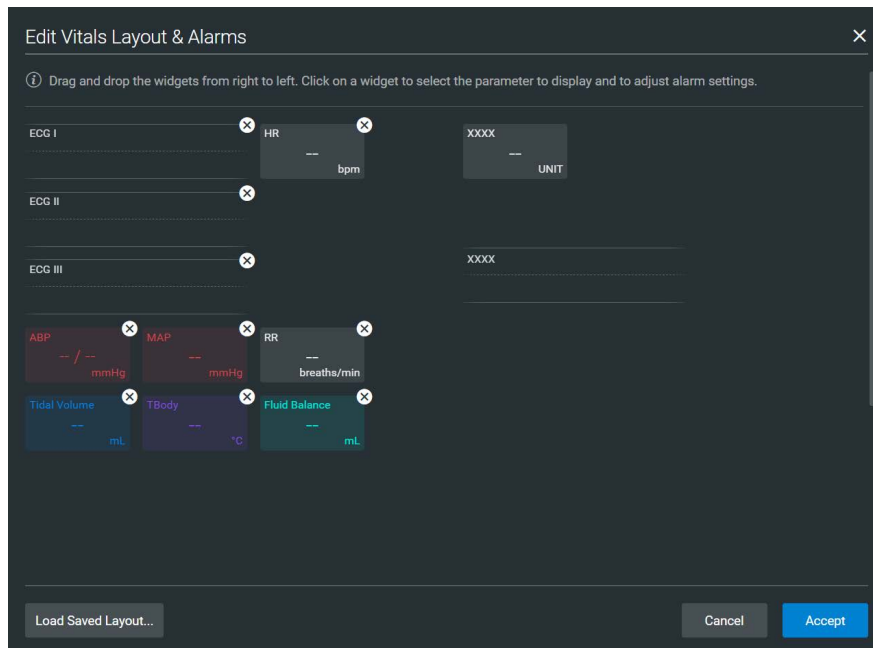
1. In the Run Screen, click on the **Patient Status** button.



**Patient Status Button**



The Edit Vitals Layout & Alarms panel appears.



**Edit Vitals Layout and Alarms**

2. Either begin modifying the baseline layout or click on **Load Saved Layout** to select another patient display layout to modify.
3. Drag and drop a waveform or numeric widget from the right side of the panel to an available display space on the left.

Once in place, the Select Waveform or Select Numeric Widget panel appears.

4. Click on a widget to modify which value will be displayed.
5. To delete a widget, click on the **X** to delete it.

**Note:** When a widget is deleted, there will be a blank space. Widgets are not rearranged.

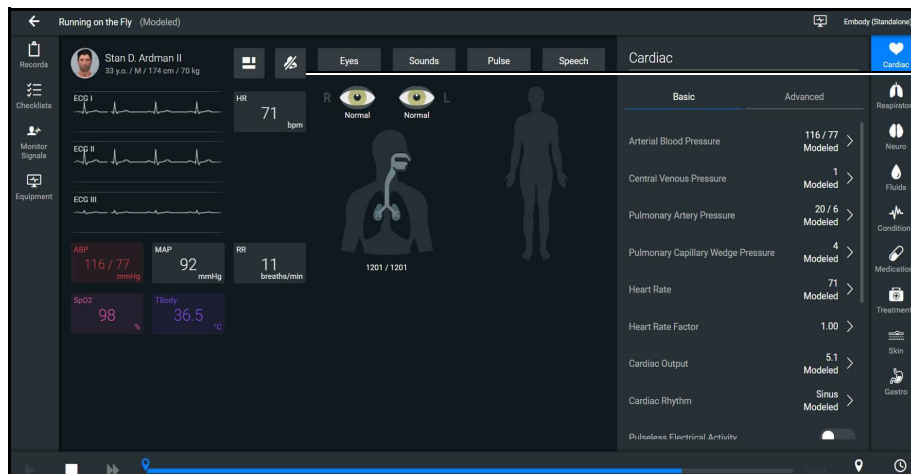
6. Select or change the physiological parameter(s) as needed. Click **Save**.
7. When the Edit Vitals Layout & Alarms panel appears either:

- Click **Accept** to update the layout without saving it.
- Click **Save to Library** to save the layout

**Note:** When changes are applied in Runtime, the layout is stored for Runtime only. In the case of the SCE editor, the changes would be stored with the SCE so that a copy of the layout is locally stored with the SCE. This way, they are not impacted by changes to the layouts, or if the SCE is used with another simulator.

# Alarm State

When an alarm is not muted and a value reaches critical state, the associated widget flashes.



Alarm State button

**Alarm State Button - Unmuted**

To mute the alarms, click on the **Alarm State** button. The icon will turn blue when it is muted.

# Markers

The use of markers in the timeline of the SCE helps indicate significant events or notes to revisit when debriefing the simulated clinical experience with the learner.

To add a marker:

1. Click on the **Marker** icon.  
A timestamp window will appear. You can add a note if desired.
2. Click **Save**.

# Editing Parameters

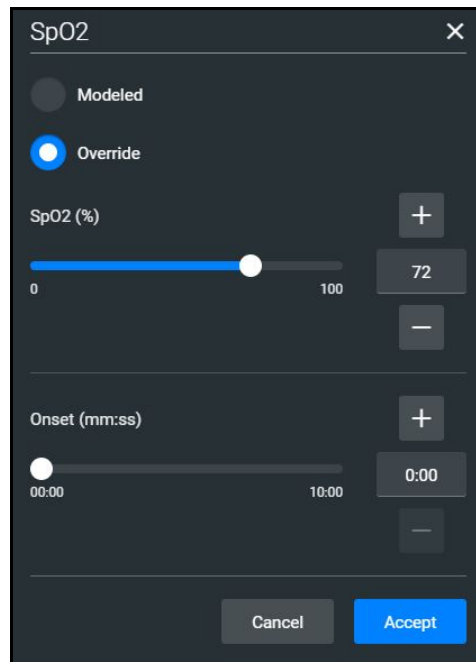
You can edit parameters in one of two ways:

- Parameter Editor
- Quick Edit

To edit a parameter in the Parameter Editor controls:

1. Click on a waveform or vital sign widget to open the Parameter Editor controls.
2. Click on the radio button to Override.

3. Use the sliders, text fields, or (+) and (-) to adjust parameters.

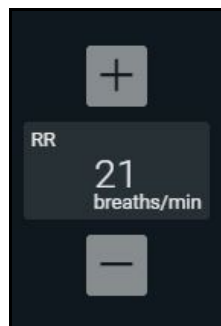


*Parameter Editor Controls*

4. Click **Accept**.

To edit a parameter using Quick Edit:

1. Click and hold a waveform or vital sign widget until (+) and (-) icons appear over the widget.



*Plus/Minus Widget*

2. Click the (+) or (-) signs to adjust the parameter.
3. Click outside of the Quick Edit area to save the changes and close the editor.

Panels, accessed from the Run screen, allow the application of conditions, medications and treatments during simulation. Once applied, changes are reflected in the patient's physiology and logged.

# Onset, Read-Only, and Override Indicators

Onset indicators are blue, rotating circles that indicate when the value of the parameter is in transition. Read-only indicators are yellow triangles that indicate a parameter is read-only and cannot currently be modified by the user (occurs in Manual Mode only).



**Onset and Read-only Indicators in Manual Mode**

Override indicators are yellow diamonds indicating a user selection is currently overriding a modeled value (occurs in Modeled Mode only).



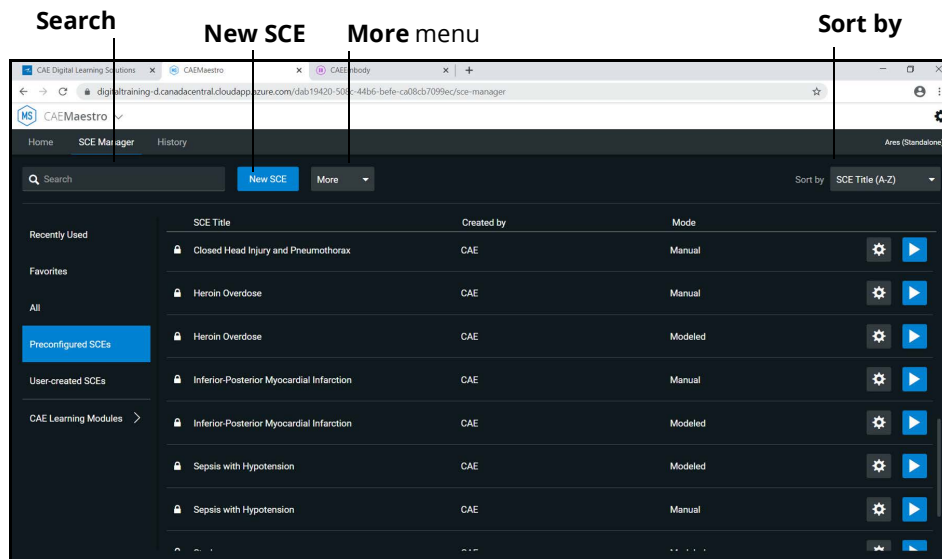
**Onset and Override Indicators**

THIS PAGE INTENTIONALLY LEFT BLANK

# MANAGING SCEs

The Maestro SCE Manager is where you can view and print information for all SCEs. You can also create, edit, copy, or delete custom SCEs and Learning Modules.

To access the SCE Manager screen, from the Maestro Home Screen click **SCE Manager**.



**SCE Manager Screen**

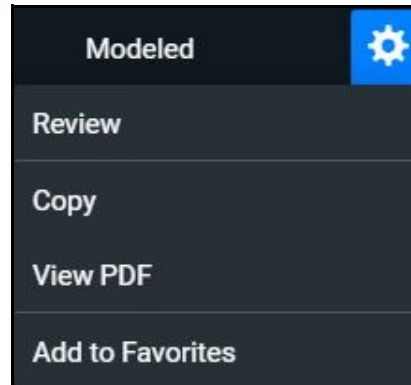
The default screen shows Recently Used SCEs but you can easily locate any SCE and Module in the SCE Manager.

There are three ways to locate SCEs or modules from the SCE Manager screen:

- In the left column, select either **Favorites, All, Preconfigured SCEs, User-created SCEs** or **User-created Modules**.
- In the **Search** field, type part or all of the name of an SCE or module.
- Click on the **Sort by** drop-down to filter the list by ascending or descending order.

## Review an SCE

To review details about an SCE, click on the name of an SCE, or click on the **Gear** icon and select **Review** from the drop-down menu.



*SCE Gear Drop-down Menu Options*

The SCE Editor screen appears.

## View SCE Details

From the SCE Editor screen, you can select a tab or panel to view details.

The SCE Editor screen is where users can enter specific details for custom SCEs. For more information on entering SCE details into a new SCE, see *Create a Custom SCE* section of this user guide.

## SCE Editor Navigation Tabs

- **Details:** Lists relevant information about the SCE. Allows access to the Overview, Learner, and Facilitator panels

For more information, see *SCE Editor Panels*.

- **Patient:** Includes the patient profile information
- **Scenario:** Includes states pertaining to the SCE
- **Checklists:** Includes checklists related to learner milestones for the SCE
- **Patient Records:** Stores patient records including but not limited to:
  - Lab reports
  - X-rays
  - Medical history
  - Healthcare Provider's orders

- Handoff reports
- **Runtime Configuration:** Allows the creation of Quicklinks for conditions, medications, and treatments
- **Monitor Signals:** Allows users to enable or disable parameters to be displayed on the patient monitor at the start of the scenario
- **Preparation:** Lists recommended equipment and supplies needed to run the SCE and manikin setup notes

## SCE Editor Panels

- **Overview:** Includes information about the SCE synopsis and descriptions of the states
- **Learner:** Displays learning objectives, performance measures for each state, and preparation questions
- **Facilitator:** Includes notes, debriefing points, teaching questions and answers, as well as clinical references about the SCE

## Create a Custom SCE

You can quickly create an SCE by copying an existing SCE, or by creating a new SCE and entering all of the details. Custom SCEs can be used alone or in a Learning Module. For more information, see *Learning Modules* section of this user guide.

**Note:** The Lock icon on any screen indicates the SCE was installed by CAE and cannot be edited or deleted.

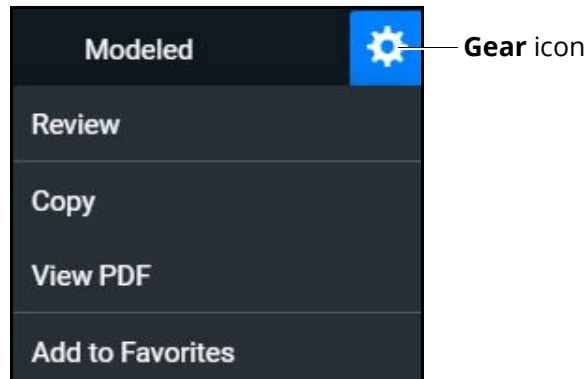
## Copy an SCE

One way to create a new SCE is to make a copy of a preconfigured (locked) SCE and then edit that as desired. To create the SCE from an existing SCE.



To copy an SCE:

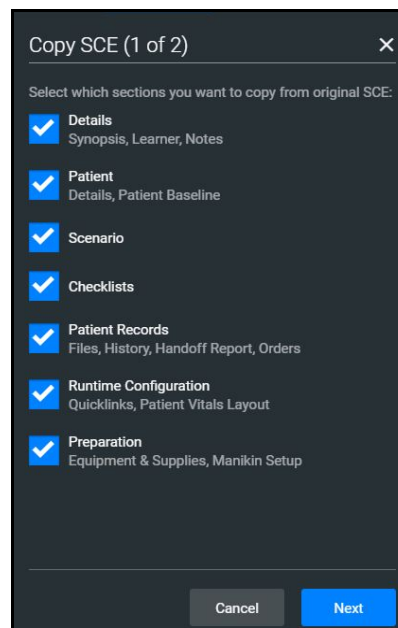
1. On the SCE Manager screen, click on the **Gear** icon on the right of the desired SCE.



***SCE Gear Drop-down Menu Options***

2. Click **Copy**.

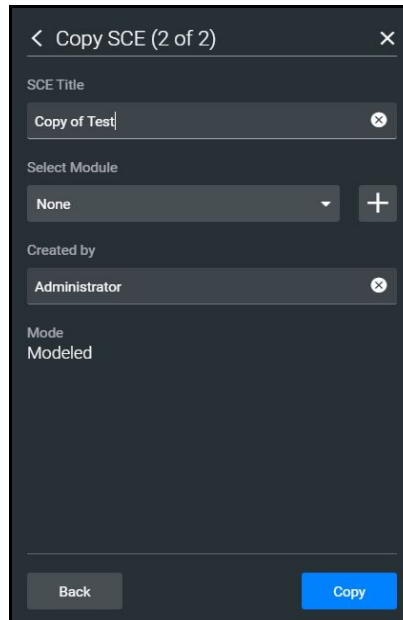
The Copy SCE panel appears and lists sections of the SCE you can copy.



***Copying SCE***

3. Select the elements of the SCE to copy. When finished, click on **Next**. In the **SCE Title** field, enter a new SCE name.
4. (Optional) Assign the SCE to a Module using the drop-down menu.

5. Click **Copy**.



***Saving Copied SCE***

The new SCE is copied and available for selection from the SCE Manager.

## Creating a New SCE

Creating a new SCE is a two-step process.

1. Create the SCE in the SCE Manager as described in this section.
2. Enter details about the SCE in the SCE Editor as described in *Using the SCE Editor* section of this user guide.

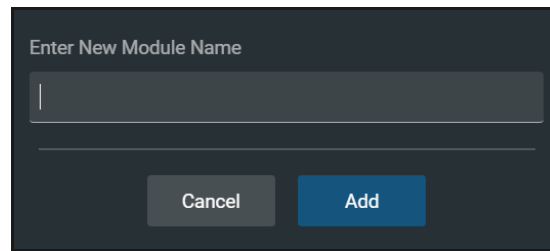
To create an SCE:

1. From the SCE Manager screen, click on **New SCE**.  
The New SCE panel appears.
2. Type a title for the SCE in the **SCE Title** field.
3. (Optional) To add an SCE to a module, click on the drop-down arrow and select a module. Or, click the + icon to create a new module.



***Select Module***

4. Type a name for the module in the Enter New Module Name screen and click on **Add**.



***New Module Name Screen***

5. Complete the remaining fields in the New SCE screen or select options as required. When finished, click on **Create**.

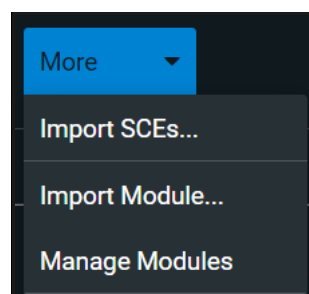
The SCE Editor screen appears with the **Details** tab displayed.

6. In the **Overview**, **Learner**, and **Facilitator** panels, click on the **Edit** icons to enter additional information.
7. Click the navigation tabs to enter additional details about the SCE as needed. To learn more, see *Using the SCE Editor* section of this user guide.

## Import or Export an SCE

SCEs can be imported from an external device or the hard disk drive where the SCE file is saved. The SCE file extension is *msce*.

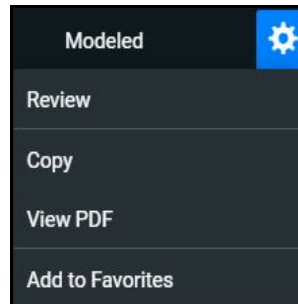
To import from the SCE Manager screen, click on the **More** drop-down menu and click on **Import SCEs**.



***More Drop-down Menu Options***

To export an SCE:

1. In the **SCE Manager**, click on the gear icon next to the desired SCE.



*SCE Gear Drop-down Menu Options*

2. Click **Export**.
3. Select the desired location for the *msce* file in your File Explorer window and click on **Save**.

The file is saved in the designated location. To view the PDF of an SCE:

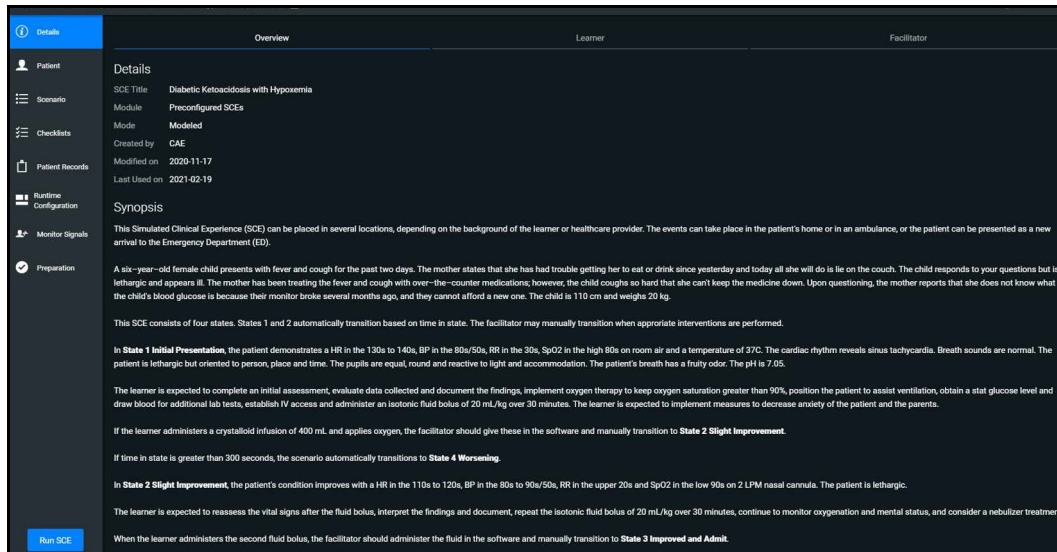
1. Click on **View PDF**.
2. In the window pop-up, identify where the PDF file should be saved to and select **Save**. The file can then be opened and viewed from that location.

THIS PAGE INTENTIONALLY LEFT BLANK

## USING THE SCE EDITOR

Use the SCE Editor to review or manage any purchased, preconfigured SCEs and to complete or edit information for custom SCEs. From the SCE Editor screen, you can also view checklists and patient records, or delete information as needed.

To access the SCE Editor, click on the name of an SCE from the SCE Manager screen.



### SCE Details

The buttons in the Navigation panel provide options to:

- Run the SCE.
- Edit the patient or scenario.
- Add checklists or patient records.
- Modify the runtime configuration including preparation information.

Some sections in the SCE Editor include a rich-text editor to allow free-form data entry.

**Note:** If the SCE is locked, you cannot modify or delete information.

# Patient Profile

To edit the Patient Profile:

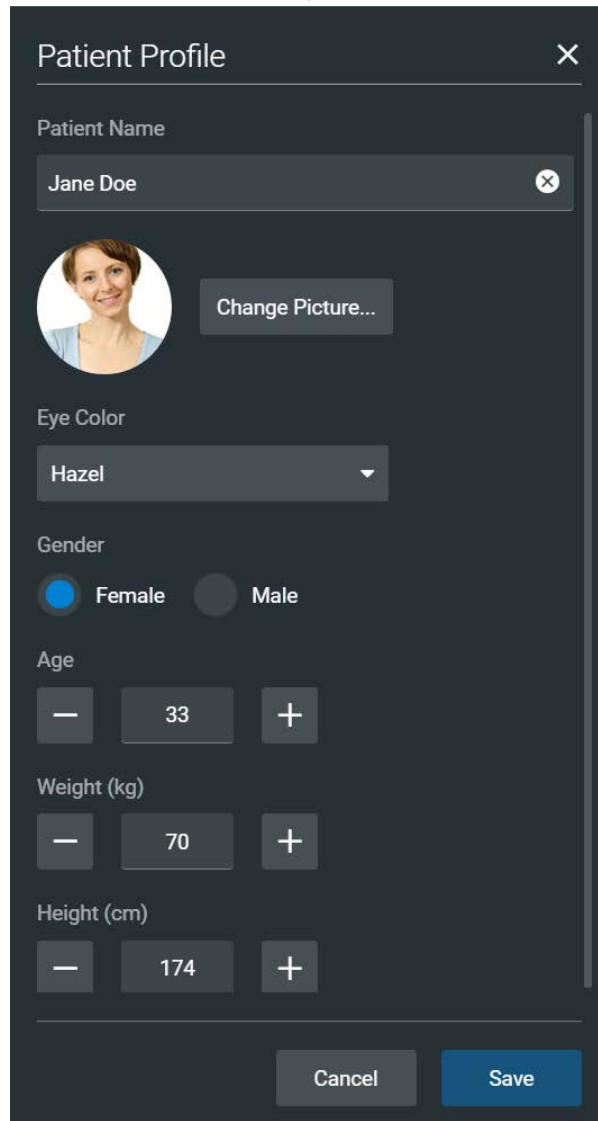
1. From the SCE Editor, click on the **Patient** tab, then click on the **Edit** button.



*Patient Profile*

The Patient Profile Editor appears.

2. Modify the patient's name, eye color, age, gender, weight, and height in the appropriate fields.



The image shows a 'Patient Profile' dialog box with the following fields and controls:

- Patient Name:** A text input field containing 'Jane Doe' with a clear (X) button on the right.
- Profile Picture:** A circular image of a woman with a 'Change Picture...' button to its right.
- Eye Color:** A dropdown menu currently set to 'Hazel'.
- Gender:** Two radio buttons, 'Female' (selected) and 'Male'.
- Age:** A numeric input field with '33' and minus/plus buttons.
- Weight (kg):** A numeric input field with '70' and minus/plus buttons.
- Height (cm):** A numeric input field with '174' and minus/plus buttons.
- Buttons:** 'Cancel' and 'Save' buttons at the bottom right.

**Patient Profile**

3. Click on **Change Picture** to change the patient's picture.

**Note:** When using the Embody Simulator, the option to **Change Profile** will be available, allowing edits to all of the patient parameters on the Patient Profile panel. This option also allows for selection of the patient that is visually represented as the virtual simulator in the Embody screen. See the chapter *CAE Embody Virtual Simulator* for more information.

4. Click on **Save**.

**IMPORTANT:** No part of the patient's profile can contain any special characters, such as / \ : \* ? < > % | " ' " "



## Setting a Patient's Baseline

The patient baseline is the patient's initial status at the start of an SCE.

To set the Patient's Baseline:

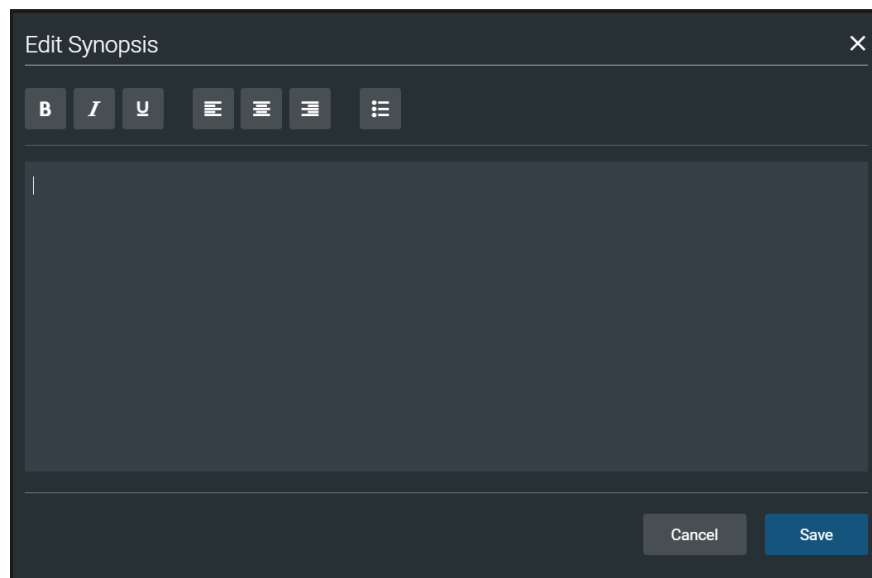
1. In the **Patient** section, click on the **Edit** button on the right of **Baseline**.  
The Patient Baseline Editor appears.
2. Set the Patient's baseline status by modifying the desired parameters and click on **Save**.

When the SCE begins, the Patient status reflects the selected baseline settings.

To use the text editor:

1. Where available, click on the **Edit** button.
2. Enter or edit information as needed.

**Note:** Text can be copied into the fields from Text Editor or Notepad only.



*Text Editor*

3. When finished, click on **Save**.

**Note:** Notes can also be added to each scenario state when editing a Scenario.

## Scenarios

When creating a custom SCE, users can create new scenarios or modify an existing unlocked SCE using the Scenario Editor or Live Scenario Editor.

**Note:** The live editor is only available within unlocked SCEs that use the optional Modeled Physiology, and allows live edits to the scenario while running the simulation.

To edit from the Scenario Editor:

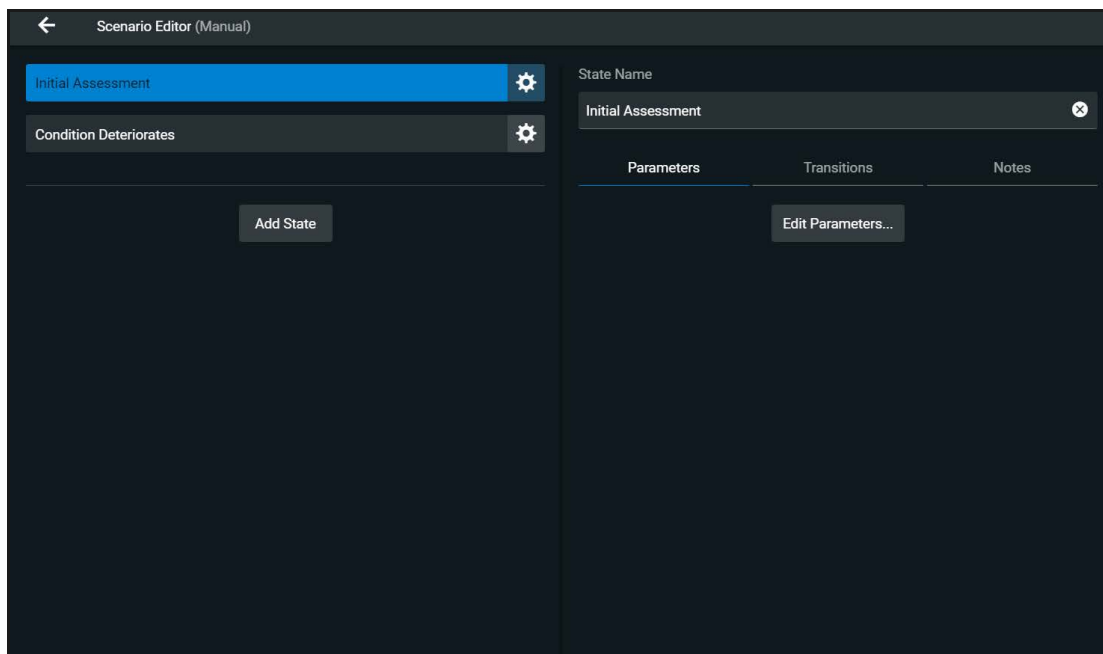
1. From the SCE Manager screen, select an SCE to edit.

The SCE Editor screen appears.

2. Click on the **Scenario** tab.
3. Click on the Scenario **Edit** icon.

**Note:** If it is a brand new SCE, click on the **Open Scenario Editor** button to open the Scenario Editor.

The Scenario Editor appears.



**Scenario Editor**

4. Click on the **Gear** icon located on the side of a state to do one or more of the following:
  - **Rename:** to rename the state
  - **Copy:** to copy the state
  - **Delete:** to delete the state
  - **Edit Parameters:** to edit the state parameters without jumping to the specified state
  - **Add Transition:** to add a transition from one state to another
  - **Edit Note:** to add state notes

From the Live Scenario Editor, states can be added, modified, and deleted. Patient Profile and other SCE sections can only be modified in the SCE Editor.

To edit from the Live Scenario Editor:

1. From the Scenario Editor screen, click on **Live Scenario Editor**. When the informational window appears, click on **Close** and the Live Scenario Editor screen opens.
2. Click on the **Gear** icon located on the side of a state. Then click on one or more of the following:
  - **Jump to State:** allows users to jump to the desired state. It is possible to perform a live edit, by selecting the **Edit Live** button. Once completed, parameter changes will be applied to the state. This option allows users to edit state parameters and see the resulting physiological impact on the patient.
  - **Rename:** to rename the state.
  - **Copy:** to copy the state.
  - **Delete:** to delete the state.
  - **Edit Parameters:** to edit the state parameters without jumping to the specified state.
  - **Add Transition:** allows transitions to be added from one state to another.
  - **Edit Note:** to add state notes.

At any time, the simulation may be restarted by clicking the **Restart Simulation** button at the bottom of the screen.

## Add, Modify or Delete Scenario States

A scenario state is comprised of conditions and/or parameters. A state may also include automated transitions to other states and notes for the instructor.

For scenarios, users can:

- Create new states and options.
- Add conditions and/or parameters to a state, or copy a state into a new state.
- Modify or delete portions of a state such as conditions, parameters, transitions, or the entire state itself.
- Add and delete transitions.

### *Add Scenario States and Parameters*

You can add states, conditions, and parameters in the Scenario Editor or Live Scenario Editor.

To add a scenario state:

1. In the Scenario Editor or Live Scenario Editor, click on **Add State**.
2. In the window that appears, enter a name for the new state. Click on **Create**.

The State window appears, where you can add parameters to the state.



*New State*

To add parameters in the Live Scenario Editor:

1. In the Live Scenario Editor, select the desired state, and then select **Jump to State**. All changes made to controls will be added to active state.
2. Click on the **Gear** icon and select **Edit Live**.
3. Add as many parameters as needed.

Parameters appear consecutively within the state.

4. Move to different states to add or edit parameters as needed using the **Jump to State** feature. Repeat this step as needed through multiple states.
5. When finished, click on **Return** to save and exit the editor.

**IMPORTANT:** If the physiology of any parameter conflicts with other parameters, Maestro will retain the last parameter entered.

To add parameters in the Scenario Editor:

1. In the Scenario Editor, select the desired state.
2. On the right side of the screen, click on **Edit Parameters**.
3. Add conditions or parameters as needed by selecting them from the list on the left side of the screen. Once added, they appear on the right side of the screen.

### ***Modify or Delete Scenario States or Parameters***

To modify a scenario state:

1. In the Scenario Editor or Live Scenario Editor, select the desired scenario state. Then, click on **Edit Parameters**.
2. Make necessary changes. Click on **Save**.

To delete a scenario state in the Scenario Editor or Live Editor, click on the **Gear** icon, then click on **Delete**.

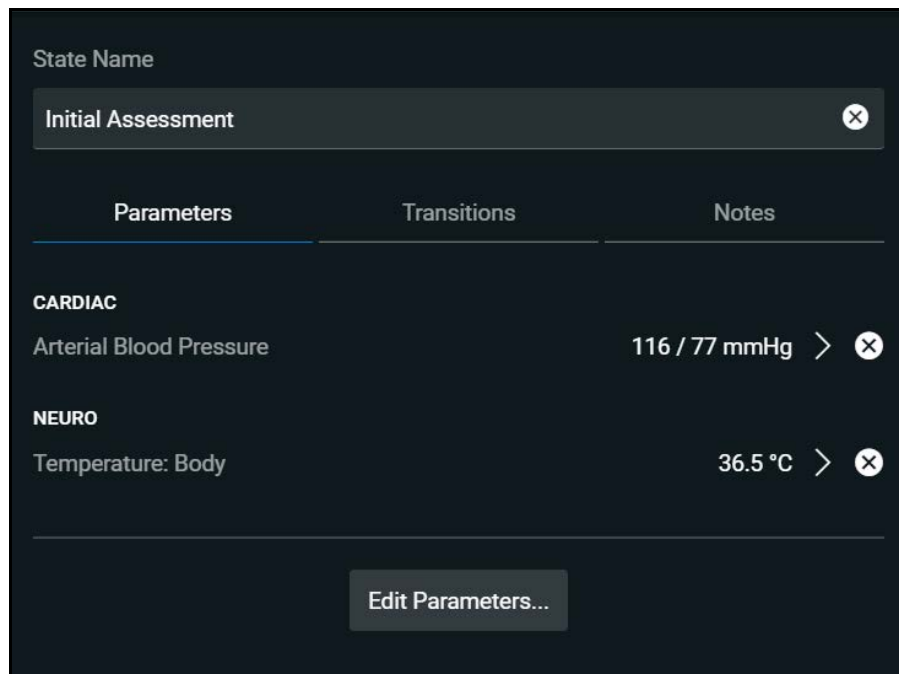
To delete parameters:

1. In the Scenario Editor or Live Scenario Editor, click on the **Information** icon to expand the state.



*Information Icon*

2. Click on the **Parameters** tab. Click on the **X** icon next to the parameter to delete.
3. Click **Save**.



*Parameters Tab*

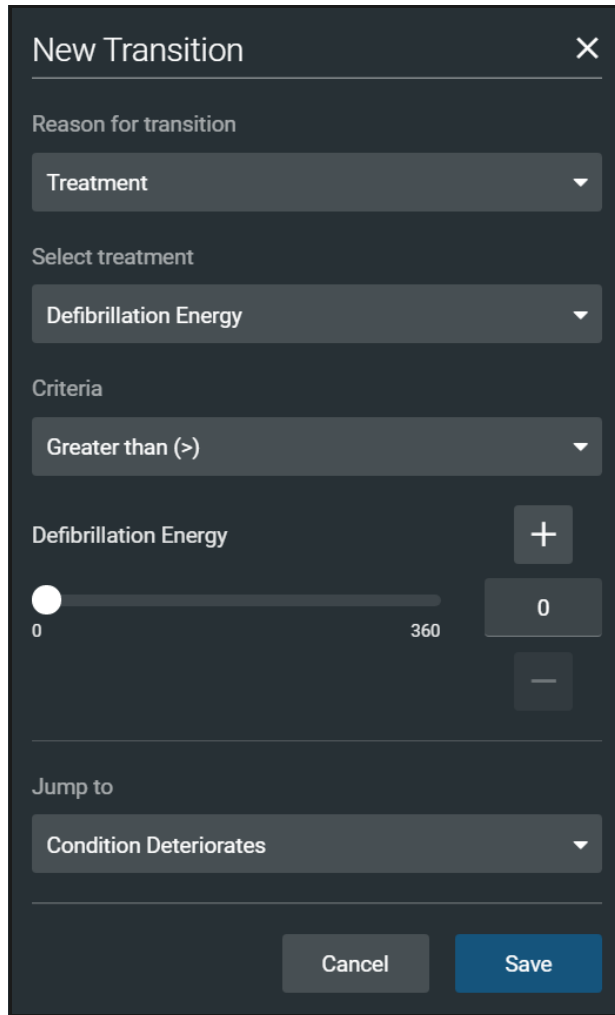
## *Add and Delete Transitions*

To add transitions, the scenario must have both an original state and a state that results from the transition. Add or delete transitions from the Scenario Editor or Live Scenario Editor.

To add transitions:

1. In the Scenario Editor or Live Scenario Editor, click on the **Gear** icon next to the desired state.
2. Click on **Add Transition**.

The New Transition panel appears.



***New Transition Panel***

3. Select a Reason for Transition from the list, then select additional options as prompted.
 

**Example:** If the administration of medication is the desired reason for transition, select Medications, then select the desired medication from the list that appears.
4. Once the transition option is selected (ex: Medication), enter the criteria, transition value, and state that results from the transition.
5. Multiple transitions may be entered for a state to create alternate pathways. Follow the same steps to make selections and assign values to the Treatment, Assessment, Vitals, Medication concentration, Fluids, Time in Scenario, and Time in State variable types.
6. When finished, click on **Save**.

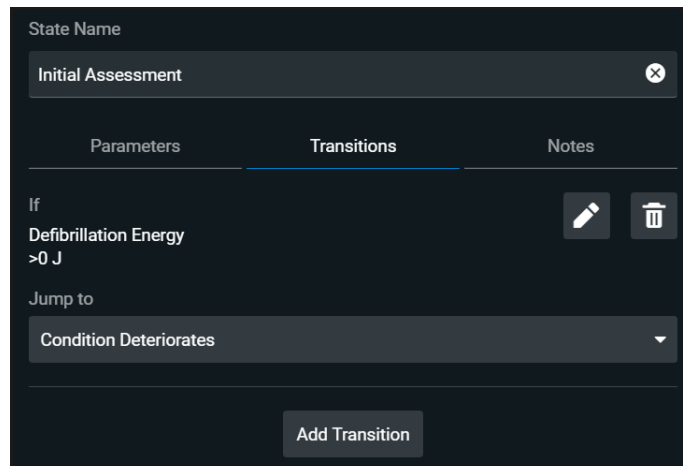
To delete a transition in the Scenario Editor or Live Scenario Editor:

1. Click on the **Information** icon next to the state.



*Information Icon*

2. Select the **Transitions** tab, then click on the **Trash** button next to the transition to delete.



*Scenario Editor - Transition Tab*

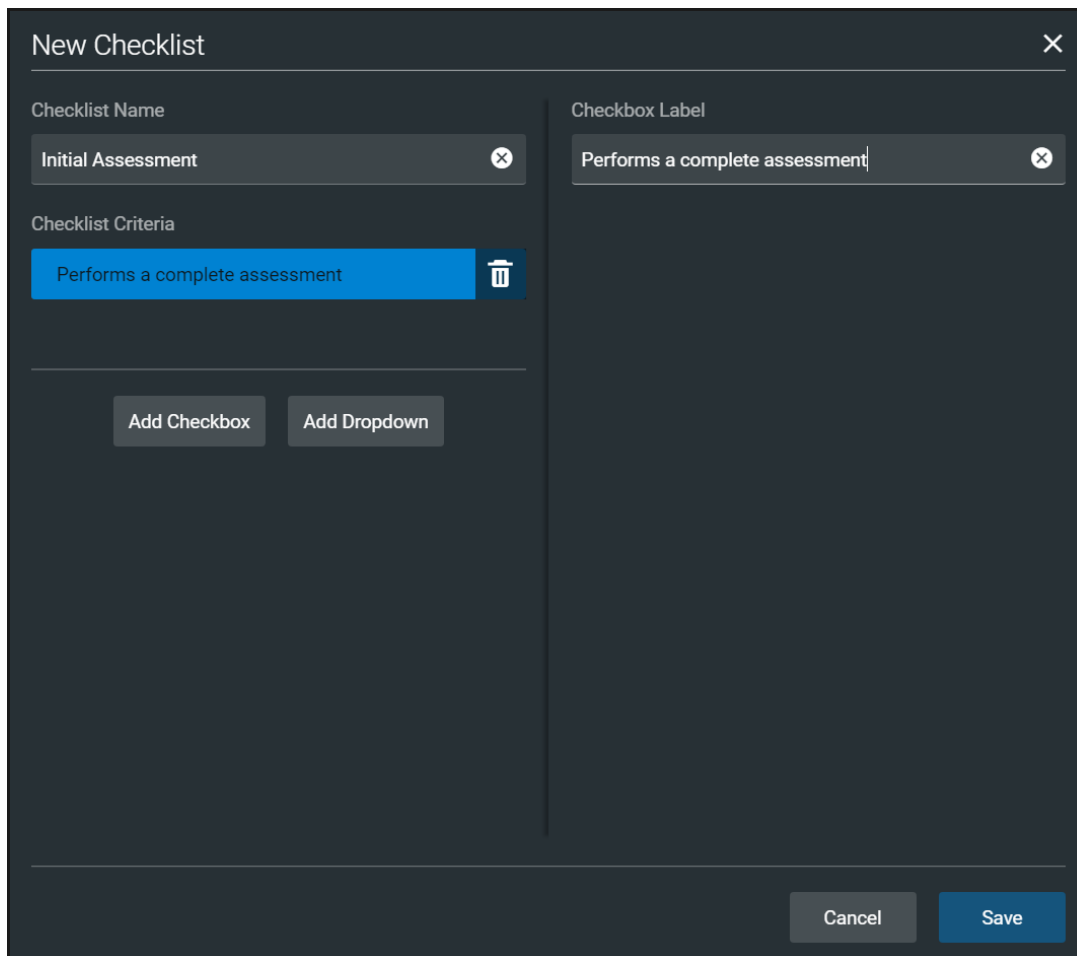
## Checklists

You can create new checklists or import existing checklists from the library.

To create a new checklist:

1. In the SCE Editor, click on the **Checklists** tab.
2. When the Checklists panel appears, click on **Create New**.

The New Checklist panel appears.



### *New Checklist Panel*

3. Enter a name for the checklist in the Checklist Name field.
4. (Optional) Click on **Add Checkbox** to add a checkbox to the checklist.
  - a. Enter a label name in the Checkbox Label field.
  - b. (Optional) Click on **Add Checkbox** to continue entering labels as needed.
  - c. Click on **Save**.
5. (Optional) Click on **Add Dropdown** to add list items to the checklist.
  - a. Enter a name for the drop-down list in the Dropdown Label field.
  - b. Click on **Add Option** to provide items that can be selected from the drop-down list.
  - c. Enter a name for the list item in the Dropdown Options field.
  - d. (Optional) Click on **Add Dropdown** to continue entering drop-down lists as needed.

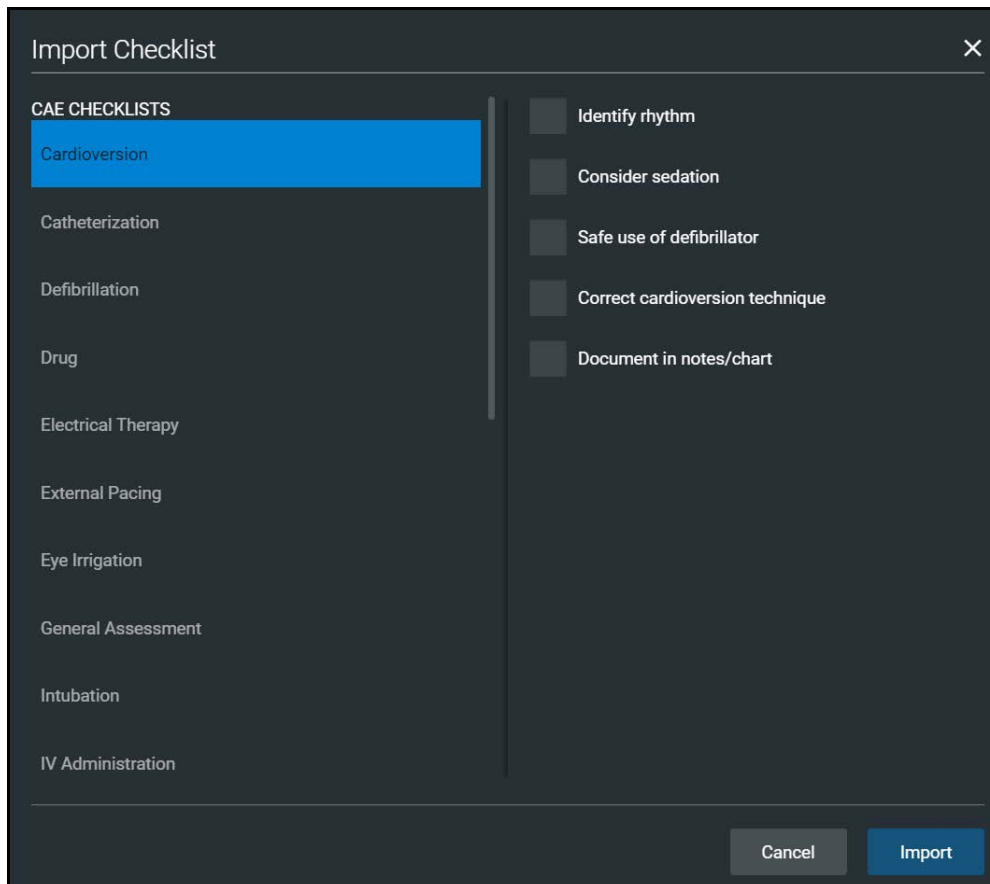


- e. Click on **Save**.
6. (Optional) Rearrange the checklist order by dragging individual checklists up or down as desired
7. (Optional) Click on the checklist Gear icon next to the created checklist to Save to Library (or to Rename, Edit, Copy or Delete).
8. (Optional) Use the Edit function to:
  - a. Edit the Checklist Name.
  - b. Edit the Checkbox Label.
  - c. Rearrange the order of the Checklist Criteria by dragging any criteria up or down.
  - d. Add a Checkbox or Dropdown.

To import a checklist:

1. In the SCE Editor, click on the **Checklists** tab.
2. When the Checklists screen appears, click on **Import from Library**.

The Import Checklist panel appears and displays all checklists from all SCEs in the system.



*Import Checklist Panel*

3. Highlight the checklist.
4. Click on **Import**.

## Patient Records

Patient records can be uploaded into Maestro for display in the CAE Patient Monitor software. Once uploaded, a patient record is available for use with the SCE.

**Note:** A single patient record file cannot exceed 20MB.

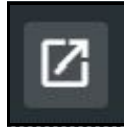
To ensure adequate space, delete patient records that are no longer needed.

To access a patient record:

1. From the SCE Editor screen, click on the **Patient Records** tab.

The Patient Records list appears with all available patient records shown.

- (Optional) To preview a patient record before sending to the Patient Monitor, select the record, and click on the **Preview** button.



*Preview Button*

- Select a patient record, then click on **Send to Patient Monitor**.

## Upload Patient Records

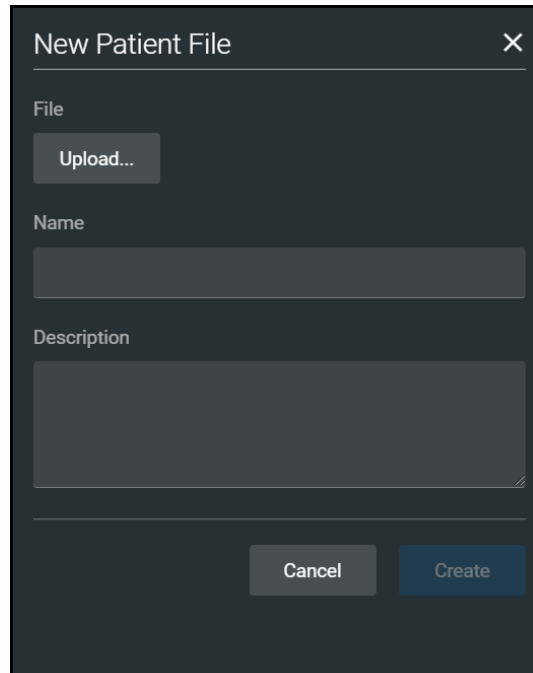
You can upload the following file types:

- GIF, JPG, PNG, and XPS images
- MPEG and MOV videos
- PDF documents
- MP3 audio Files

To upload a patient record:

- In the SCE Editor, click on the **Patient Record** tab.
- In the panel that appears, click on **Patient Files > Add File**.

The New Patient File panel appears.



*New Patient File - Upload Panel*

3. Click on **Upload**. Select the desired file and click on **Open**.
4. When the file name and description appear, modify as needed in the text fields to reflect the desired file name and description.
5. Click on **Create**.

## Edit or Delete Patient Records

You can only change the name or description of the patient record. You cannot edit the content of the record from the Patient Record tab.

To edit a patient record name:

1. From the list of Patient Files, click on the **Gear** icon next to the desired file.
2. Click on **Edit**. Change the **Name** or **Description** as needed.
3. Click on **Save**.

To delete a patient record:

1. From the list of Patient Files, click on the **Gear** icon next to the desired file.
2. Click on **Delete**.
3. When the message appears to confirm your selection, click on **Delete**.

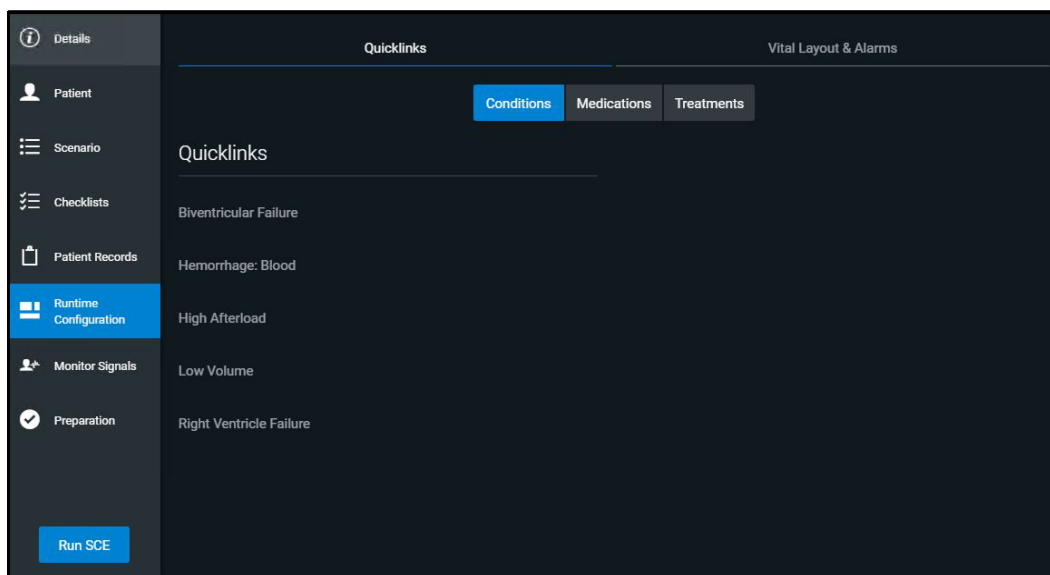
# Runtime Configuration

Click on **Runtime Configuration** to access the Quicklinks setup as well as the Vitals Layout & Alarms setup screen.

## Quicklinks Setup

From the Quicklinks Setup screen within the SCE Editor, conditions, medications, and treatments can be preconfigured for the SCE by creating Quicklinks. For more information about using Quicklinks, see the *Quicklinks* section of this user guide.

To navigate through available conditions, medications, and treatments, click on the **Conditions**, **Medications** and **Treatments** buttons.



*Runtime Configuration Quicklinks Setup Screen*

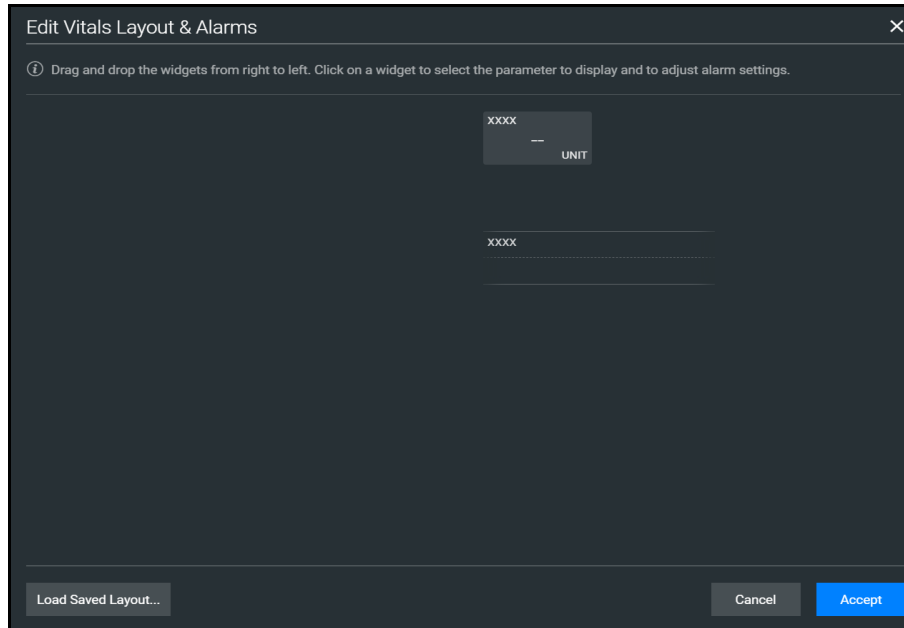
To create a Quicklink, select an item from the **Conditions**, **Medications**, or **Treatments** lists.

To remove a Quicklink, deselect the option.

## Edit Vital Layout & Alarms

To edit the vital layout and alarms, click on the **Vital Layout & Alarms** tab.

Any current vital widgets and alarms appear. If the SCE is new, click the **Edit** button to the right of **Vital Layouts & Alarms** and begin adding vital widgets and alarms by dragging the desired widget template from the right side of the screen to the left.



***Runtime Configuration Vital Layout & Alarms Screen***

Upon dragging the widget, the Select Numeric Widget or Select Waveform box will appear. Select the desired vital or waveform from the available options, modify alarms and thresholds as desired, and click on **Save** when complete.

The option to load a saved layout is also available by selecting the **Load Saved Layout** button.

When all modifications are complete, select **Accept**.

THIS PAGE INTENTIONALLY LEFT BLANK

# VIRTUAL EQUIPMENT

Maestro Evolve offers virtual equipment that may be used during the simulation, providing user interfaces that mirror authentic medical equipment. Running equipment, modifying settings, and applying treatments will impact the physiology of the patient status in Maestro offering a deeper learning experience. When using virtual equipment during a simulation, it may also be visually represented by launching the virtual patient.

Virtual equipment options include:

- **CAEPatient Monitor** - an on-screen patient monitor with preconfigured layouts or the ability to modify settings for the user's preference. Adjustable settings, 12 Lead ECG reports, and the ability to capture a patient's status from the display are other examples of the Patient Monitor features.
- **CAEAED** - a virtual automated external defibrillator that is easy to use, providing audible prompts guiding the learner on appropriate action to take.
- **CAEDefibrillator** - an electrotherapy device that paces and delivers cardiac shocks to the virtual patient during the simulation, providing the learner with knowledge of how to use this life-saving device.
- **CAEVentilator** - offers both invasive and non-invasive options, various modes, and a display featuring waveforms and audible alarms. Much like bedside medical equipment, the virtual ventilator allows for monitoring and treating the virtual patient with respiratory needs.
- **CAETransport Ventilator** - has many of the same features as the CAE Ventilator, though providing an interface that more closely resembles equipment used for portable respiratory support.
- **CAEAnesthesia Machine** - provides the learner with anesthesia technology, by delivering the ability to virtually administer medical gases, adjusting pressure and flow while monitoring and providing respiratory ventilation.

## CAE Patient Monitor

Patient Monitor can run in a browser window, while the Maestro simulation is running in a separate window, and a third window may run additional virtual equipment (e.g. ventilator). When using dual monitors it allows the user to view the Patient Monitor at the same time as the simulation, enabling a view of impact to patient status as parameters like blood pressure and heart rate as they are modified. See more information in the *Appendix A - FAQ* of this guide for configuration of dual monitors.



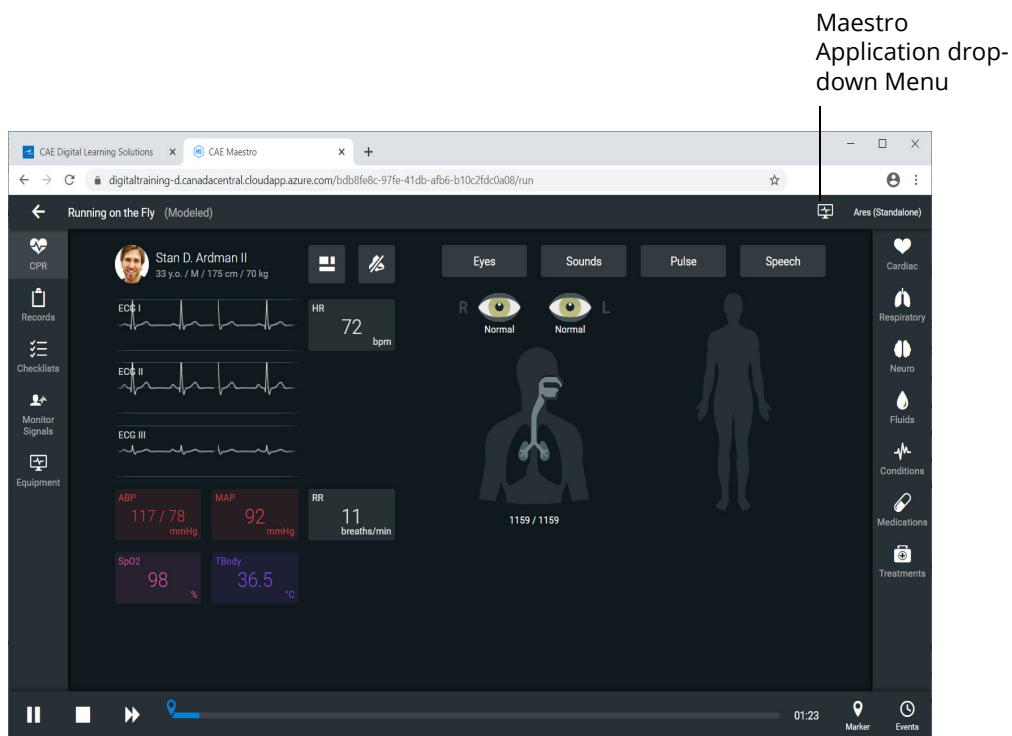
This section will describe how to:

- Launch Patient Monitor
- Use Patient Monitor

## Launch Patient Monitor

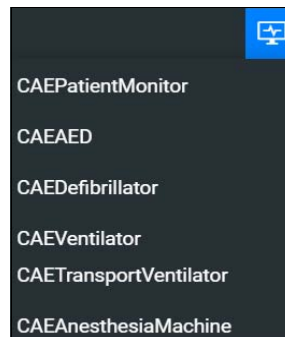
To launch the Patient Monitor:

1. Keep the Maestro Evolve window open. From the upper-right corner of the SCE Run screen, select the Maestro Application drop-down menu.



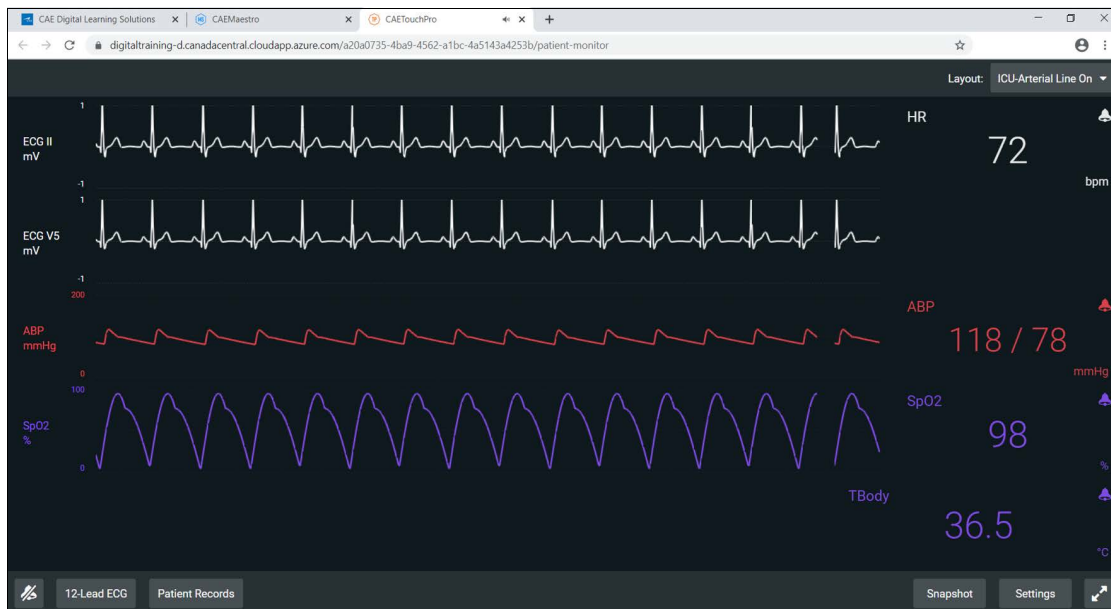
*SCE Run Screen*

The Maestro Application drop-down menu appears.



**Maestro Application Drop-Down Menu**

2. Select **CAEPatient Monitor**. The Patient Monitor appears in a separate browser tab.



**CAE Patient Monitor**

Patient Monitor will display wave forms and vital signs consistent with parameters set in Maestro Evolve.

To silence all of the Patient Monitor sounds, click the **Mute** button in the lower-left corner of the screen.



**Mute Button**

When using a single monitor:

1. Restore or resize the Maestro Evolve screen so that some of the Windows desktop is visible.
2. Position the mouse pointer on the **CAEPatient Monitor** tab in the browser window.
3. Drag the **CAEPatient Monitor** tab outside of the active browser window. The Patient Monitor will appear in a separate window.
4. Minimize the Patient Monitor window.

This will allow the monitor to stay active while other equipment options are selected and utilized. The monitor window may be restored at anytime to view or modify during the simulation until the window is closed.

See *Appendix A - FAQ* for information on configuration of dual monitors.

# Select a Preconfigured Layout

These are the preconfigured CAE Healthcare Layouts available in Maestro Evolve:

- **ICU-Arterial Line Only** - waveform and numeric readouts for ECG Lead II, ECG Lead V, ABP, Pleth, and a numeric readout for Body Temperature.
- **EMS-ED-Telemetry** - waveform and numeric readout for ECG Lead II and numeric readouts for SpO<sub>2</sub>, and NIBP (noninvasive blood pressure).
- **ICU-OR No CVP** - waveform and numeric readouts for ECG Lead II, ECG Lead V, ABP, PAP and Pleth, and numeric readouts for NIBP, Blood Temperature, and Body Temperature.
- **ICU-OR** - waveform and numeric readouts for ECG Lead II, ECG Lead V, ABP, PAP, CVP and Pleth, and numeric readouts for NIBP, Blood Temperature, and Body Temperature.
- **Saturation-Pulse** - numeric readouts for SpO<sub>2</sub> and pulse.

**Note:** Additional layouts may be available depending upon the simulator that is used.

To select a preconfigured layout:

1. Click the **Layout** drop-down menu in the upper-right corner of screen.



**Layout Drop-down Menu**

The Patient Monitor Settings menu appears.

2. Select a layout.

# Settings

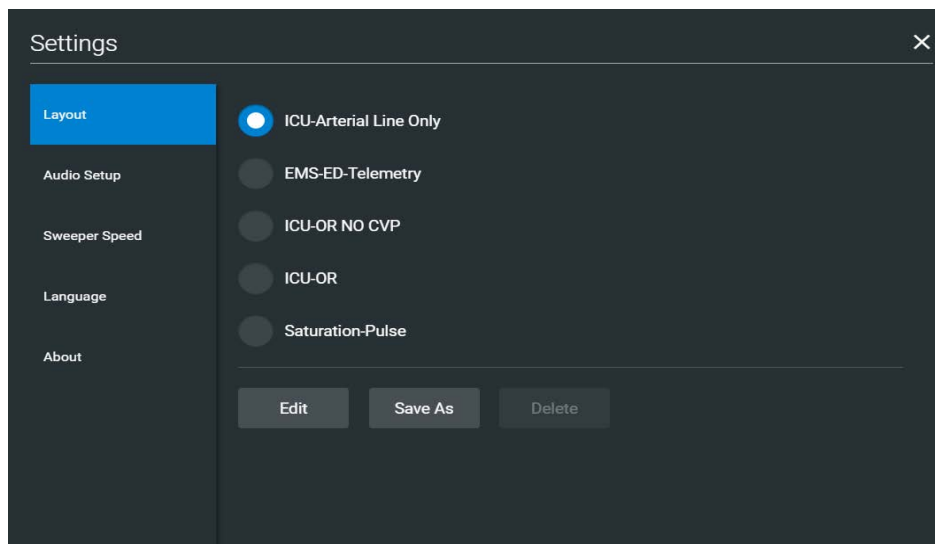
Patient Monitor settings options allow for configuration preferences. The following selections are available on the settings panel:

- Layout - customize specific vital signs, colors, wave forms, numerics and specific location of the parameters on the display.
- Audio - specify alarm ranges and suspension times.
- Sweeper Speed - adjust intervals from 3 to 60 seconds for sweeper speed.
- Language - select preferred language.

To access the Settings panel:

1. Click **Settings** in the lower-right corner of the screen.

The Settings menu appears. The **Layout** tab is displayed by default.

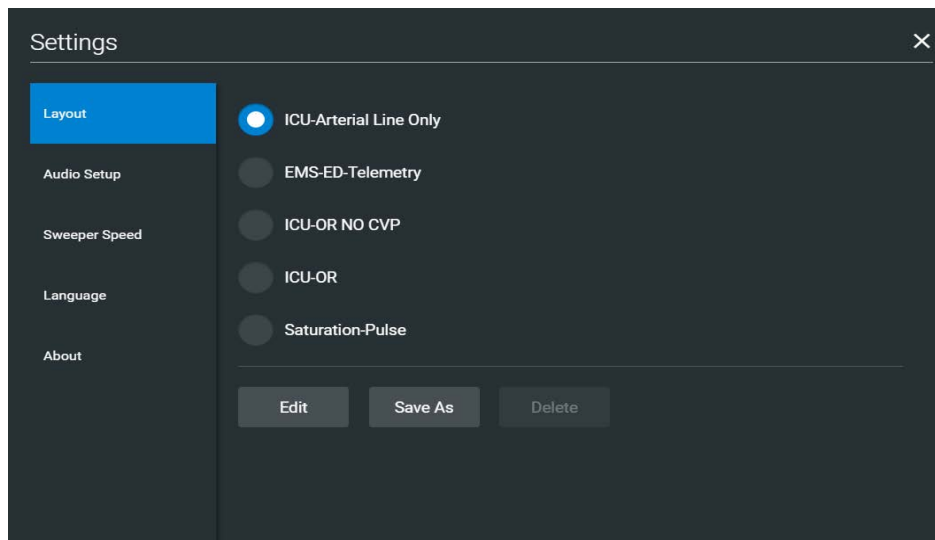


*Settings Panel - Layout Options*

## Layout

To access the Layout options:

1. From the **Settings** panel, the **Layout** tab is displayed by default. From the Layout options, select a Layout. In this example, ICU-Arterial Line Only is selected.



*Settings Panel - Layout Options*

2. Click **Edit**.

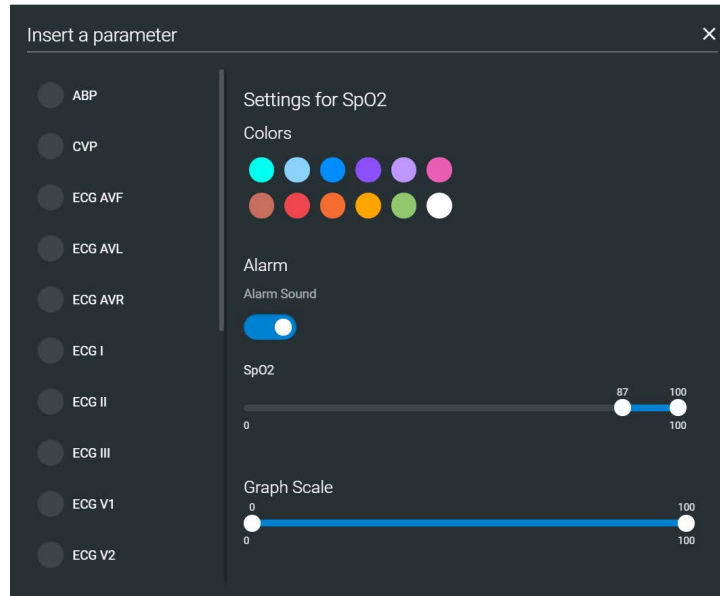
The Layout Edit screen appears.



*ICU-Arterial Layout Edit Screen*

3. Select a signal to edit its parameters.

The Insert a parameter screen appears.



*Insert a Parameter*

4. Adjust the signal's **Color**, **Alarm**, and **Graph Scale** parameters as needed.

OR

Select a parameter to insert it in the place of the selected parameter.

5. When finished, click the **X** in the upper-right corner to close the panel.

The Layout Edit screen reappears.

- Use the plus (+) buttons to add waveforms to the layout.



**Layout Edit Screen**

Patient Monitor adds a line to the Layout.

- Select the new line to open the Insert a Parameter window.
- Select the parameter to display on the new line.
- Set the parameter's **Color** and **Alarms**. When finished, close the parameter panel.
- Click **Done** to close the Layout Edit screen.

The Settings Layout panel opens.

- Click **Edit** to resume editing the layout.
- Click **Save As** to save the layout.

Type a name for the layout, then click **Save**.



## Audio Setup

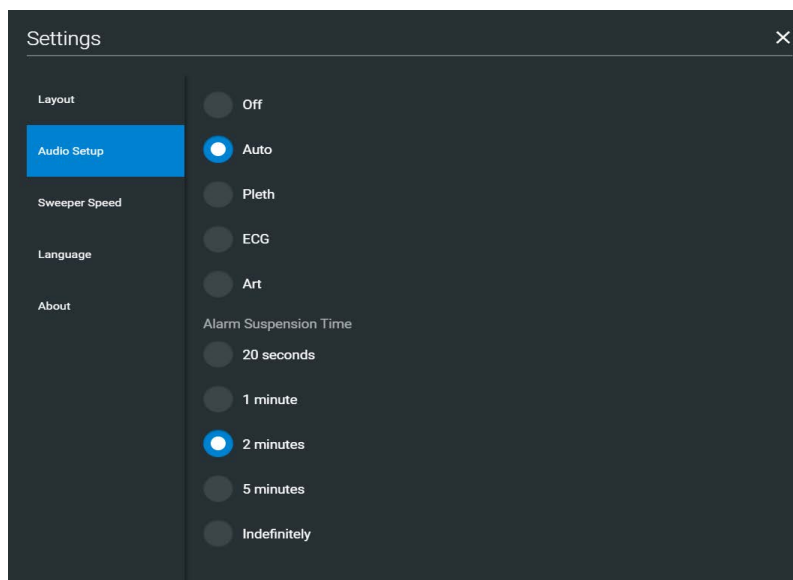
To silence all sounds, click the **Mute** button in the lower-left corner of the screen.



**Mute Button**

To set up the audio for Patient Monitor:

1. Click **Settings** in the lower-right corner of the Patient Monitor screen.
2. From the Settings panel, select the **Audio Setup** tab.



**Settings - Audio Setup Options**

3. (Optional) Select a waveform to set it as the pulse sound trigger.
4. (Optional) Select an **Alarm Suspension Time** to disable the selected waveform for an indicated amount of time.
5. When finished, click **X** to close the window.

# Snapshot

The snapshot tool captures an image of the data that is displayed on the screen. The image may then be printed or saved. This function is unavailable if the device is connected to a wireless network where users cannot print a report.

To capture an image:

1. Click **Snapshot** at the lower-right corner of the Patient Monitor screen.

The Snapshots window appears showing the live data available to capture.



**Snapshots Window**

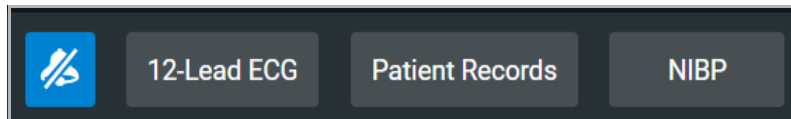
2. To take another snapshot, click the **Capture Snapshot** (camera) button at the lower-right corner of the screen.
3. (Optional) Click the **Full Screen View** button at the lower-right corner of the screen.

Click the **Esc** key to exit full screen view.

## 12-Lead ECG

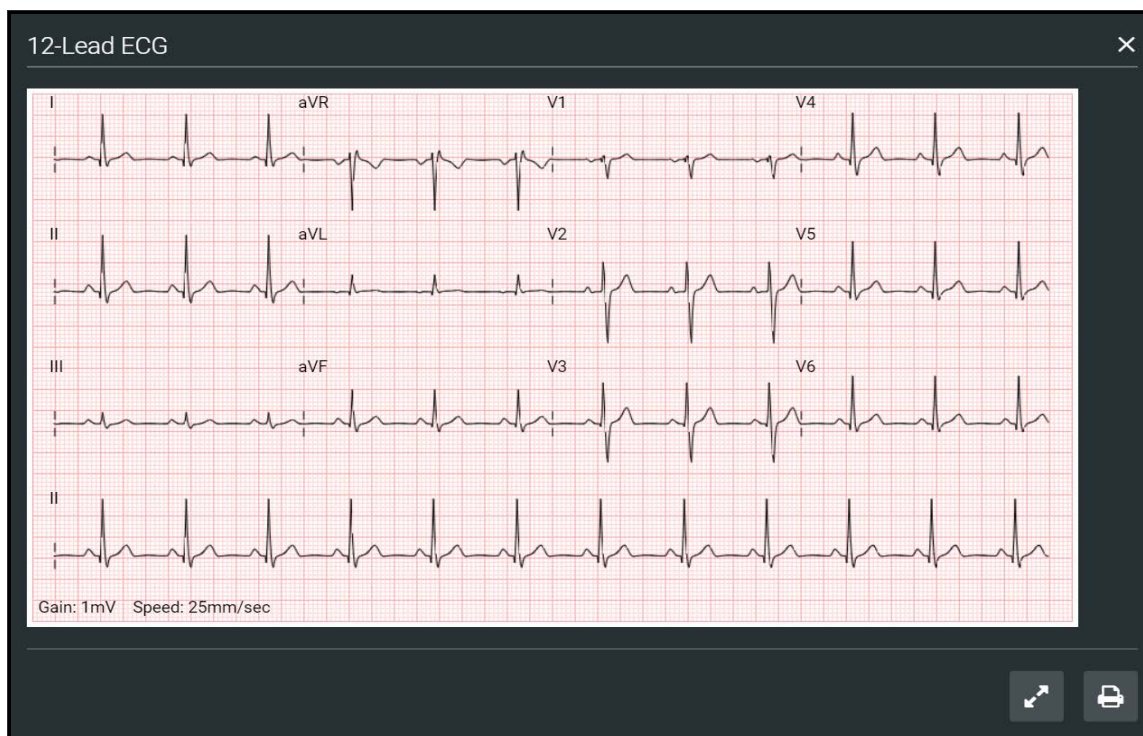
To view a 12-lead ECG report:

1. From patient monitor controls at the lower-left corner of the screen, select **12-Lead ECG**.



**Patient Monitor Controls**

The report appears.



**12-Lead ECG Report**

2. (Optional) To view the full screen, click the **Full Screen View** button at the lower-right corner of the 12-lead ECG report.

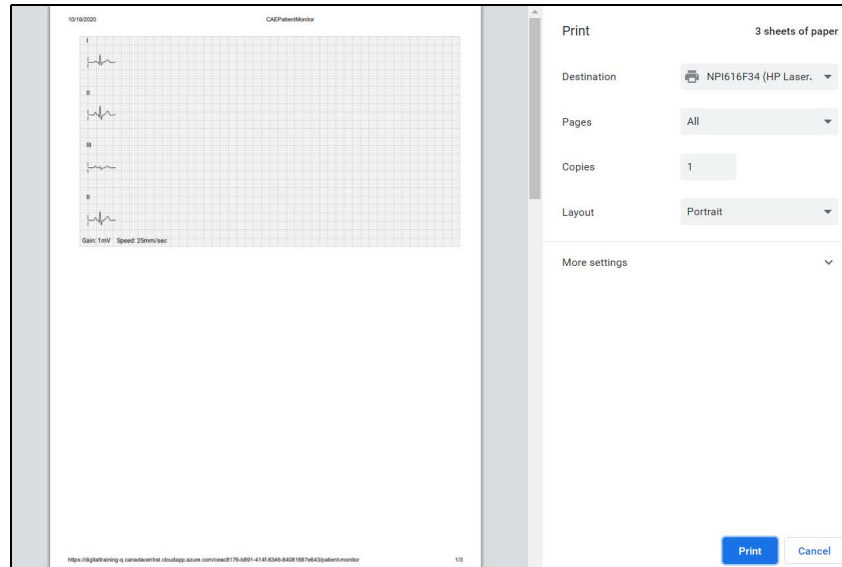


**Full Screen View and Print Buttons**

3. Click the **Esc** key to return to the inset view.

4. Click the **Print** button to print the report.

The Print Settings window appears.



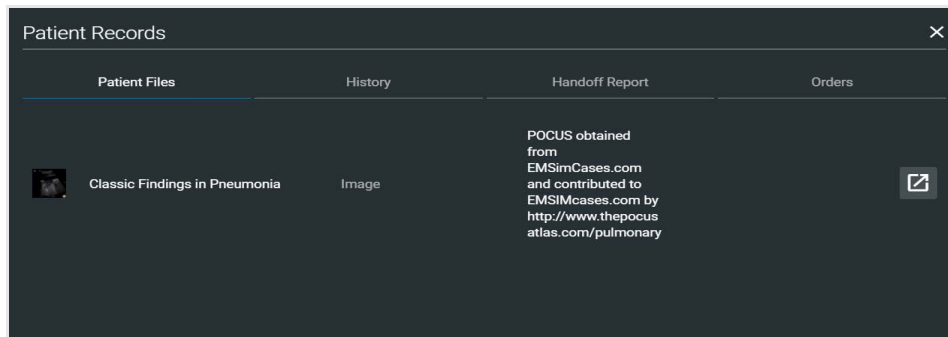
**Print Settings Window**

5. Select the print settings on the right side of the window.
6. Click **Print** to print the report.

## Patient Record

To view Patient Records, click **Patient Record** from patient monitor controls at the lower-left of the screen.

The Patient Records window appears.



***Patient Records Window***

This information provides access to the same Patient Files, History, Handoff Report, and Orders information contained in Maestro.

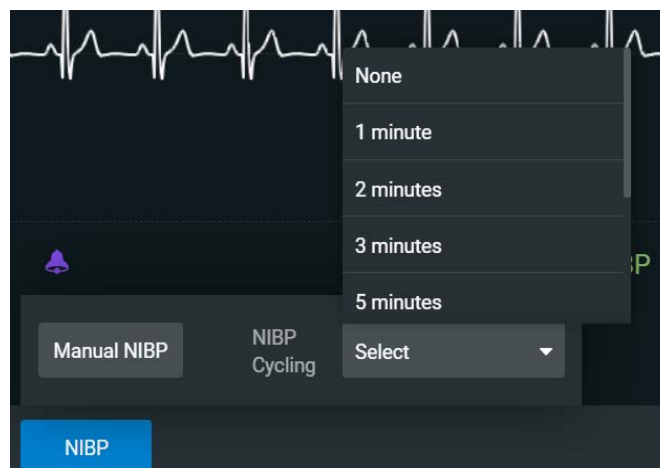
## NIBP Cycling

When non-invasive blood pressure (NIBP) is displayed, the patient's NIBP can be updated at specified intervals using NIBP Cycling.

To set NIBP cycling:

1. Select **NIBP** from patient monitor controls at the lower-left of the screen.
2. Click **Manual**.
- OR
3. Click **Select**.

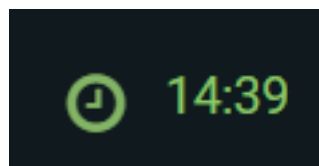
Auto cycling options will appear 1 minute to 60 minutes.



***NIBP Auto Cycling Options***

4. Select the desired interval for the cycling.

The NIBP Cycling timer will appear at the lower-center of the patient monitor screen.



***NIBP Cycling Timer***

**Note:** Manual NIBP can be used at any time during cycling, however it turns off auto-cycling.

# CAE Defibrillator and CAE AED

Listed below are the steps to get started using CAE Defibrillator and CAE AED.

**Note:** Only one electrotherapy device may be used at a time. For example, if the AED is active, and the Defibrillator is powered on, the AED will automatically power off.

Defibrillator and AED Steps	
1	Set up the Patient for Electrotherapy
2	Set up the Defibrillator
3	Launch the Defibrillator
4	Set up the AED
5	Launch the AED

## Step 1: Set up the Patient for Electrotherapy

To perform a realistic and effective cardiac electrotherapy simulation, parameters are set to reflect a patient's condition that would require use of a Defibrillator or AED. This section provides information on modifying and activating the appropriate parameters.

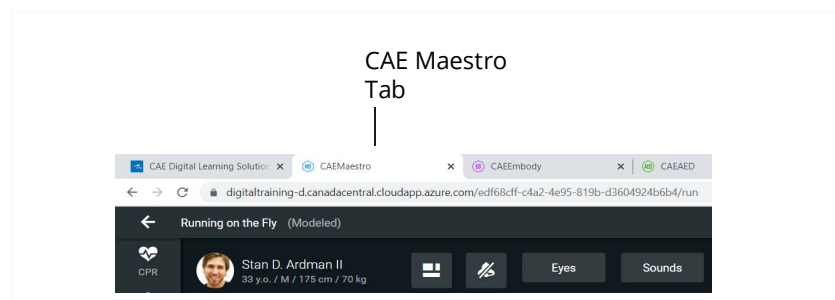
In the case that Maestro Evolve is running but another virtual device is in the active window, it may be necessary to switch windows.

To switch windows:

1. If a virtual device window (e.g. Patient Monitor or Ventilator) is open, minimize the device window.

OR

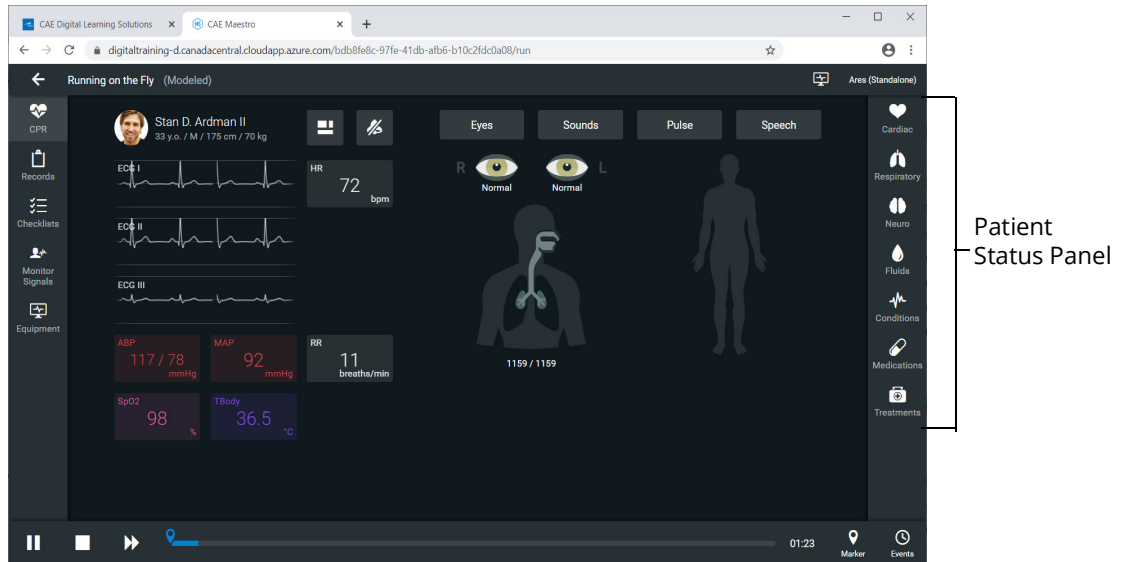
At the top of the browser window, select the **CAE Maestro** tab.



**Browser Window Tabs**

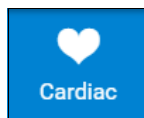
**Tip:** In Windows 10, holding down on the **ALT** key and pressing the **Tab** key will allow you to alternate between open windows.

The SCE Run Screen appears.



**SCE Run Screen**

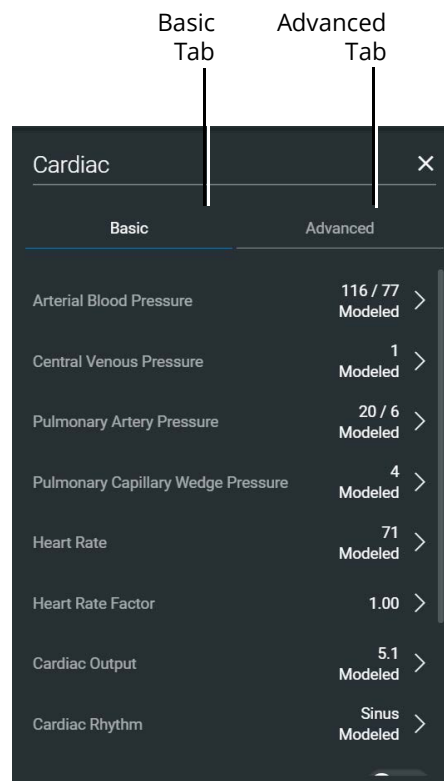
- From Patient Status panel, on the right side of the SCE Run Screen, click the **Cardiac Parameters** icon.



**Cardiac Parameters Icon**



The Cardiac Parameters panel appears.

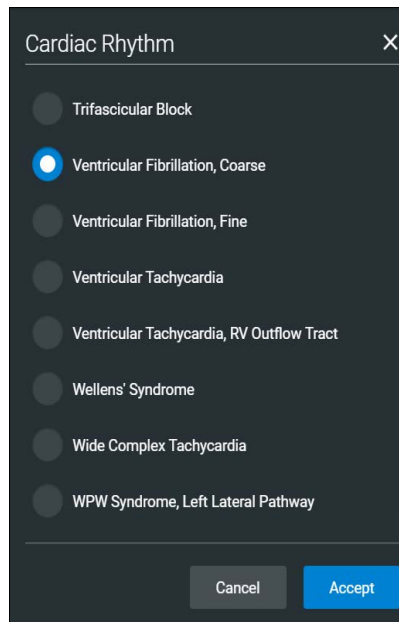


***Cardiac Parameters Panel***

3. From the Cardiac Parameters panel, select **Cardiac Rhythm**.

The Cardiac Rhythm Options appear.

4. Toggle Modeled to **Override**.



**Cardiac Rhythm Options**

5. The arrhythmias in the following table result in a shock advised state for the Defibrillator and AED.

Cardiac Rhythm Parameters - Arrhythmias	
Basic	Coarse Ventricular Fibrillation
	Fine Ventricular Fibrillation
	Torsade de Pointes
	Ventricular Tachycardia

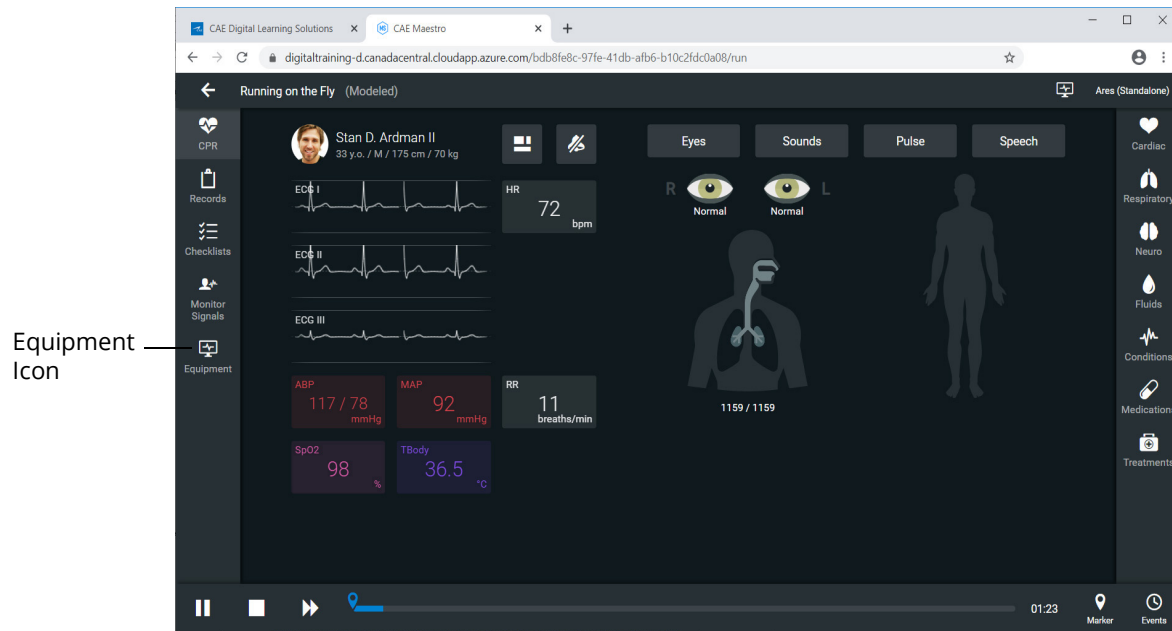
To change the Maestro default modeled cardiac parameters to one of the suggested arrhythmias:

- a. From the Cardiac Rhythm Options, scroll through the list to find the desired arrhythmia.
- b. Select the Arrhythmia.
- c. Click **Accept**.

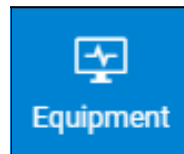
## Step 2: Set up the Defibrillator

To setup the Defibrillator, select probes and enabling the power as follows:

1. From the left panel of the SCE Run screen, select the **Equipment** icon.



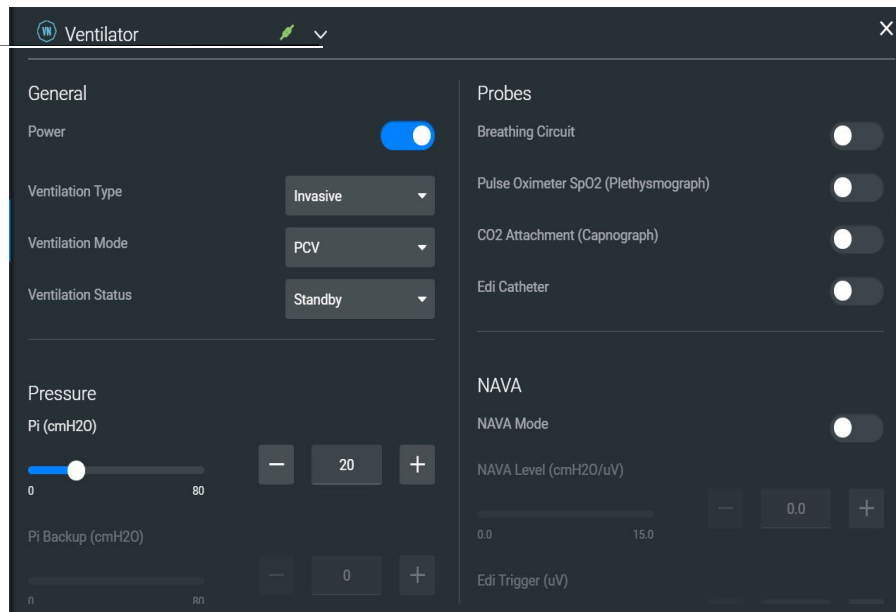
*SCE Run Screen*



*Equipment Icon*

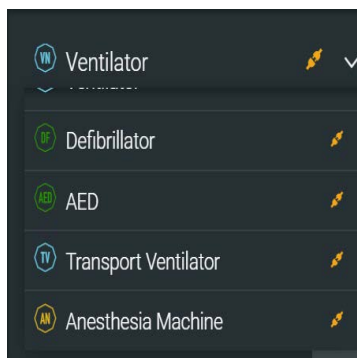
The Equipment parameters appear.

Select Equipment Parameters drop-down



**Equipment Parameters**

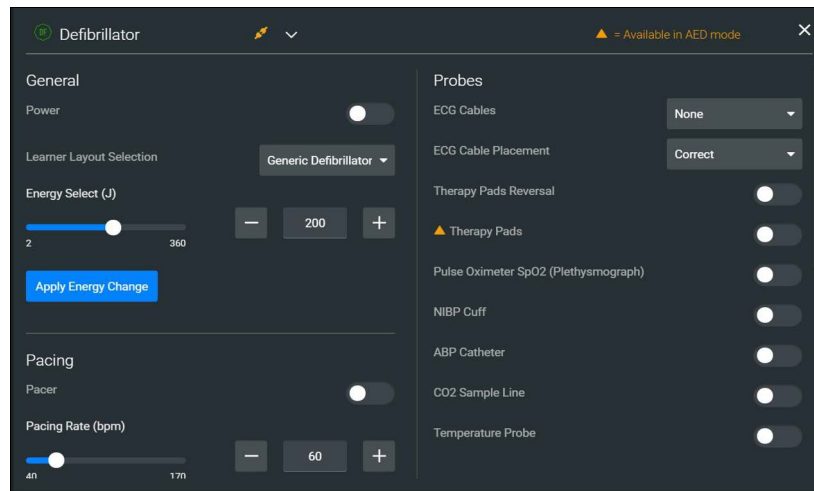
Click the **Select Equipment Parameters** drop-down indicator to the right of the equipment type at the top of the list.



**Select Equipment Parameters Drop-Down**

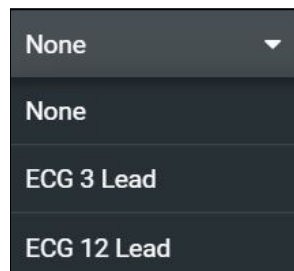
2. Select **Defibrillator** from the list.

The Defibrillator parameters appear for editing.



**Defibrillator Equipment Parameters**

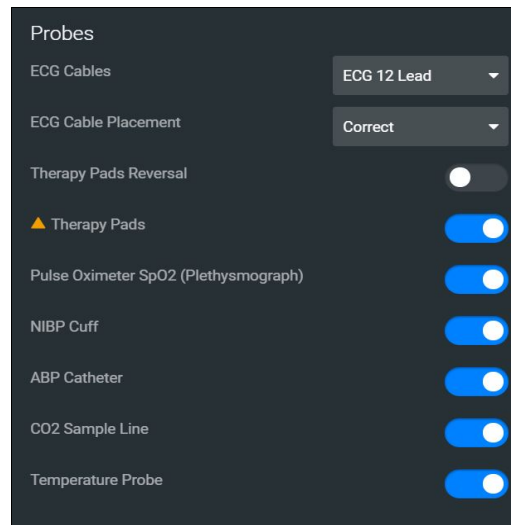
- From the Probes options, select the drop-down list for **ECG Cables**.



**ECG Cables Drop-Down List**

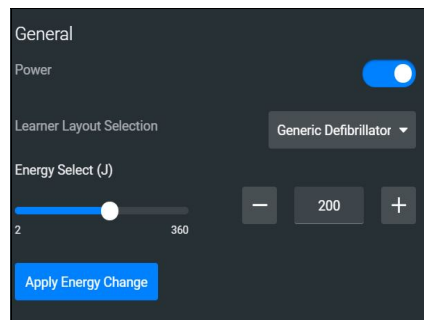
- Select **ECG 12 Lead** from the drop-down list.
- From the Probes options, select the drop-down list for **ECG Cable Placement**.
- Select **Correct** from the drop-down list.
- Ensure that the **Therapy Pads Reversal** is **disabled**.
- Enable** the following probes:
  - Therapy Pads
  - Pulse Oximeter SPO<sub>2</sub> (Plethysmograph)
  - NIBP Cuff
  - ABP Catheter
  - CO<sub>2</sub> Sample Line
  - Temperature Probe

The Probes options will appear as shown in the following image.



**Defibrillator Probes Enabled**

- From the General parameters, verify that the **Power** indicator is **enabled**.



**General Equipment Parameters - Power Enabled**

**Note:** Once the power is enabled to the Defibrillator, the simulation connection status will change at the top of the Equipment Parameters Panel. This same status icon will be displayed at the top of the defibrillator screen, when running the defibrillator.



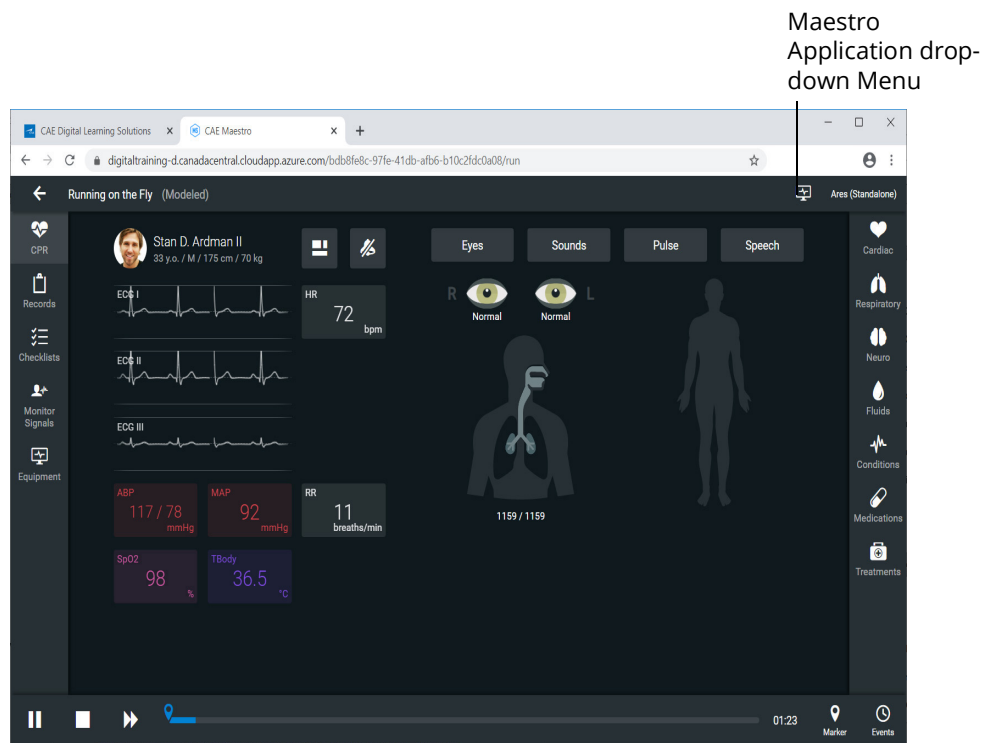
**Simulation Connection Status**

- Click the **X** in the upper-right corner to close the Equipment parameters panel and return to the SCE Run screen.

## Step 3: Launch the Defibrillator

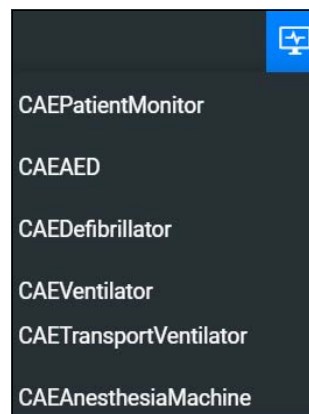
To launch the Defibrillator:

1. From the top right of the SCE Run screen, select the Maestro Application drop-down menu.



**SCE Run Screen**

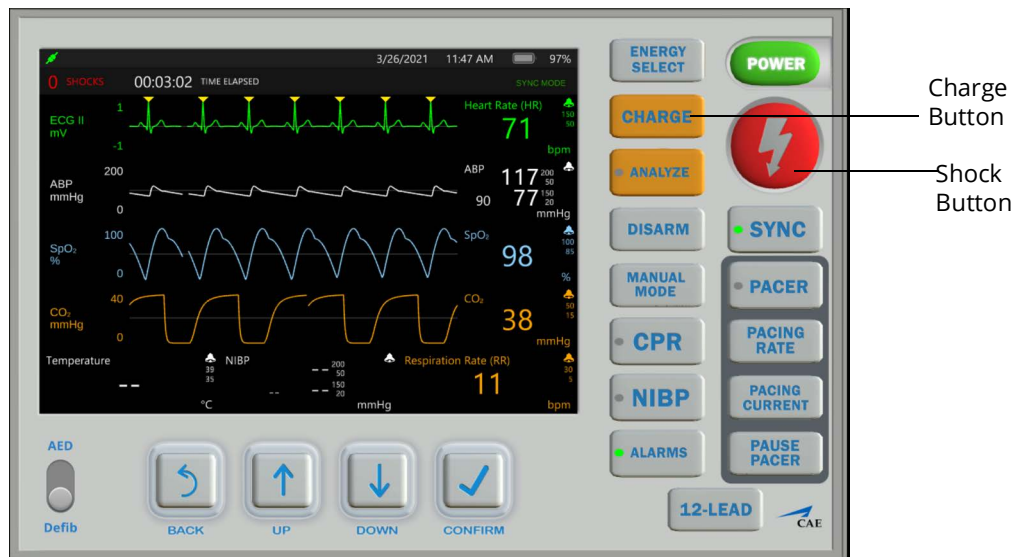
The Maestro Application drop-down menu appears.



**Maestro Application Drop-Down Menu**

2. From the drop-down menu, select **CAEDefibrillator**.

After the system has initialized, the CAE Defibrillator screen appears.



**CAE Defibrillator**

**Note:** Enable all probes as described in *Step 2: Set up the Defibrillator*. Having probes enabled will ensure appropriate patient vital signs are displayed and monitored by the equipment during the simulation.

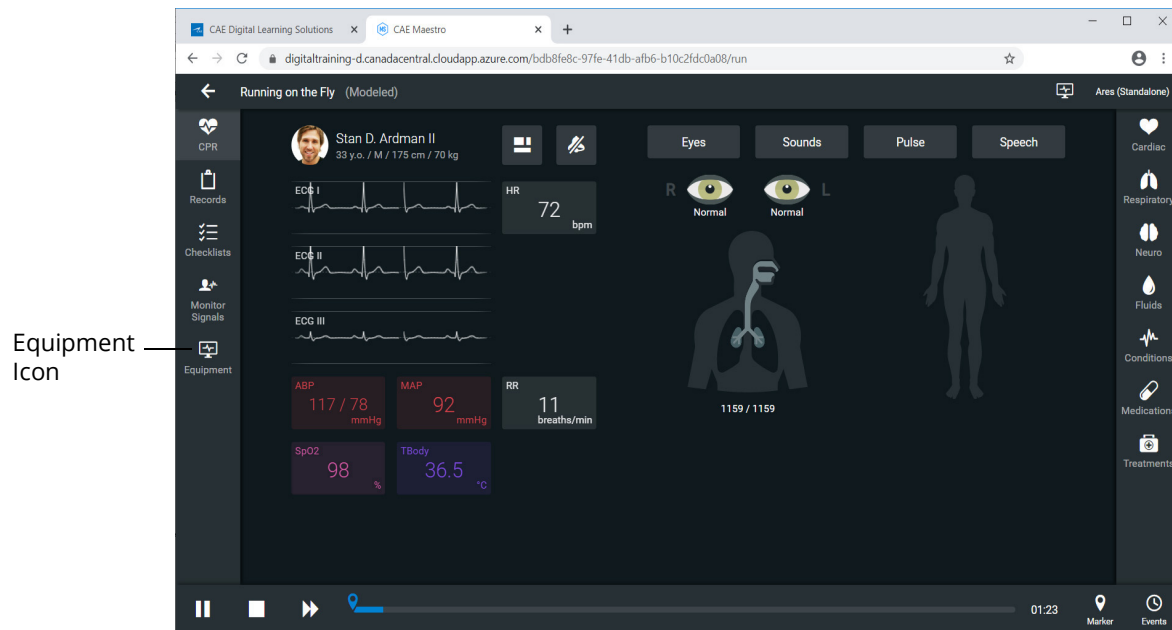
See *Appendix B - Defibrillator Controls and Display Options* for more information.



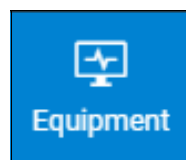
## Step 4: Set up the AED

To set up the AED:

1. Only one electrotherapy device may be used at a time. If the Defibrillator is running, close the Defibrillator by clicking on the **X** in the upper-right corner of the Defibrillator browser tab.
2. From the left panel of the SCE Run screen, select the **Equipment** icon.



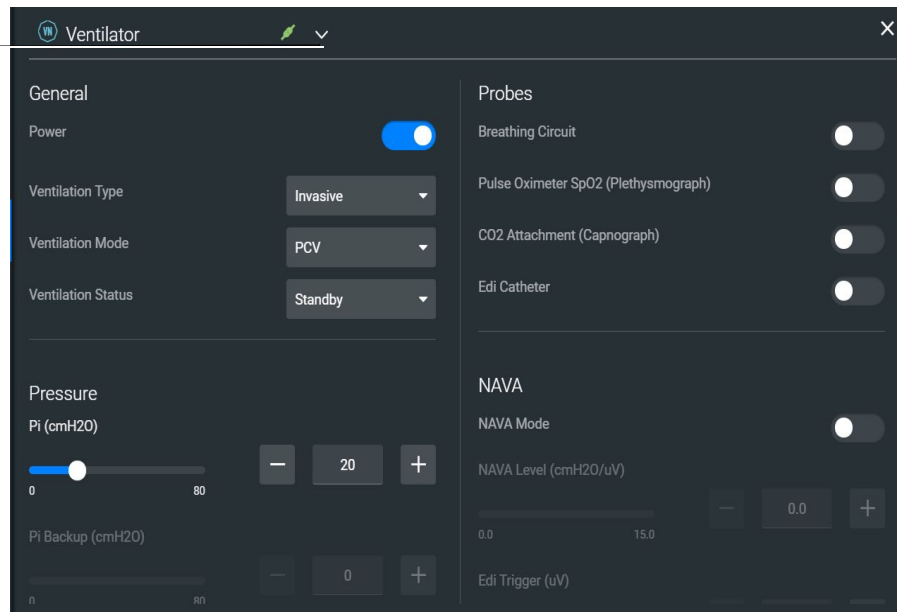
*SCE Run Screen*



*Equipment Icon*

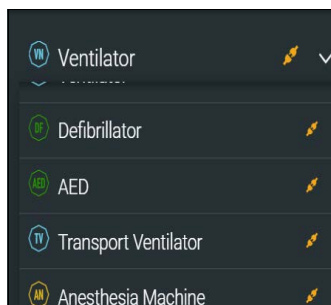
The Equipment parameters appear.

Select Equipment Parameters drop-down



**Equipment Parameters**

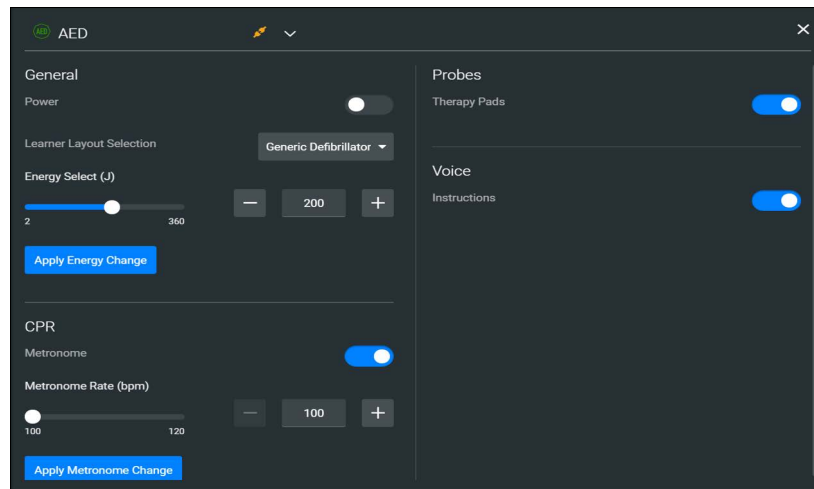
3. Click the **Select Equipment Parameters** drop-down indicator to the right of the equipment type at the top of the list.



**Select Equipment Parameters Drop-Down**

4. Select **AED** from the list.

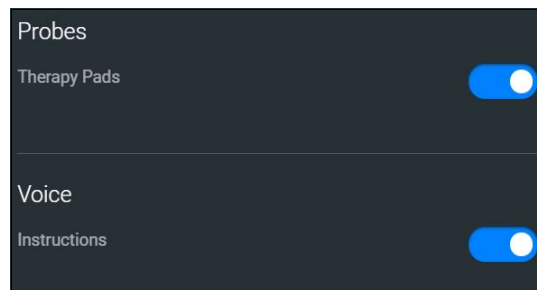
The AED parameters appear for editing.



***AED Equipment Parameters***

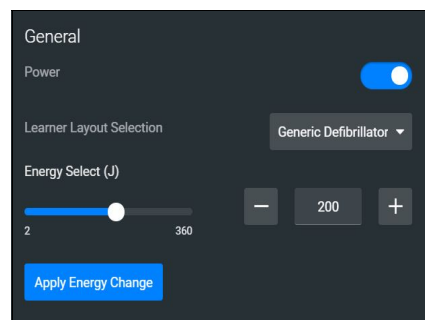
5. From the Probes options, ensure that the **Therapy Pads Reversal** is **disabled**.
6. **Enable** the **Therapy Pads**.
7. From the Voice options, **Enable** the **Instructions**.

The Probes and Voice options appear as shown in the following image.



***AED Probes and Voice Options***

8. From the General parameters, verify that the **Power** indicator is **enabled**.



***General Equipment Parameters - Power Enabled***

**Note:** Once the power is enabled to the AED, the simulation connection status will change at the top of the Equipment Parameters Panel. This same status icon will be displayed at the top of the AED screen, when running the AED.



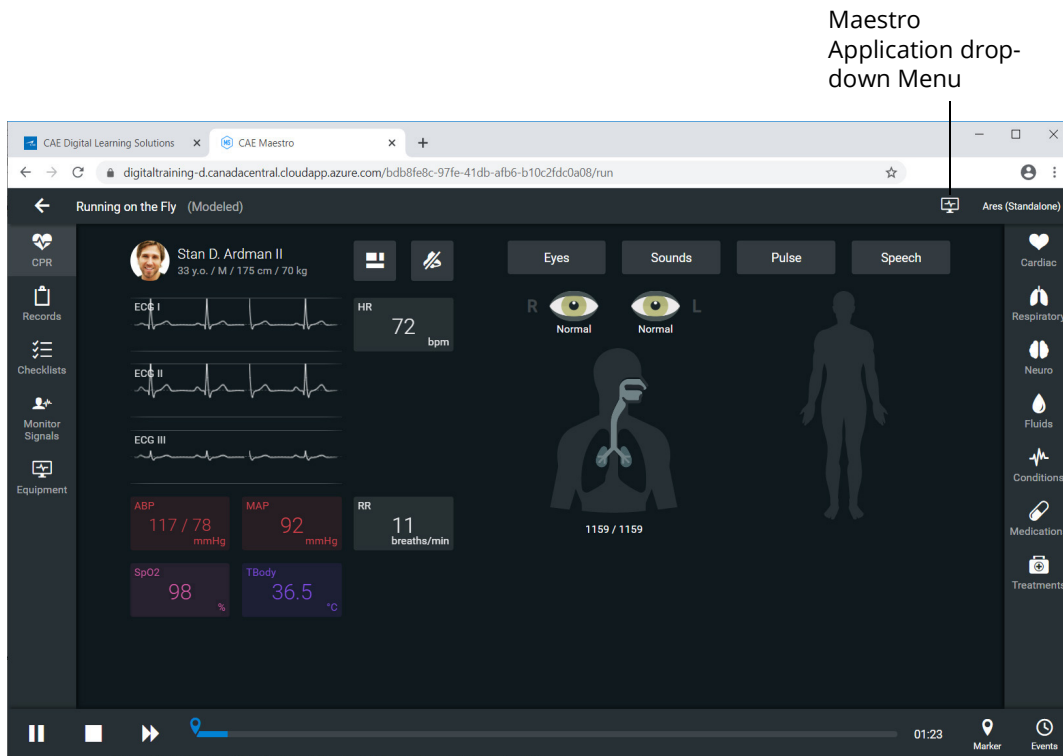
***Simulation Connection Status***

9. Click the **X** in the upper-right corner to close the Equipment parameters panel and return to the SCE Run screen.

## Step 5: Launch the AED

To launch the AED:

1. From the upper-right corner of the SCE Run screen, select the Maestro Application drop-down menu.



**SCE Run Screen**

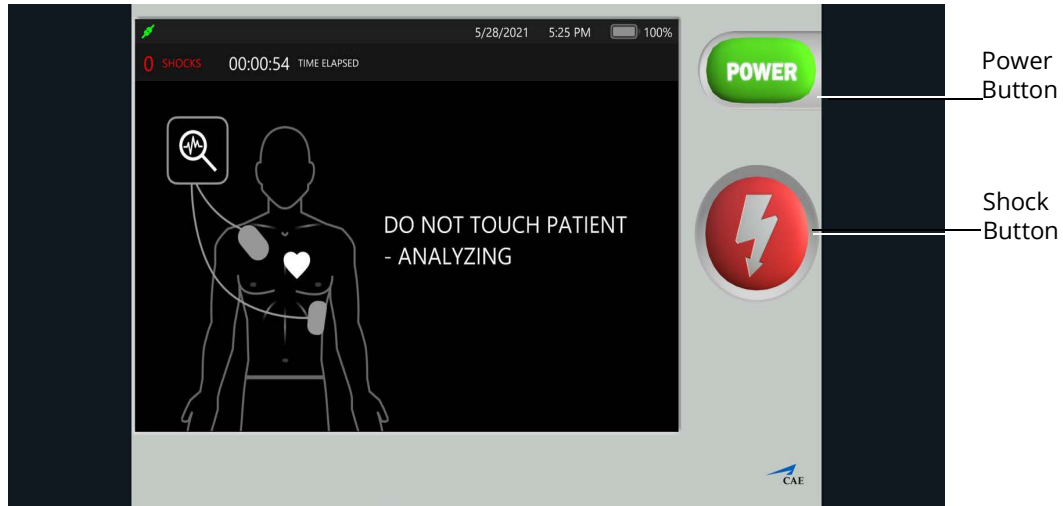
The Maestro Application drop-down menu appears.



**Maestro Application Drop-Down Menu**

2. Select **CAEAED**.

After the system initializes, the CAE AED appears in a separate browser tab. When voice instructions are enabled, audible instructions will be heard, in addition to the textual instructions that appear on the screen.



**CAE AED**

**Note:** Enable all probes as described in *Step 4: Set up the AED*. Having probes enabled will ensure appropriate patient vitals are displayed and monitored by the equipment during the simulation.

See *Appendix C - AED Controls and Display Options* for more information.

## CAE Ventilator and CAE Transport Ventilator

Listed below are the steps to use the virtual ventilation equipment included with Maestro Evolve.

**Note:** Only one ventilation device may be used at a time. For example, if the Transport Ventilator is active, and the Ventilator or Anesthesia Machine is powered on, the Transport Ventilator will automatically power off.

Ventilation Equipment Steps	
1	Set up the patient for ventilation
2	Set up the Ventilator
3	Launch the Ventilator
4	Set up the Transport Ventilator
5	Launch the Transport Ventilator

## Step 1: Set up the Patient

To perform a realistic and effective ventilation simulation, parameters are set to reflect a patient's condition that would require ventilation. This section provides information on modifying and activating the appropriate parameters.

- These settings should be set in CAE Maestro Evolve prior to powering on and using the ventilator.
- The same suggested patient parameters may be used for CAE Ventilator or CAE Transport Ventilator.

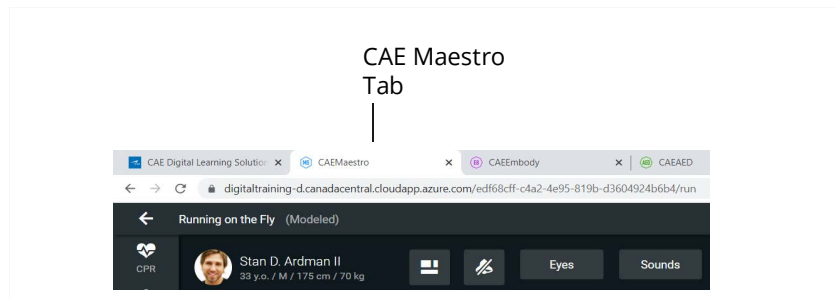
In the case that Maestro Evolve is running but another virtual device is in the active window, it may be necessary to switch windows.

To switch windows:

1. If a virtual device window (e.g. the Patient Monitor) is open, minimize the device window.

OR

At the top of the browser window, select the **CAE Maestro** tab.

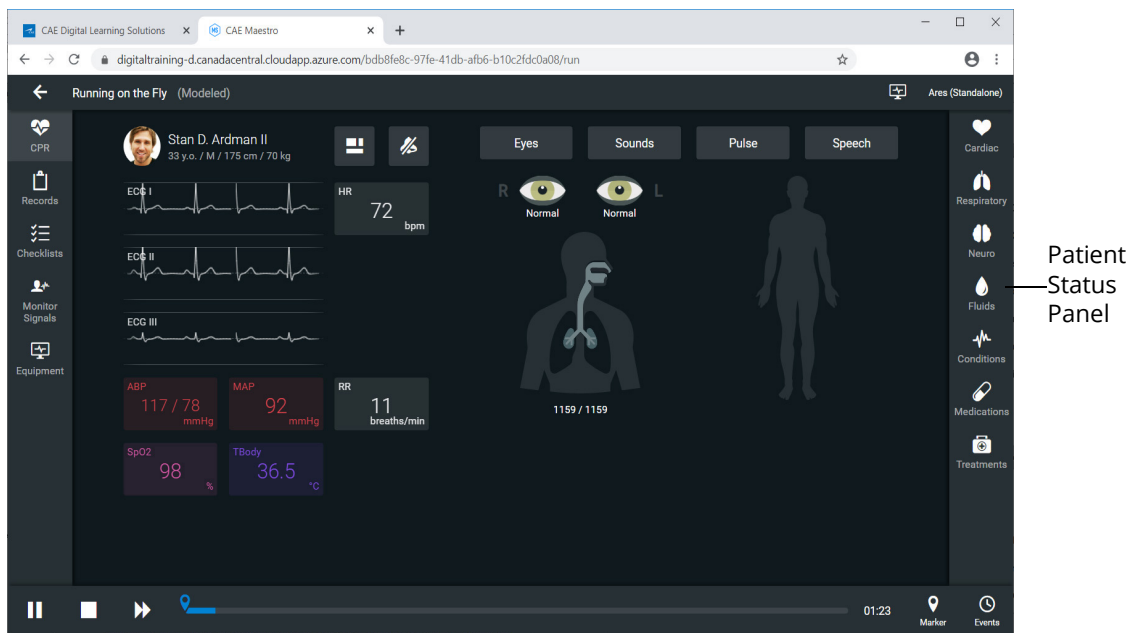


**Browser Window Tabs**

**Tip:** In Windows 10, hold down on the **ALT** key and press the **Tab** key to alternate between open windows.

**Note:** Select a modeled simulation for the Ventilator to function appropriately.

The SCE Run Screen appears.



**SCE Run Screen**

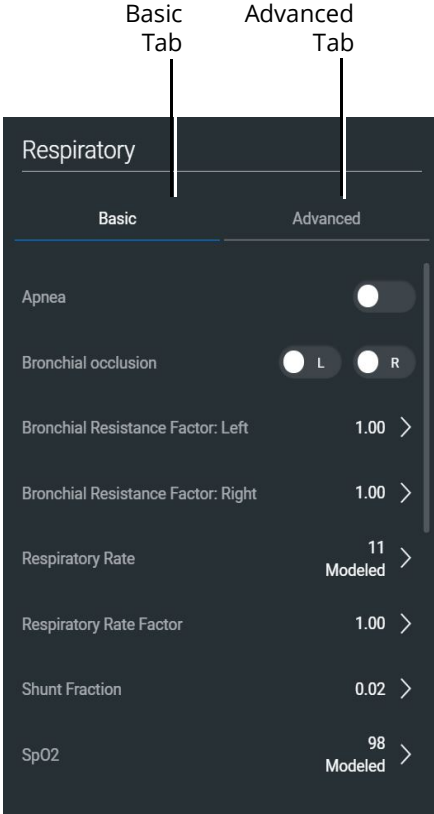
- From the Patient Status panel on right side of the SCE Run screen, click the **Respiratory Parameters** icon.



**Respiratory Parameters Icon**



The Respiratory Parameters panel appears.



**Respiratory Parameters Panel**

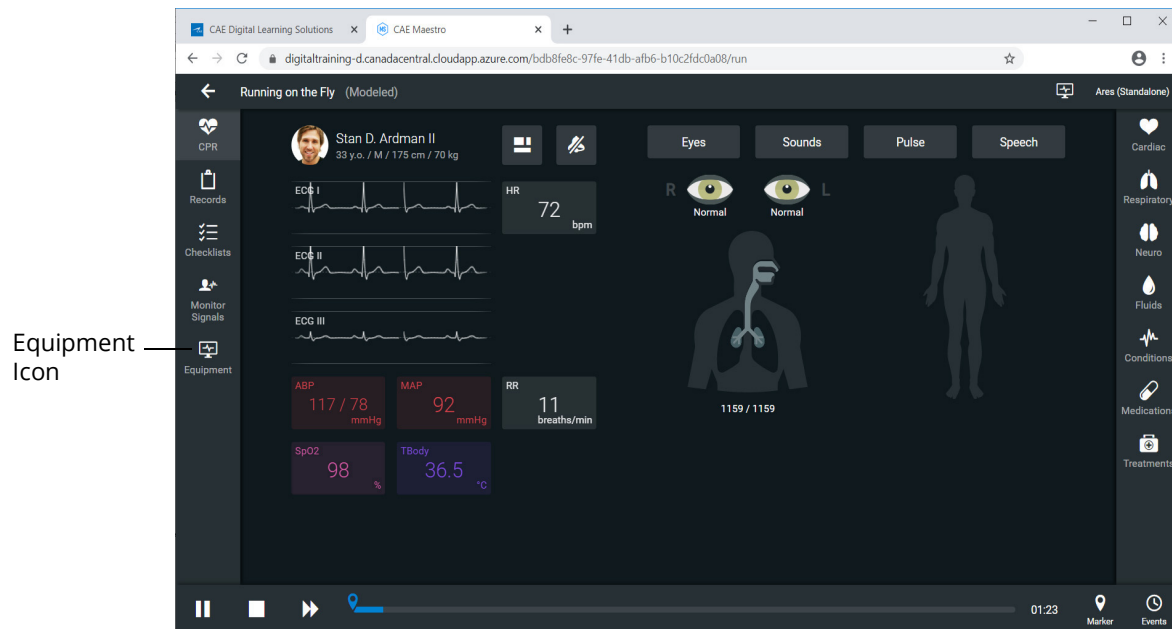
3. Set the following Respiratory Parameters in Maestro Evolve:

Respiratory Parameters		Setting
Basic	Bronchial Resistance Factors: Left	5.0
	Bronchial Resistance Factors: Right	5.0
	Apnea	<ul style="list-style-type: none"> <li>• For testing <i>control</i> mode, <b>enable</b> Apnea.</li> <li>• For testing <i>support</i> mode, <b>disable</b> Apnea.</li> </ul>
Advanced	Chest Wall Compliance Factor	.50
	Lung Compliance Factor: Left	.50
	Lung Compliance Factor: Right	.50

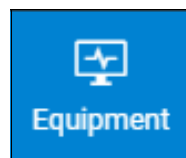
## Step 2: Set up the Ventilator

Prior to running a simulation using the Ventilator, there are setup steps involved; selecting probes and enabling the power as follows:

1. From the left panel of the SCE Run Screen, select the **Equipment** icon.



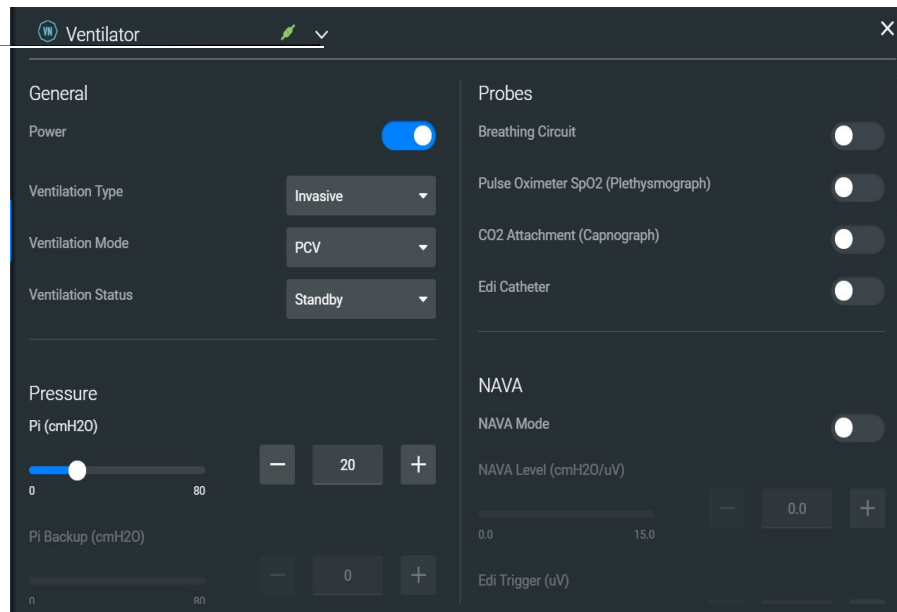
*SCE Run Screen*



*Equipment Icon*

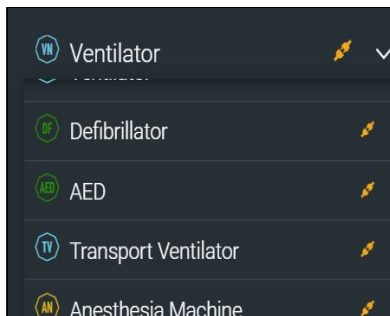
The Equipment parameters appear.

Select Equipment Parameters drop-down



**Equipment Parameters**

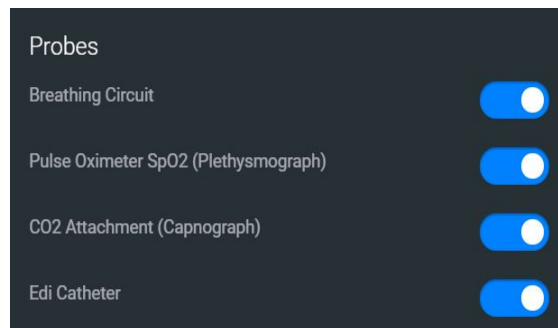
2. Click the **Select Equipment Parameters** drop-down indicator to the right of the equipment type at the top of the list.



**Select Equipment Parameters Drop-Down**

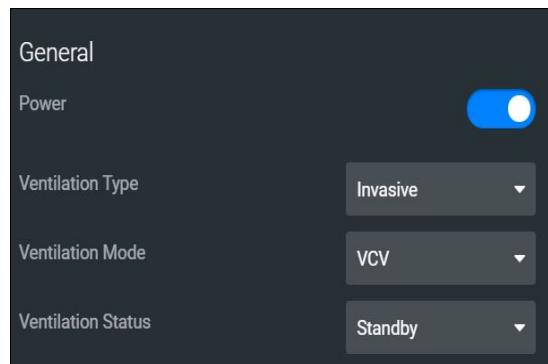
3. Scroll down the list and select **Ventilator**.

- From the Probes options, **enable** the following **probes**:
  - Breathing Circuit
  - Pulse Oximeter SPO<sub>2</sub>
  - CO<sub>2</sub> Attachment



**Ventilator Probes Enabled**

- From the General parameters, verify that the **Power** indicator is **enabled**.



**General Equipment Parameters - Power Enabled**

**Note:** Once the power is enabled to the ventilator, the simulation connection status will change at the top of the Equipment parameters panel. This same status icon will be displayed at the top of the ventilator screen, when running the ventilator.



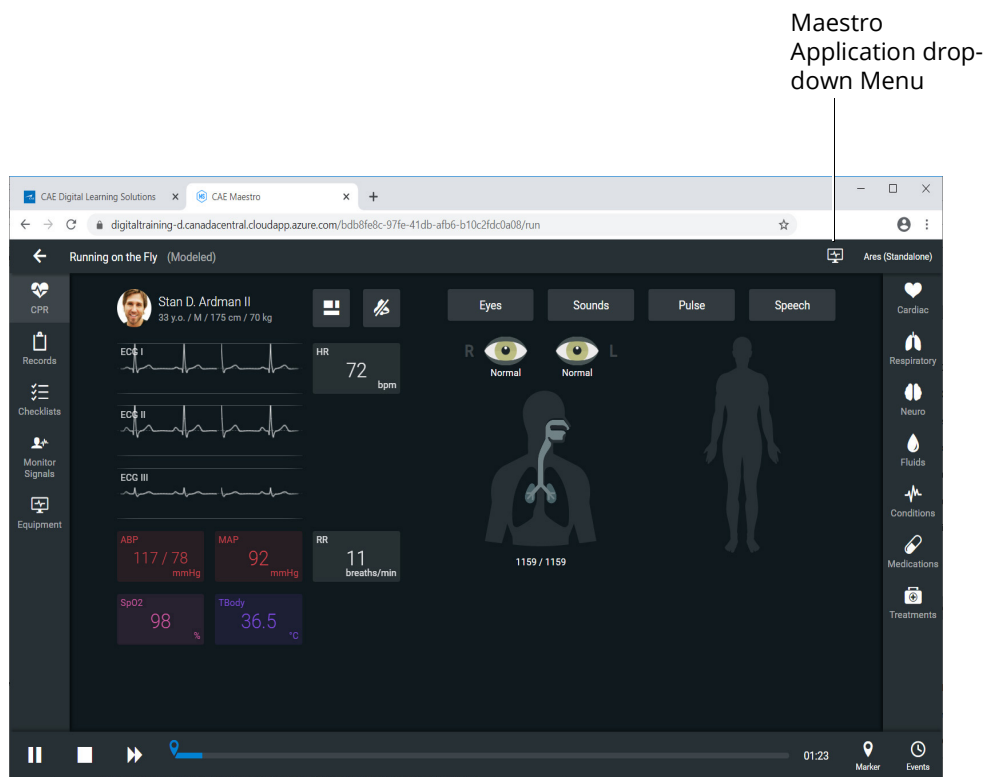
**Simulation Connection Status**

- Click the **X** in the upper-right corner to close the Equipment parameters panel and return to the SCE Run screen.

## Step 3: Launch the Ventilator

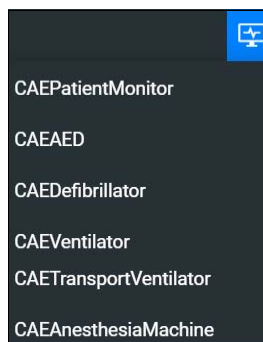
To launch the Ventilator:

1. From the upper-right corner of the SCE Run screen, select the Maestro Application drop-down menu.



**SCE Run Screen**

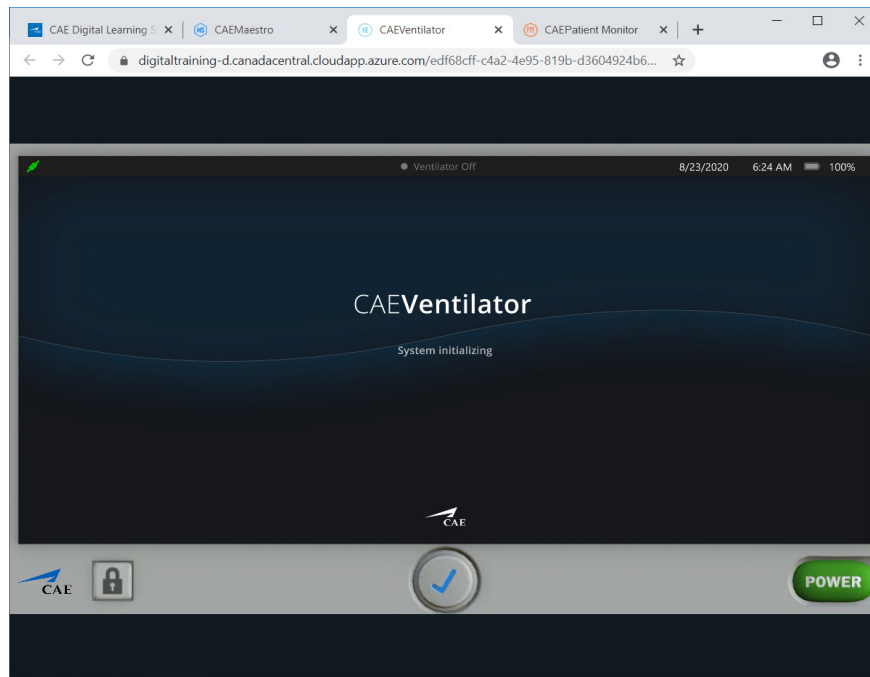
The Maestro Application drop-down menu appears.



**Maestro Application Drop-Down Menu**

2. From the drop-down menu, select **CAEVentilator**.

The System Initializing Screen will appear in a separate browser tab.



**System Initializing Screen**

3. Arrange the open browser tabs for the most effective viewing:

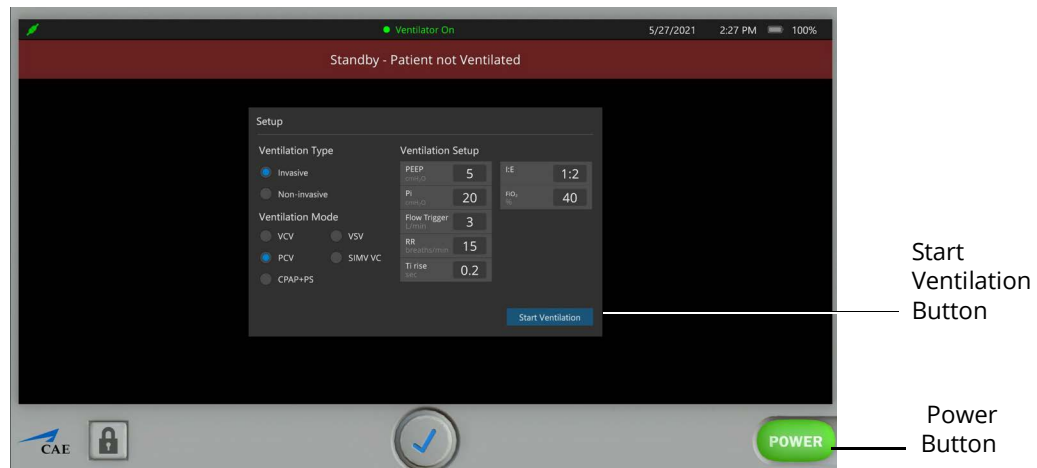
When using dual monitors:

- a. Position the mouse pointer on the **CAE Ventilator** browser tab.
- b. Drag the Ventilator window to the second monitor display, leaving the Maestro Evolve window in the first display.

When using a single monitor:

- a. Restore or resize the Maestro Evolve screen so that some of the Windows desktop is visible.
- b. Position the mouse pointer on the **CAE Ventilator** tab in the browser window.
- c. Drag the Ventilator window outside of the active browser window. The Ventilator will appear in a separate window.

After the system has initialized, the Ventilator Setup Standby screen appears.



**Ventilator Setup Standby Screen**

4. Change the parameter values as needed. After positioning the cursor in one of the parameter value fields, and selecting the value for editing, additional control buttons will appear at the bottom of the screen.

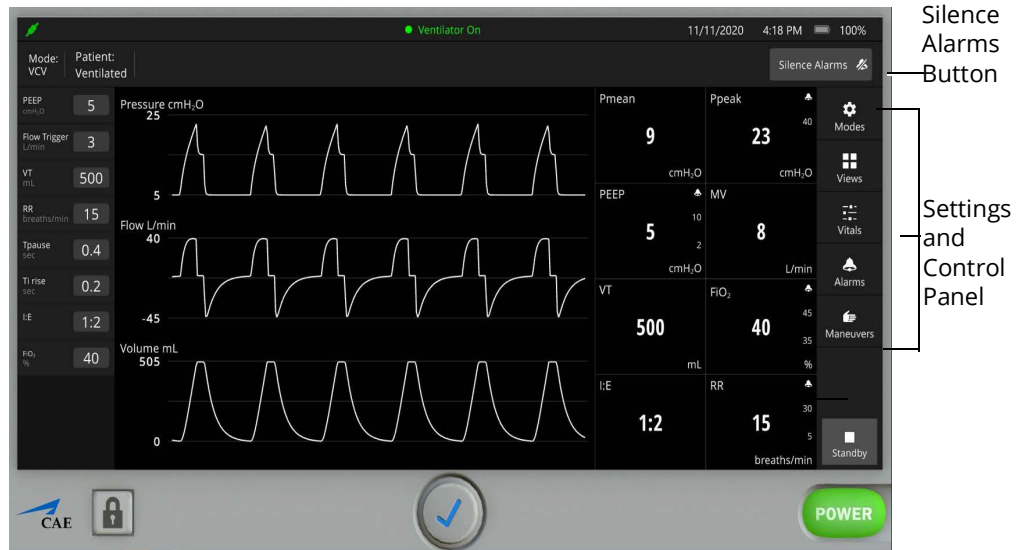


**Value Select Buttons**

5. Use the **plus (+)** and **minus (-)** buttons at the bottom center of the screen to adjust the value lower or higher as needed.
6. Click the **Check mark symbol** in the center to finalize the change in value.
7. When finished making all changes on the Setup screen, click the **Start Ventilation** button.



The Ventilator screen appears.



**Ventilator Screen - Ventilator On**

To silence the alarms, from the upper-right corner of the ventilator screen, click the **Silence Alarms** button.



**Silence Alarms Button**

There are additional settings that represent a typical ventilator used in a clinical setting. Status and parameters are displayed on the Ventilator screen based on options selected from the Settings and Controls panel at the right of the screen. Options to select from are:

- Modes
- Views
- Vitals
- Alarms
- Maneuvers

Refer to *Appendix D- Ventilator Controls and Display Options* for further details.

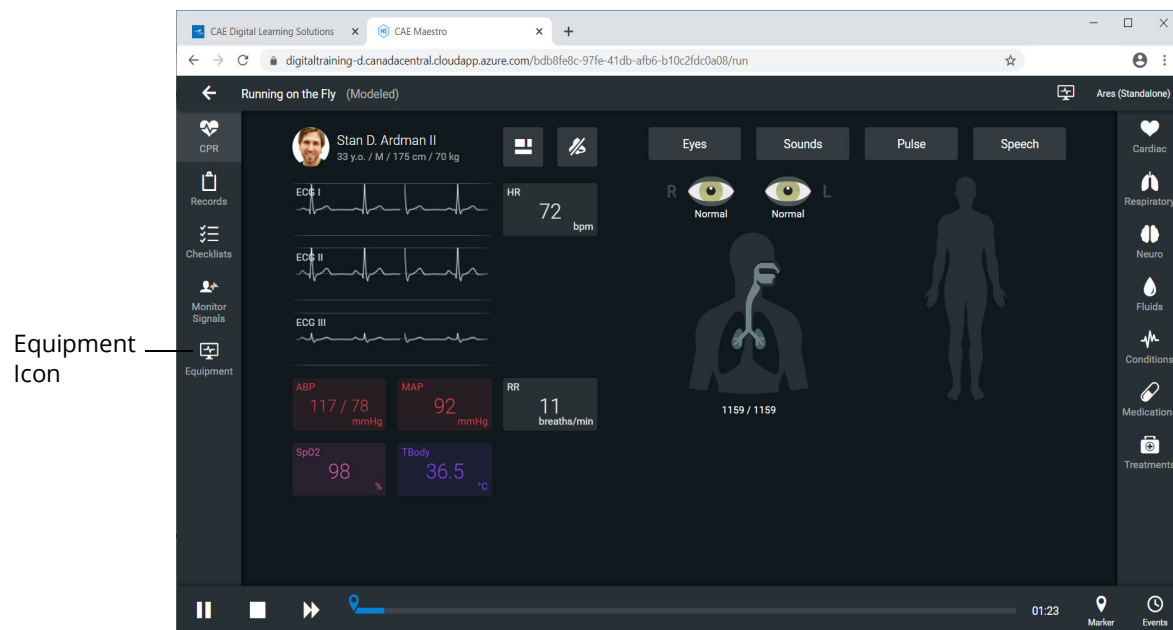
**Note:** Enable all probes as described in *Step 2: Set up the Ventilator*. Having probes enabled will ensure appropriate patient vital signs are displayed and monitored by the equipment during the simulation.

The ventilator screen may be minimized and continue to run during the simulation. This is especially helpful if using a single monitor, allowing for a full view of the Maestro Evolve SCE Run screen and the patient status display.

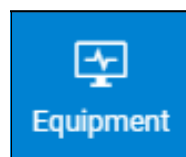
## Step 4: Set up the Transport Ventilator

Prior to running a simulation using the Transport Ventilator, there are setup steps involved; selecting probes and enabling the power as follows:

1. From the left panel of the SCE Run Screen, select the **Equipment** icon.



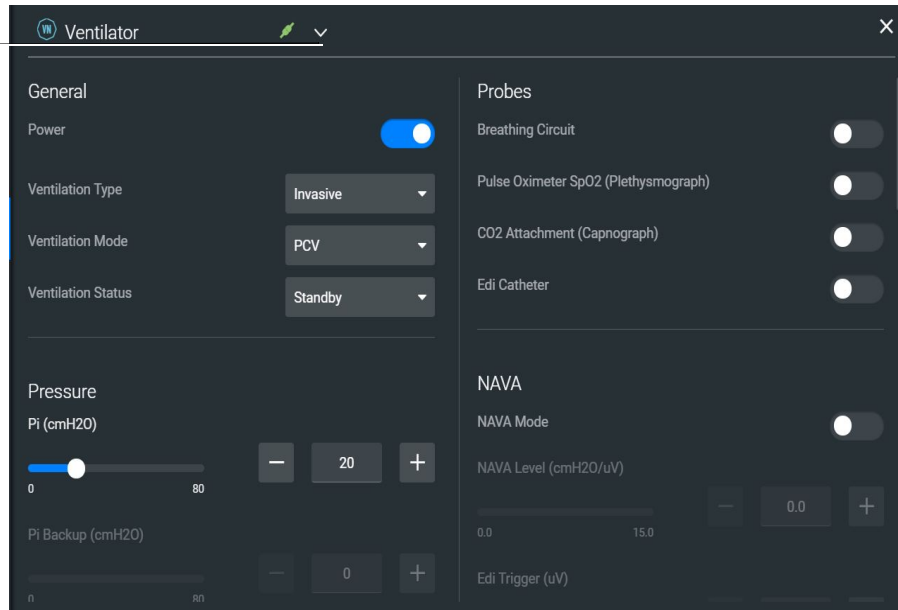
*SCE Run Screen*



*Equipment Icon*

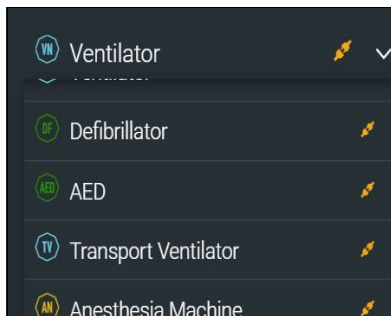
The Equipment parameters appear.

Select Equipment Parameters drop-down



**Equipment Parameters**

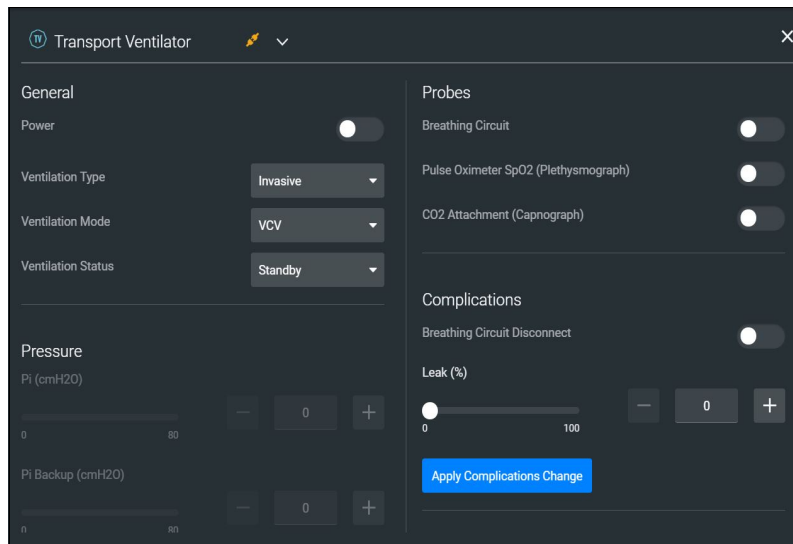
2. Click the **Select Equipment Parameters** drop-down indicator to the right of the equipment type at the top of the list.



**Select Equipment Parameters Drop-Down**

3. Scroll down the list and select **Transport Ventilator**.

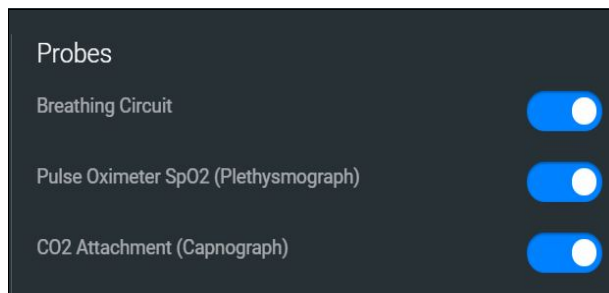
The Transport Ventilator parameters appear for editing.



**Transport Ventilator Equipment Parameters**

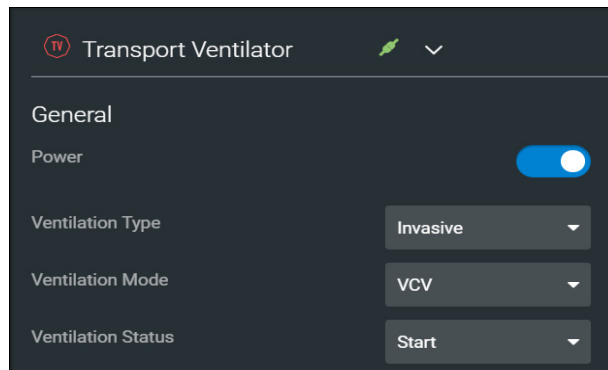
4. From the Probes options, **enable** the following **probes**:

- Breathing Circuit
- Pulse Oximeter SPO<sub>2</sub>
- CO<sub>2</sub> Attachment



**Transport Ventilator Probes Enabled**

- From the General parameters, verify that the **Power** indicator is **enabled**.



**General Equipment Parameters - Power Enabled**

**Note:** Once the power is enabled to the transport ventilator, the simulation connection status will change at the top of the Equipment parameters panel. This same status icon will be displayed at the top of the transport ventilator screen, when running the ventilator.



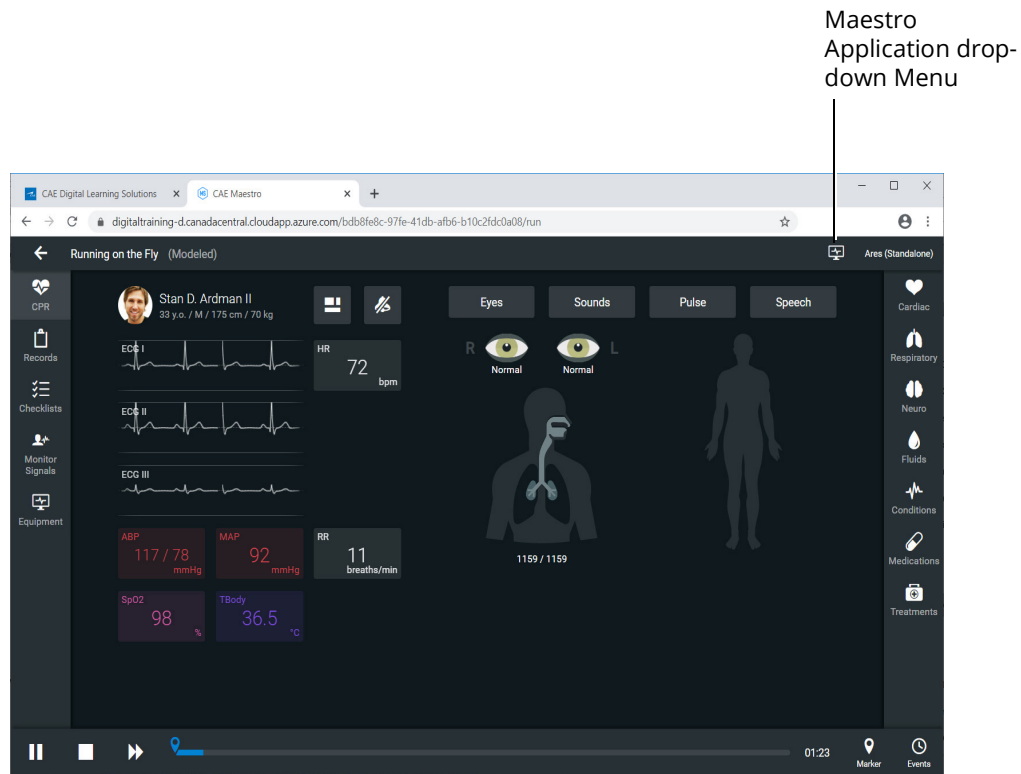
**Simulation Connection Status**

- Click the **X** in the upper-right corner to close the Equipment parameters panel and return to the SCE Run screen.

## Step 5: Launch the Transport Ventilator

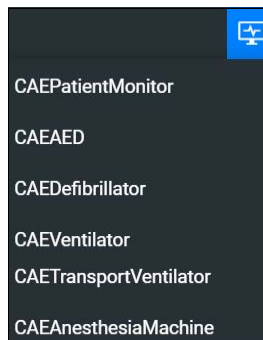
To launch the Transport Ventilator:

1. From the upper-right corner of the SCE Run screen, select the Maestro Application drop-down menu.



**SCE Run Screen**

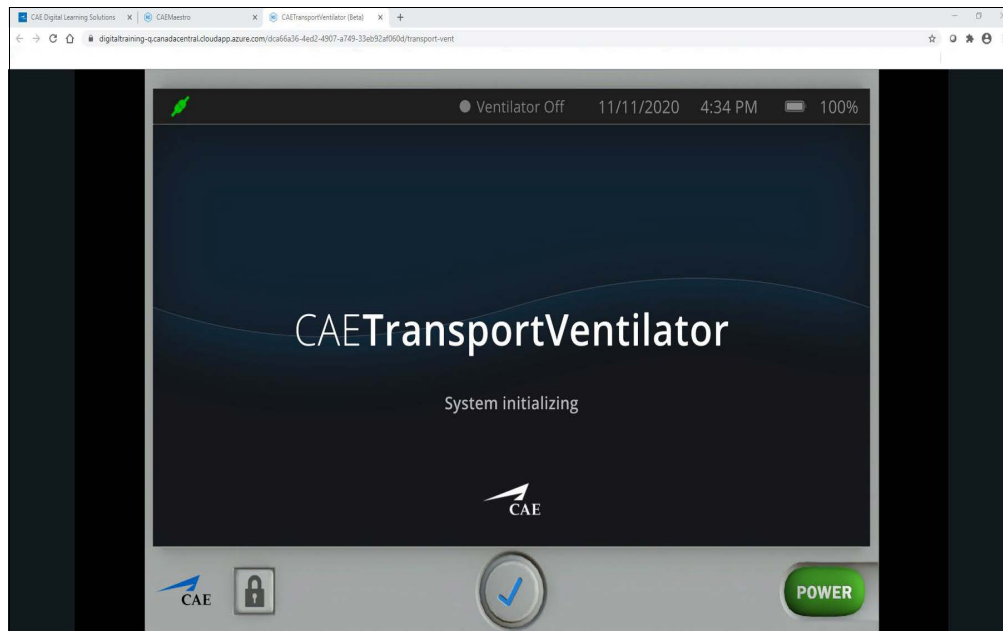
The Maestro Application drop-down menu appears.



**Maestro Application Drop-Down Menu**

2. From the drop-down menu, select **CAETransportVentilator**.

The System Initializing Screen will appear in a separate browser tab.



*System Initializing Screen*

3. Arrange the open browser tabs for the most effective viewing:

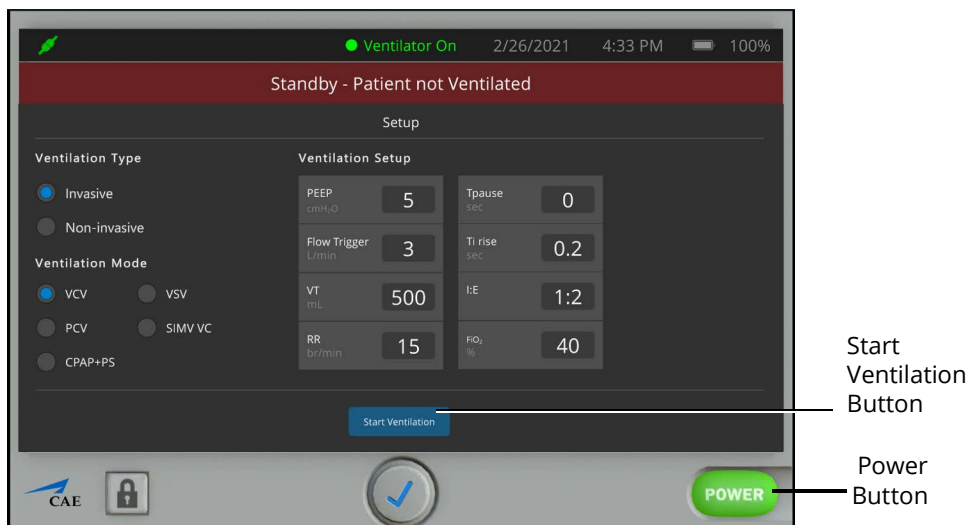
When using dual monitors:

- a. Position the mouse pointer on the **CAETransport Ventilator** browser tab.
- b. Drag the Transport Ventilator window to the second monitor display, leaving the Maestro Evolve window in the first display.

When using a single monitor:

- a. Restore or resize the Maestro Evolve screen so that some of the Windows desktop is visible.
- b. Position the mouse pointer on the **CAETransport Ventilator** tab in the browser window.
- c. Drag the Transport Ventilator window outside of the active browser window. The Ventilator will appear in a separate window.

After the system has initialized, the Transport Ventilator Setup Standby screen appears.



**Transport Ventilator Setup Standby Screen**

4. Change the parameter values as needed. After positioning the cursor in one of the parameter value fields, and selecting the value for editing, additional control buttons will appear at the bottom of the screen.

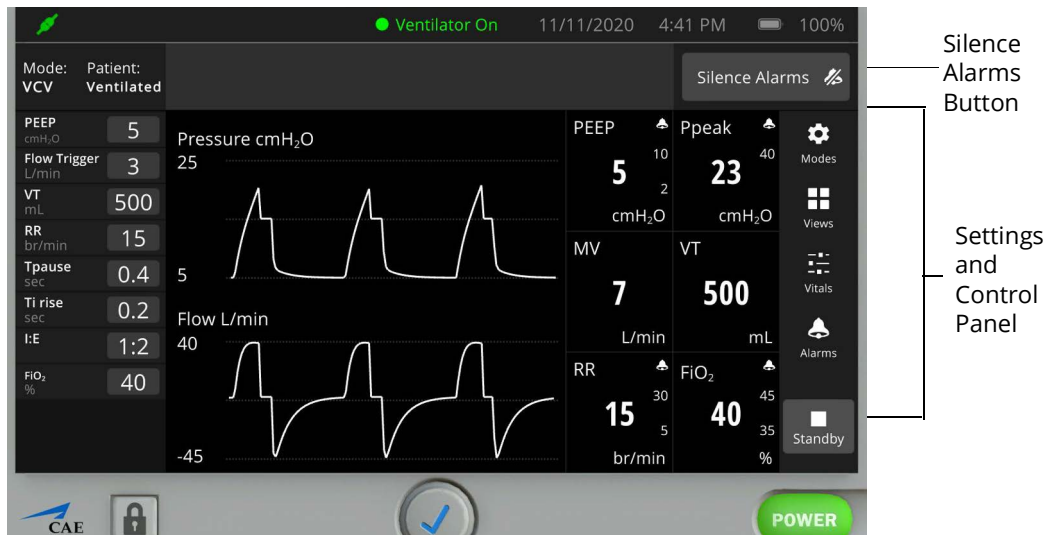


**Value Select Buttons**

5. Use the **plus (+)** and **minus (-)** buttons at the bottom center of the screen to adjust the value lower or higher as needed.
6. Click the **Check mark symbol** in the center to finalize the change in value.
7. When finished making all changes on the Setup screen, click the **Start Ventilation** button.



The Ventilator screen will appear.



**Transport Ventilator Screen - Ventilator On**

To silence the alarms, from the upper-right corner of the transport ventilator screen, click the **Silence Alarms** button.



**Silence Alarms Button**

There are additional settings that represent a typical ventilator used in a clinical setting. Status and parameters are displayed on the Ventilator screen based on options selected from the Settings and Controls panel at the right of the screen. Options to select from are:

- Modes
- Views
- Vitals
- Alarms

Refer to *Appendix E- Transport Ventilator Controls and Display Options* for further details.

**Note:** Enable all probes as described in *Step 4: Set up the Transport Ventilator*. Having probes enabled will ensure appropriate patient vital signs are displayed and monitored by the equipment during the simulation.

The transport ventilator screen may be minimized and continue to run during the simulation. This is especially helpful if using a single monitor, allowing for a full view of the Maestro Evolve SCE Run screen and the patient status display.

# CAE Anesthesia Machine

Listed below are the steps to begin using CAE Anesthesia Machine.

**Note:** Only one ventilation device may be used at a time. For example, if the Transport Ventilator is active, and the Ventilator or Anesthesia Machine is powered on, the Transport Ventilator will automatically power off. However, both an electrotherapy device and a ventilation device may be used in parallel.

Unlike the Ventilator and Transport Ventilator, it is not necessary to establish specific patient parameters in the setup process.

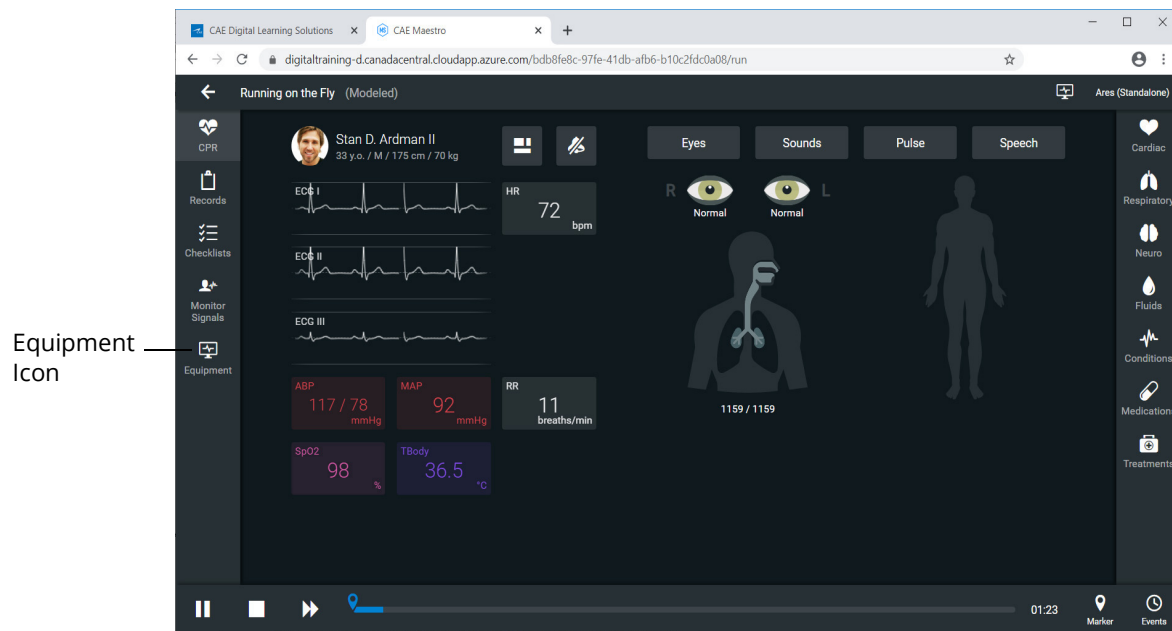
**Note:** Select a modeled simulation for the Anesthesia Machine to function appropriately.

Anesthesia Machine Steps	
1	Set up the Anesthesia Machine
2	Launch the Anesthesia Machine

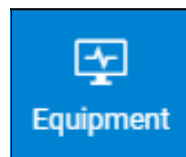
## Step 1: Set up the Anesthesia Machine

Prior to running the Anesthesia Machine, there are setup steps involved; selecting probes and setting gas parameters as follows:

1. From the left panel of the SCE Run Screen, select the **Equipment** icon.



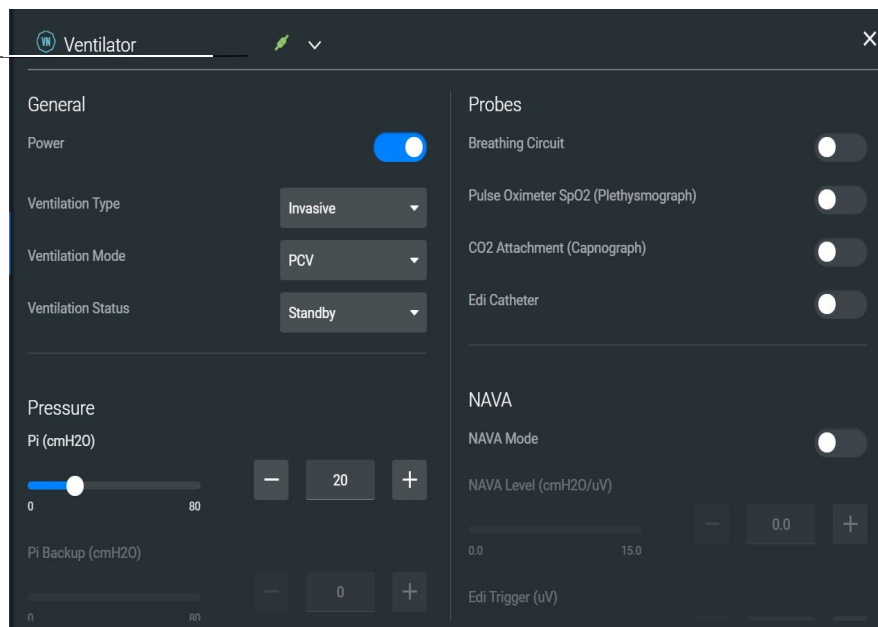
*SCE Run Screen*



*Equipment Icon*

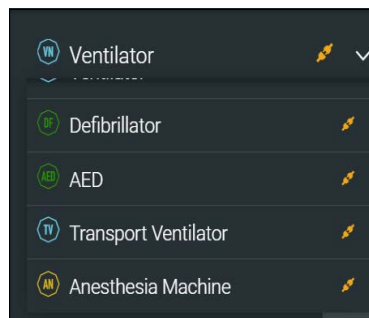
The Equipment parameters appears.

Select Equipment Parameters drop-down



**Equipment Parameters**

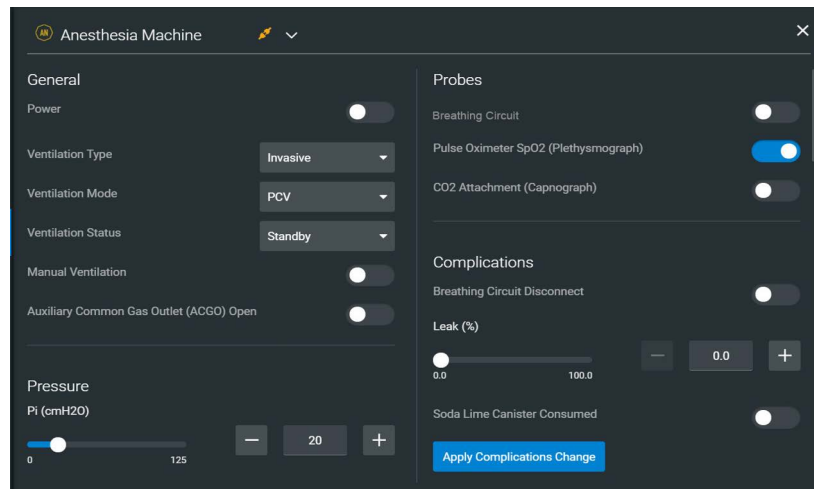
2. Click the **Select Equipment Parameters** drop-down indicator to the right of the equipment type at the top of the list.



**Select Equipment Parameters Drop-Down**

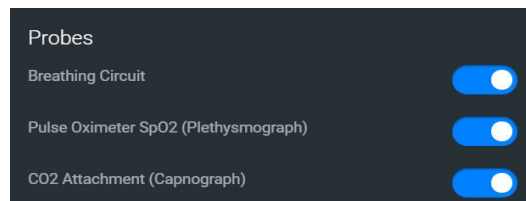
3. Scroll down the list and select **Anesthesia Machine**.

The Anesthesia Machine parameters appear for editing.



**Anesthesia Machine Equipment Parameters**

- From the Probes options, **enable** the following probes:
  - Breathing Circuit
  - Pulse Oximeter SPO<sub>2</sub>
  - CO<sub>2</sub> Attachment



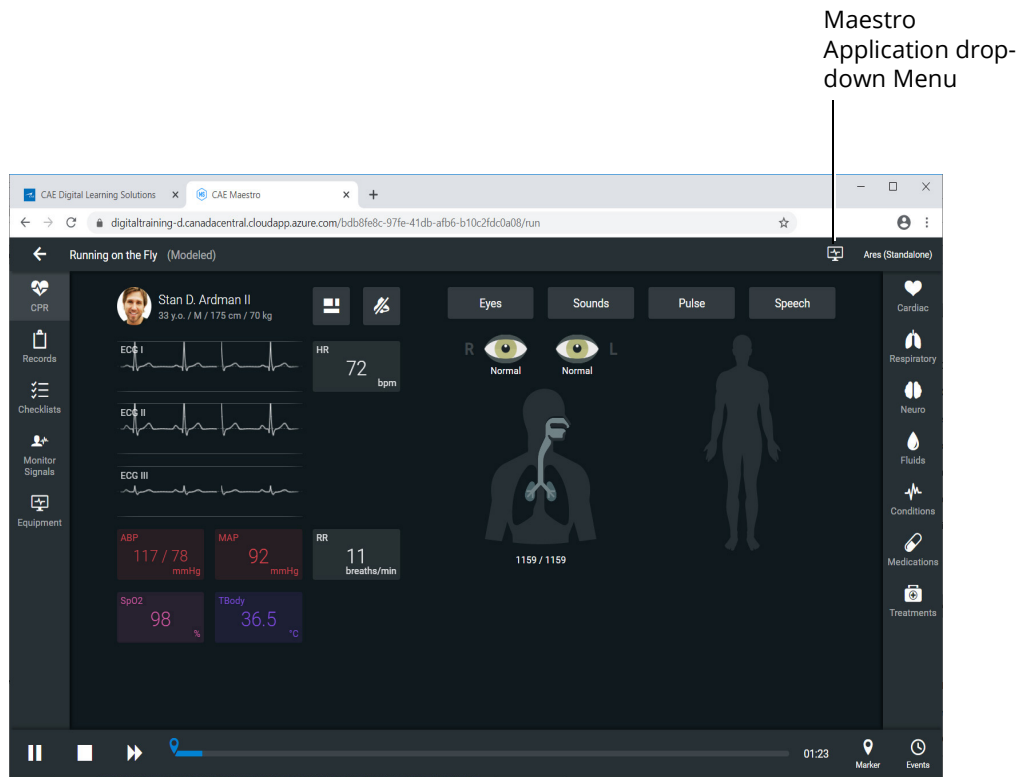
**Anesthesia Probes Enabled**

- Click the **X** to close the Equipment parameters panel and return to the SCE Run screen.

# Step 2: Launch the Anesthesia Machine

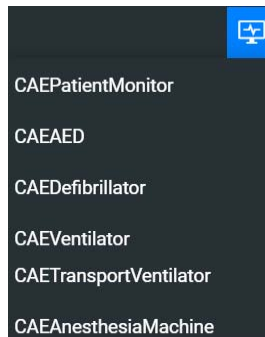
To launch the Anesthesia Machine:

1. From the upper-right corner of the SCE Run screen, select the Maestro Application drop-down menu.



**SCE Run Screen**

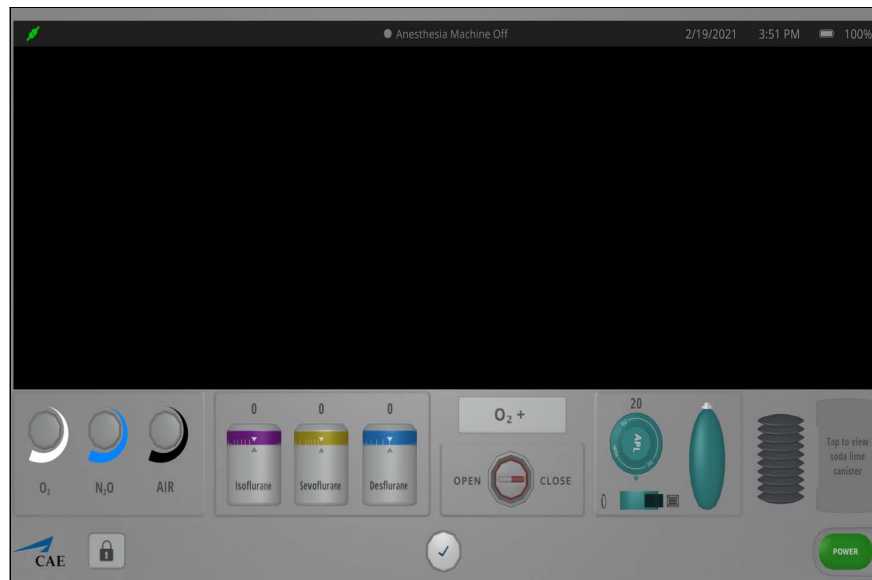
The Maestro Application drop-down menu appears.



**Maestro Application Drop-Down Menu**

2. From the drop-down menu, select **CAEAnesthesiaMachine**.

The Anesthesia Machine Screen will appear in a separate browser tab.



*Anesthesia Machine Screen - Machine Off*

3. Arrange the open browser tabs for the most effective viewing:

When using dual monitors:

- Position the mouse pointer on the **CAEAnesthesia Machine** browser tab.
- Drag the Anesthesia Machine window to the second monitor display, leaving the Maestro Evolve window in the first display.

When using a single monitor:

- Restore or resize the Maestro Evolve screen so that some of the Windows desktop is visible.
- Position the mouse pointer on the **CAEAnesthesia Machine** tab in the browser window.
- Drag the Anesthesia Machine window outside of the active browser window. The Anesthesia Machine will appear in a separate window.

## Power On the Anesthesia Machine

To turn on the Anesthesia Machine, click on the **Power** button in the lower-right corner of the Anesthesia Machine screen.



**Power Button**

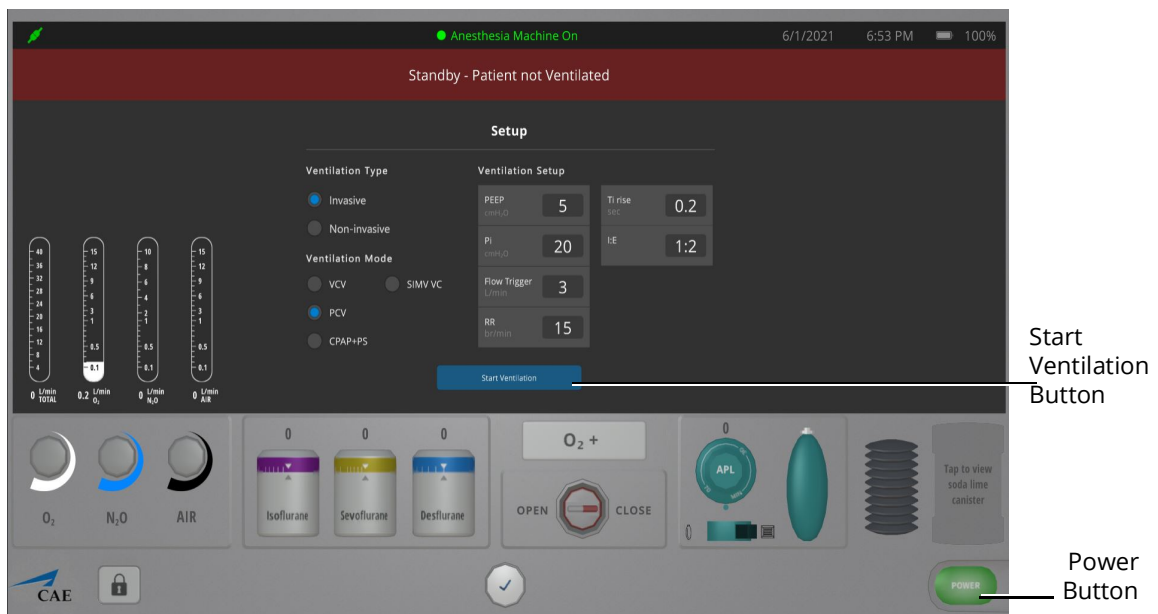
The System Initializing Screen will appear in a separate browser tab.



**System Initializing Screen**



After the system has initialized, the Anesthesia Setup Standby screen appears.



**Anesthesia Setup Standby Screen**

## Setting Ventilation Parameter Values

To change the ventilation parameter values:

1. Select the value for editing by positioning the cursor in one of the parameter value fields.  
Additional control buttons appear at the bottom of the screen.



**Value Select Buttons**

2. Use the + and - buttons at the bottom center of the screen to adjust the value lower or higher as needed.
3. Click the **Check mark symbol** in the center to finalize the change in value.

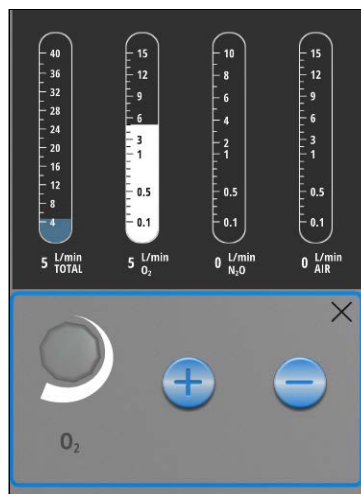
## Setting Gas Flow Volume

To set gas flow volume:



**Gas Controls**

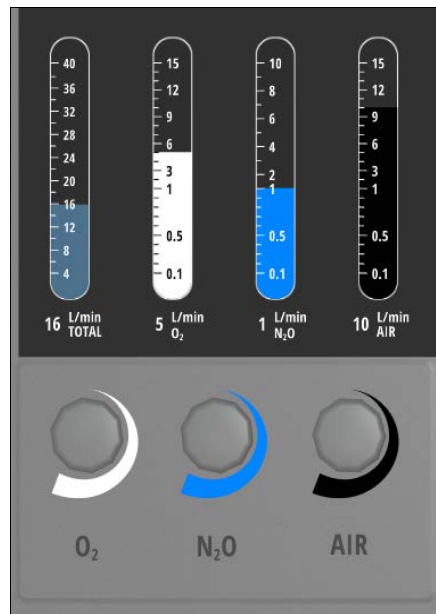
1. From the Gas controls on the lower-left of the Anesthesia screen, click on the O<sub>2</sub> control.  
The O<sub>2</sub> controls are activated.
2. Click on the **plus (+)** control until the O<sub>2</sub> flow gauge displays 5 L per minute. Use the **minus (-)** control if necessary to decrease the value.



**O<sub>2</sub> Gas Set at 5.0**

3. Click on the **X** to close the O<sub>2</sub> control.
4. Click on the N<sub>2</sub>O control.
5. Adjust the N<sub>2</sub>O flow to 1 L per minute.
6. Click on the **X** to close the N<sub>2</sub>O control.
7. Click on the Air control.
8. Adjust the Air flow gauge to 10 L per minute.
9. Click on the **X** to close the Air flow control.

Gauges will reflect volumes set.



*Gases Flow Volume Set*

## Setting Anesthetic Agent Volumes

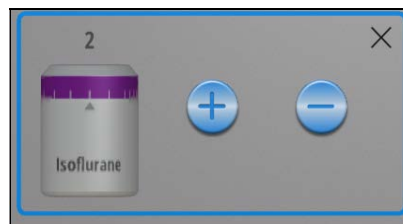
To set anesthetic agent volume percentages:

1. From the lower-left of the Anesthesia screen, select one of the anesthetic agents. In this example, **isoflurane** is selected.



*Anesthetic Agents*

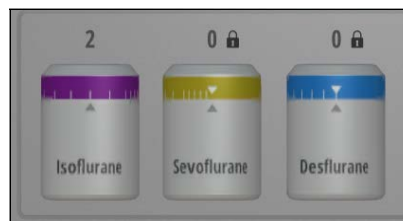
The anesthetic agent controls will appear.



***Isoflurane Controls***

2. Click on the **plus (+)** to increase the amount of the anesthetic agent. In this example, **Isoflurane** is increased to 2 (2.0%). Depending upon the agent selected, the ranges will vary.
3. Click on the **X** to close the Anesthetic Agents Controls window.

The Anesthetic Agents that were not selected will be shown locked, preventing the administration of additional agents. The agent chosen will display the value previously set using the controls.



***Anesthetic Agents - Set and Locked***

## ***O2 Flush and Auxillary Common Gas Outlet***



***O<sub>2</sub> Flush***

Clicking on the **O<sub>2</sub> + Flush** control pushes 100% O<sub>2</sub> into the breathing circuit.

To open and close the Auxillary Common Gas Outlet (ACGO):

1. Click on the **ACGO Valve** control.

The valve control is activated.



**ACGO Valve Control Closed**

2. Click on the **Open** or **Close** option.

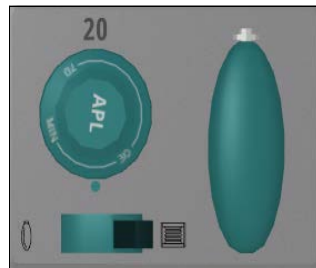
The red marker indicates the setting for the valve.

**Note:** If the valve is left open, the gases will not go to the main breathing circuit causing erratic patient vitals on the Maestro Run Screen display.

3. Click on the **X** to close the ACGO valve control.

## Manual Ventilation Controls

On the lower-right side of the Anesthesia screen are the controls for the APL valve, the Manual Switch and the Rebreather Bag.



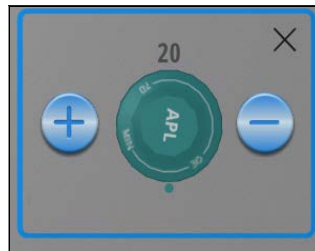
**APL Valve, Manual Swtich and Rebreather Bag Controls**

## Adjusting the APL Valve

To adjust the Adjustable Pressure Limiting (APL) valve:

1. Click on the **APL Valve** control.

The valve is activated.



**APL Valve Control**

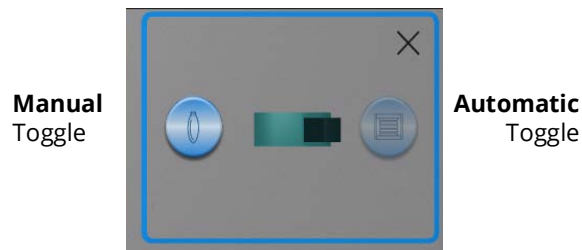
2. Click on the **plus (+) or minus (-)** option, to increase or decrease amount of pressure. The value will be displayed in the control.
3. Click on the **X** to close the APL control.

## Controlling Manual Ventilation

To control manual ventilation:

1. Click on the **Manual Switch** button on the left of the control panel.

The switch control is activated.



**Manual Switch Control**

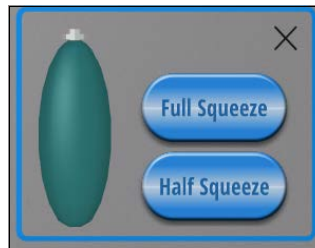
2. Click on the **Manual** or **Automatic** option.
3. Click on the **X** to close the **Manual Switch** control panel.

While the ventilation is set to manual, air may be administered using the rebreather bag.

To use the rebreather bag:

1. Click on the **Rebreather Bag** control.

The control is activated.

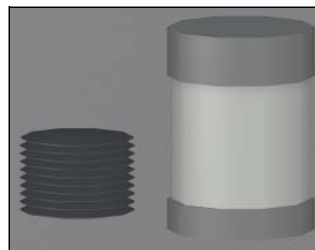


*Rebreather Bag Control*

2. Select **Full Squeeze** or **Half Squeeze**.
3. Click on the **X** to close the **Rebreather Bag** control.

## Soda Lime Canister

The soda lime canister is a visual indicator of how much CO<sub>2</sub> is absorbed through the breathing circuit. If the canister is completely consumed, it will turn to purple.



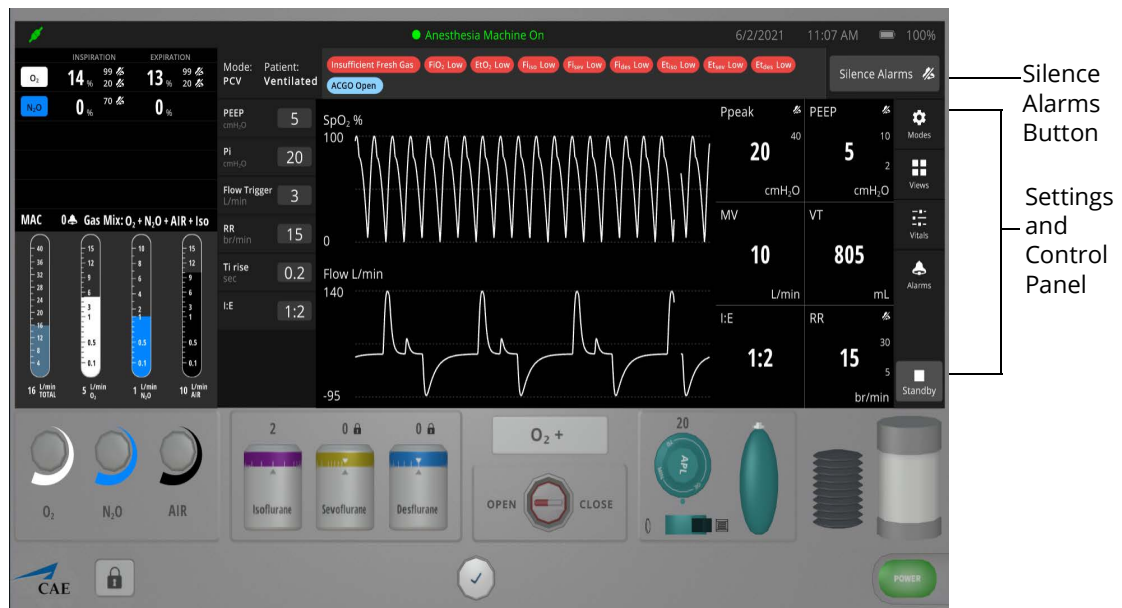
*Soda Lime Canister*

To view the soda lime canister, click the canister icon in the lower-right corner of the Anesthesia screen.

## Start Ventilation

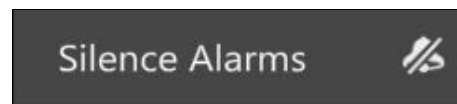
When finished making all changes on the Setup screen, click the **Start Ventilation** button.

The Anesthesia Machine screen will appear.



**Anesthesia Machine Screen - Power On**

To silence the alarms, from the upper-right corner of the ventilator screen, click the **Silence Alarms** button.



**Silence Alarms Button**

There are additional settings that represent a typical anesthesia machine used in a clinical setting. Status and parameters are displayed on the anesthesia screen based on options selected from the Settings and Controls panel at the right of the screen. Options to select from are:

- Modes
- Views
- Vitals
- Alarms

Refer to *Appendix F - Anesthesia Machine Controls and Display Options* for further details.

**Note:** Enable all probes as described in *Step 5: Set up the Anesthesia Machine*. Having probes enabled will ensure appropriate patient vital signs are displayed and monitored by the equipment during the simulation.



The Anesthesia Machine screen may be minimized and continue to run during the simulation. This is especially helpful if using a single monitor, allowing for a full view of the Maestro Evolve SCE Run screen and the patient status display.

Once the power is enabled to the anesthesia machine, the simulation connection status will change at the top of the Equipment parameters panel. This same status icon will be displayed at the top of the Anesthesia screen, when running the Anesthesia Machine.



***Simulation Connection Status***

# CAE EMBODY THE VIRTUAL SIMULATOR

Embody, CAE's virtual simulator, is designed with advanced physiology, interfacing with Maestro and all of the virtual equipment features. When parameters are modified in Maestro Evolve, the virtual simulator reflects the adjusted conditions and vital signs.

## Using Embody

Embody may be used in one of two ways:

- As the Selected Simulator - Selecting Embody as the preferred simulator for the simulation, prior to starting the simulation.
- During the Simulation in Progress - Embody may also be used to virtually represent the simulation in progress, although a different patient simulator (e.g. Ares, Juno, etc.) was selected prior to starting the simulation.

**Note:** Not all Embody functionality will be available if another simulator was selected prior to starting the simulation.

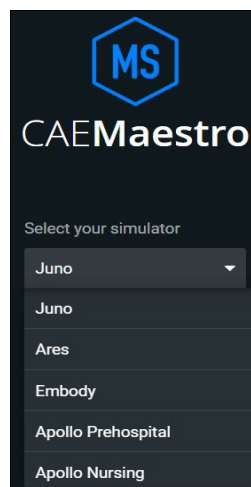
## Select the Simulator

Selecting Embody as the simulator for the simulation will provide these additional features:

- Additional patient parameters; skin and gastro.
- Ability to select from multiple male and female patient profiles to represent the virtual simulator when creating and editing SCEs.

To select Embody as the preferred simulator for the simulation:

1. After logging into Maestro, from the Select a Simulator screen, click the drop-down list and select **Embody**.

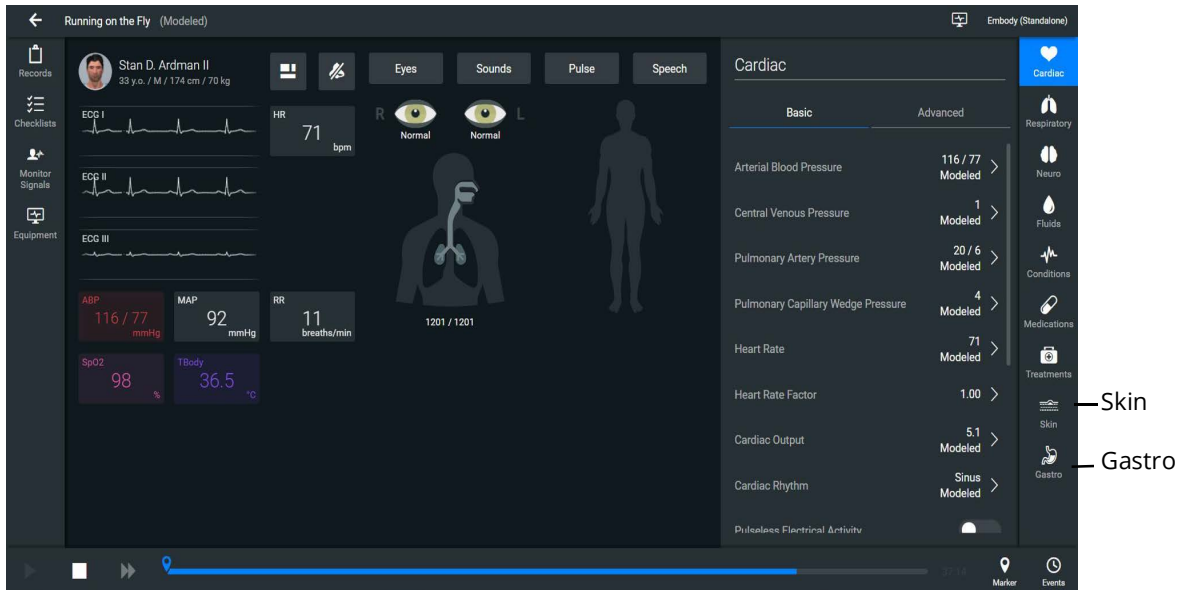


*Select Simulator Drop-Down List*

The Maestro Home Screen appears.

2. Select Run on the fly (Modeled), Run on the fly (Manual), or Run an SCE.

The SCE Run screen appears, featuring the additional Embody patient parameters.

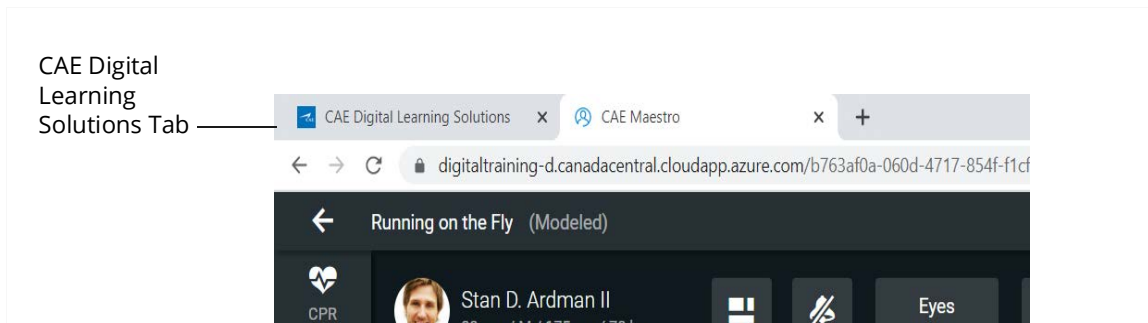


**SCE Run Screen - Embody**

## Launch the Virtual Simulator

To launch the virtual simulator:

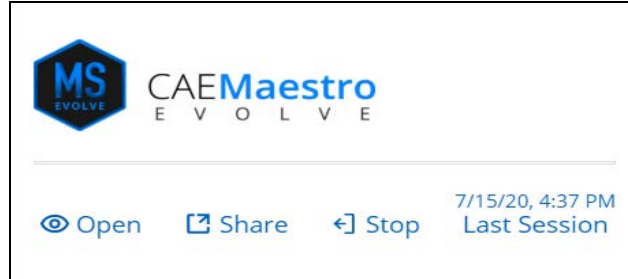
1. Keep the Maestro Evolve window open. At the top of the browser window, select the **CAE Digital Learning Solutions** tab.



**Browser Window Tabs**

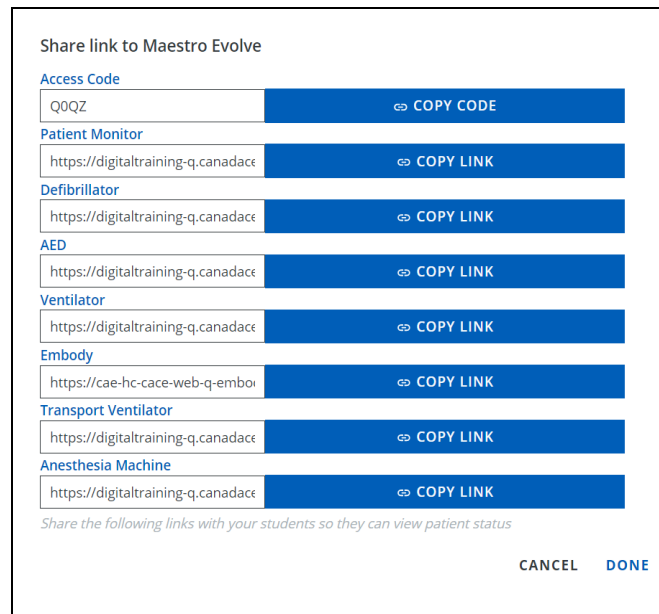
The CAE Learning Digital Solutions page appears.

2. From the Maestro Evolve Module Menu on the CAE Digital Learning Solutions page, select **Share**.



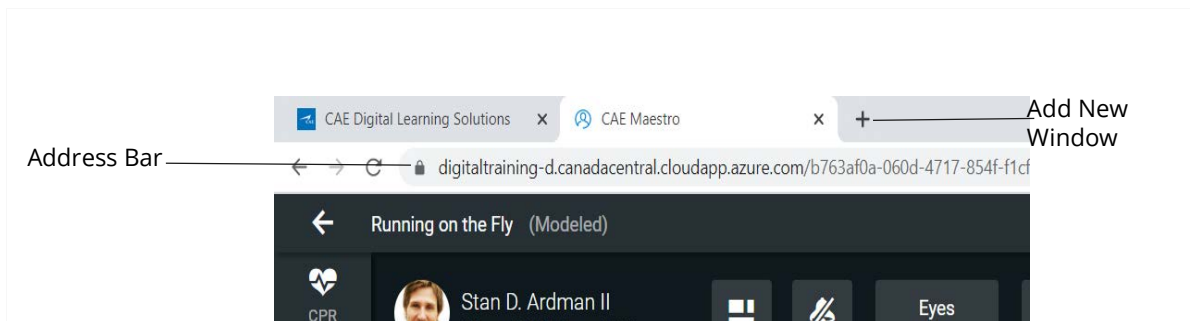
**Maestro Evolve Module Menu - Open, Share, and Stop**

The Share Link to Maestro Evolve window appears.



### Share Link to Maestro Evolve

3. Find **Embody** in the list of options.
4. Click the **COPY LINK** button associated with Embody.
5. Click **DONE**.
6. At the top of the browser window, select the **+** to open a new window.

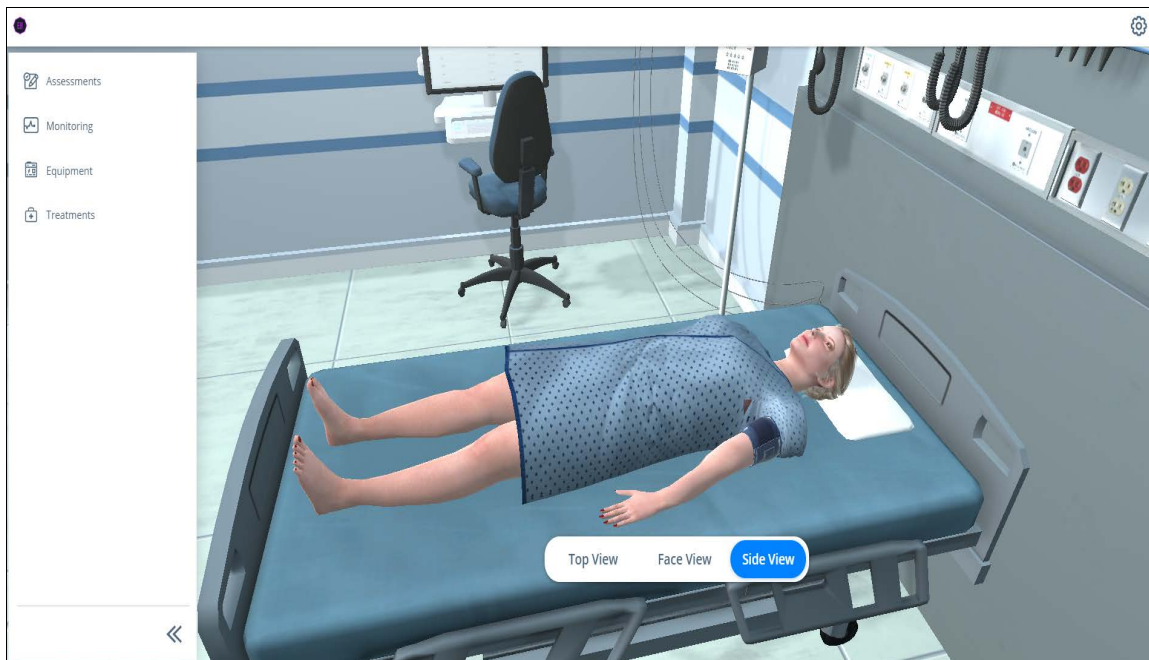


### Browser Window Tabs

7. In the blank address bar of the new window, paste the copied link from Maestro Evolve and press Enter.

**Note:** This can be done by positioning the cursor in the address bar and using the keyboard shortcut **CTRL+V**.

The CAE Embody virtual simulator appears in a separate browser tab.



**CAE Embody**

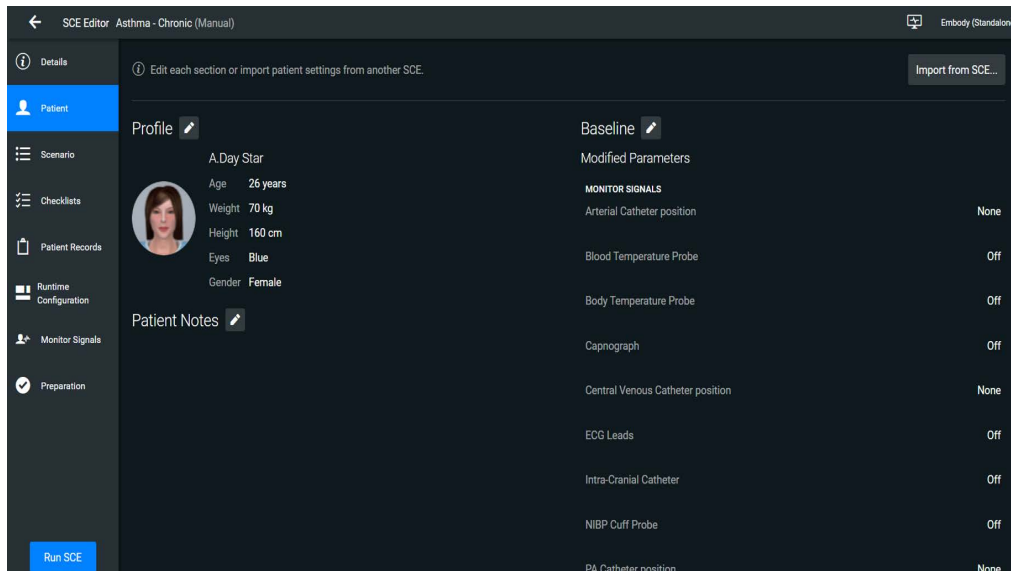
**Note:** If the chosen simulator was a simulator other than Embody, the same steps would be followed to launch the virtual simulator in a separate browser window.

# Selecting the Patient

If Embody is chosen as the preferred simulator, multiple patient profiles are available when creating and editing SCEs.

When creating or editing the SCE:

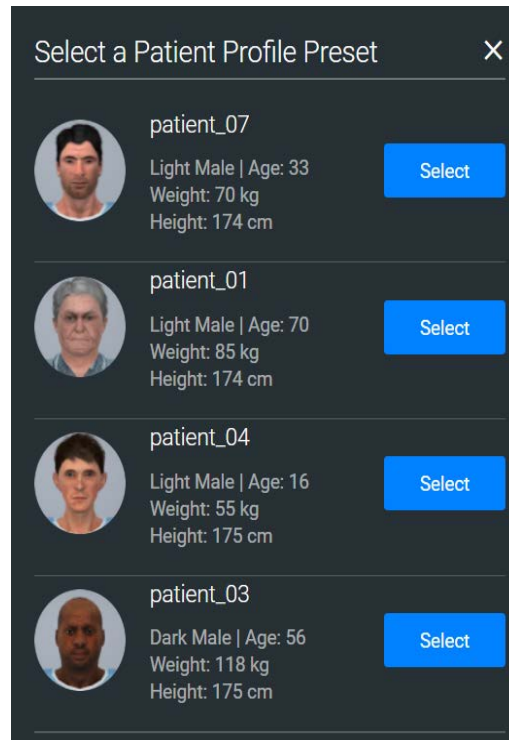
1. From the SCE Navigation tabs on the left side of the window, select **Patient**.



**SCE Editor - Editing a Patient Profile**

2. Select the **Profile** edit icon.

The Select a Patient Profile Preset window appears. The gender selected at the beginning of the simulation will determine the initial profile options available (male or female). In the following example, Male was chosen as the gender initially at the beginning of the simulation. In the event a female gender profile is preferred, the gender may later be changed after selecting a profile.

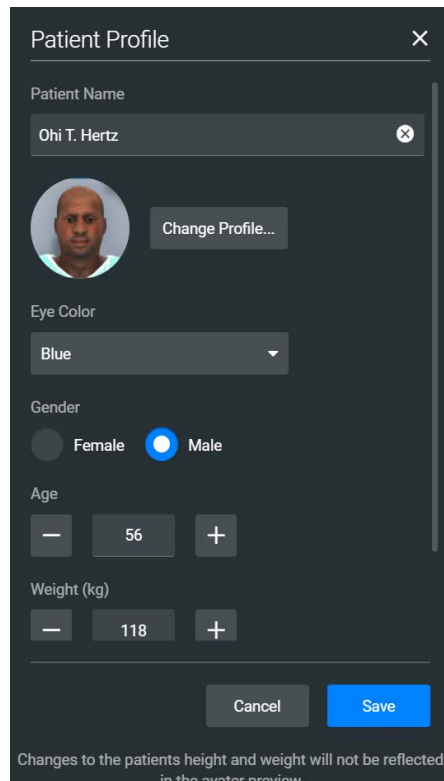


**Select a Patient Profile Window**

3. Identify the preferred patient profile.
4. Click on the associated **Select** button.



The selected patient profile appears.



Patient Profile

Patient Name  
Ohi T. Hertz

Change Profile...

Eye Color  
Blue

Gender  
 Female  Male

Age  
- 56 +

Weight (kg)  
- 118 +

Cancel Save

Changes to the patients height and weight will not be reflected in the avatar preview.

### ***Patient Profile***

Use the **drop-down list** or **plus (+)** and **minus (-)** buttons to make patient parameters changes to: eye color, age, weight, or height.

To change the gender:

1. Select the preferred gender.
2. Click on **Change Profile**.
3. The Select a Patient Profile window appears and a preferred selection may be made.

The selected patient profile is represented as the virtual patient when Embody is launched from the browser window.



**CAE Embody - Selected Patient**

**Note:** The patient represented in the Embody window will reflect the eye colors, age, weight, and height that were original to the profile. Changes made to parameters will not be morphed to the image.

More information is provided regarding creating and editing SCEs in the previous chapters of this guide:

- Managing SCEs
- Using the SCE Editor

# Embody Features

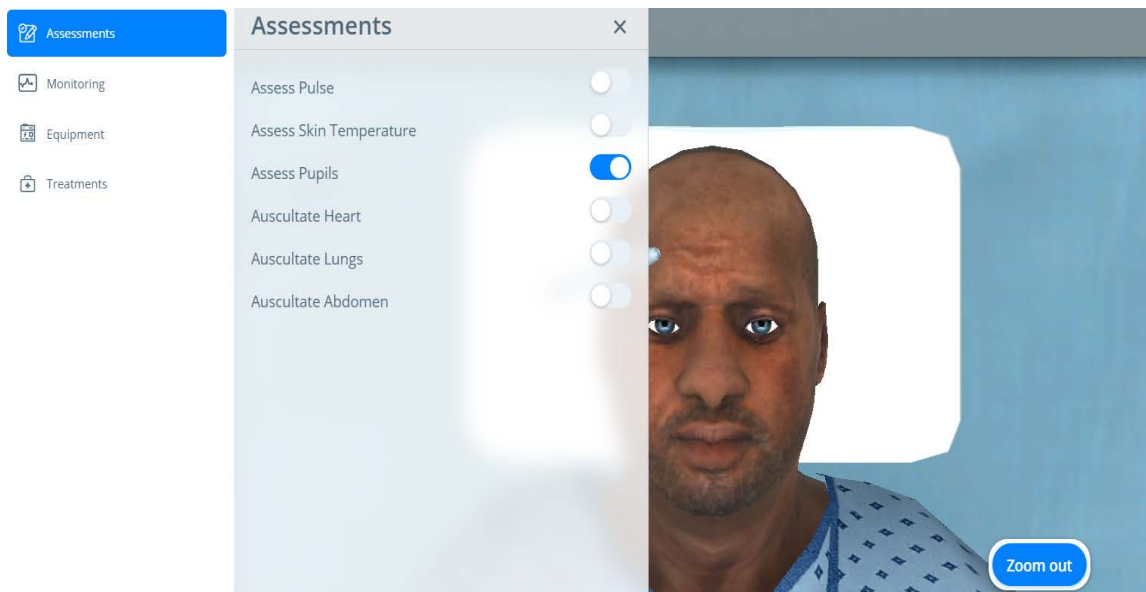
Features are available for the learner to assess, monitor, and treat the virtual patient. The following are options available from the panel at the left side of the Embody screen:

- Assessments
- Monitoring
- Equipment
- Treatments

## Assessments

Selecting Assessments provides the following options:

- Pulse
- Skin Temperature
- Pupils
- Heart
- Lungs
- Abdomen



**Assessment Options**

In the example shown, the Assess Pupils option is toggled on. The patient view is modified so the pupils are more visible and a penlight is provided for use during the assessment. Click on the **X** to close the Assessments options panel, providing a more complete view of the patient.

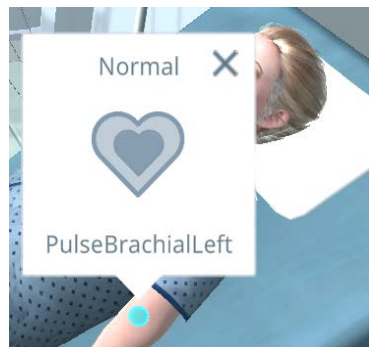
To use the assessment features:

1. Identify the desired option to assess and toggle on.

Depending upon which option is selected, detection points (e.g. pulse) or tools (e.g. penlight or stethoscope) will be displayed on the virtual patient.

2. Click on one of the detection points or move the tool to the area chosen for assessment.

After selecting the assessment point, a corresponding widget will appear displaying data from the chosen assessment.



**Assess Pulse Widget**

Audible sounds can be heard by the learner when the Embody link to the simulation has been shared by the Instructor. Sounds are not audible by the learners when the Instructor is sharing the simulation via the Instructor's machine.

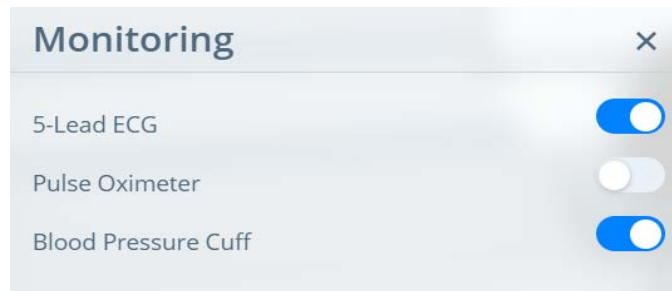
See the *Share Virtual Equipment* section of this guide for more information on how to share components of the simulation with learners.

Click on the **X** to close the widget.

## Monitoring

Selecting Monitoring provides the following options:

- 5-Lead ECG
- Pulse Oximeter
- Blood Pressure Cuff



**Monitoring Options**

To use the monitoring features:

Identify the desired option to monitor and toggle on.

Depending upon which option is selected, equipment (e.g. pulse oximeter) will be displayed on the virtual patient. The corresponding monitoring option in the Maestro window will be modified to synchronize with the changes made in Embody.

## Equipment

Equipment options include the virtual equipment applications found in Maestro and bed calibration options.



**Equipment Options**

## Virtual Equipment

The following types of virtual equipment may be launched from the Embody virtual patient window:

- Patient Monitor
- Ventilator
- Defibrillator

Launching the equipment from Embody allows the learner to use the equipment in the current simulation, without having the links provided from the instructor, and without having access to the Maestro interface.

To launch the virtual equipment, click on the associated **Launch** button and the equipment chosen will appear in a separate browser window.

For more information on the devices, see the *Virtual Equipment* section of this User Guide. There are also Appendices specific to each device detailing parameters and controls.

## Bed Calibration

To adjust the patient's bed calibration:

1. From the Equipment options, click on the drop down list to the right of **Bed**.

The calibration options appear.



**Bed Calibration Options**

2. Select one of the bed calibration options.

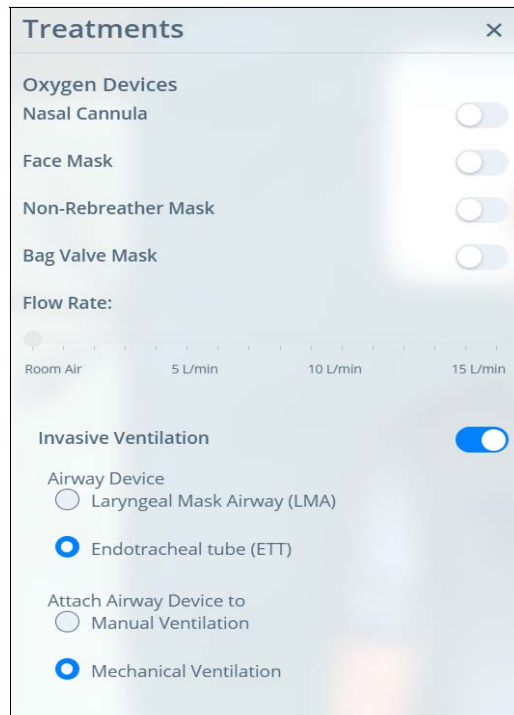
Embody will display the patient using the new bed calibration selected.

## Treatments

Selecting Treatments provides the following options:

- Oxygen Devices
- Noninvasive or Invasive Ventilation

Selecting invasive or noninvasive will determine the enabled respiratory treatments.

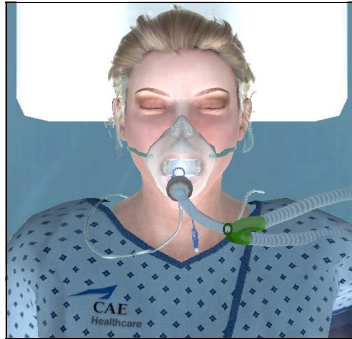


**Treatment Options**

To select and apply treatments:

1. If desired, enable an **Oxygen Device**.
  - a. Adjust the **Flow Rate** using the slider control.
2. Using the toggle switch, toggle off for **Noninvasive** or toggle on for **Invasive** Ventilation.
  - a. Select the desired option for **Airway Device**.
  - b. Select the desired option for **Attach Airway Device to**.
3. Click on the **X** to close the Treatment window.

After selecting and enabling treatment, the virtual patient will appear with the selected device. In the following example the patient is displayed with the Mechanical Ventilator.

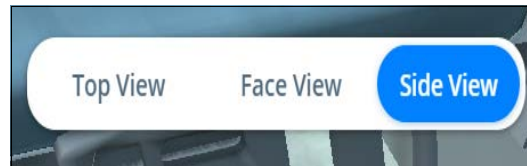


***Patient with Mechanical Ventilator***



## Change Patient View

The view of the patient may be adjusted by selecting any of the buttons in the right-center of the Embody screen.



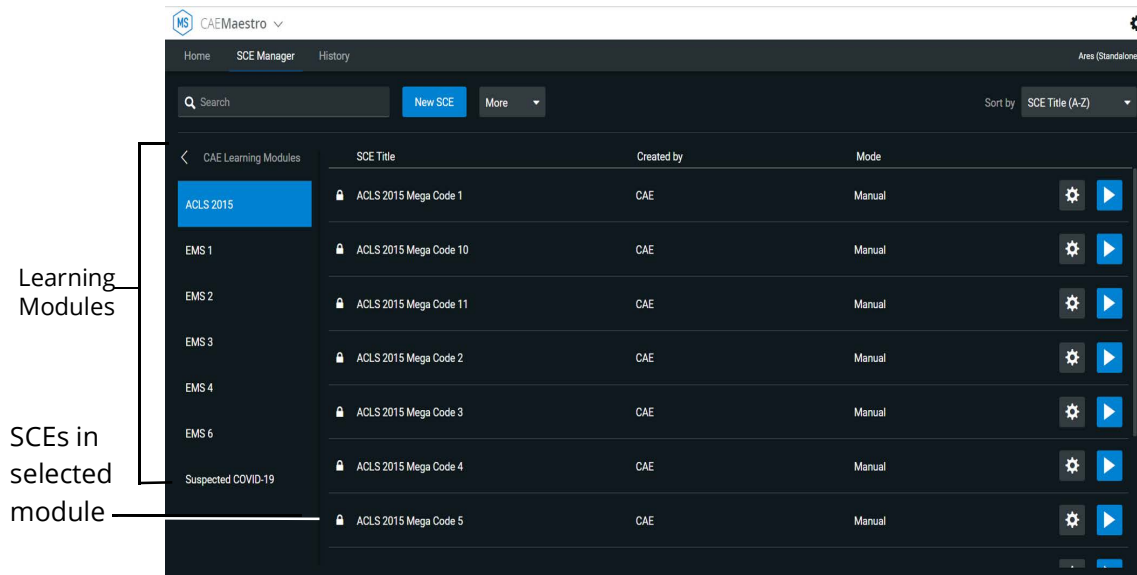
*Patient View Buttons*

When assessment options are chosen which automatically provide close up views of the patient, the standard patient view buttons are replaced by a **Zoom Out** option.

# LEARNING MODULES

Learning Modules are comprised of multiple SCEs. Some Learning Modules are predefined and included in Maestro Evolve. Users can also import or delete existing Learning Modules, or create new Learning Modules in Maestro.

From the SCE Manager screen, select **CAE Learning Modules** and the Learning Modules Screen appears.

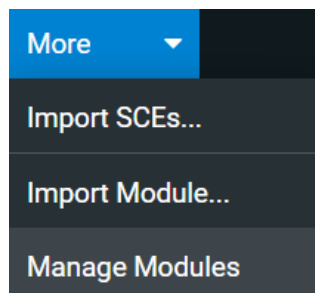


*Learning Modules Screen*

## Import a Learning Module

To import a learning module in Maestro:

1. From the SCE Manager screen, click the **More** button.
2. From the drop-down menu, select **Import Module**.



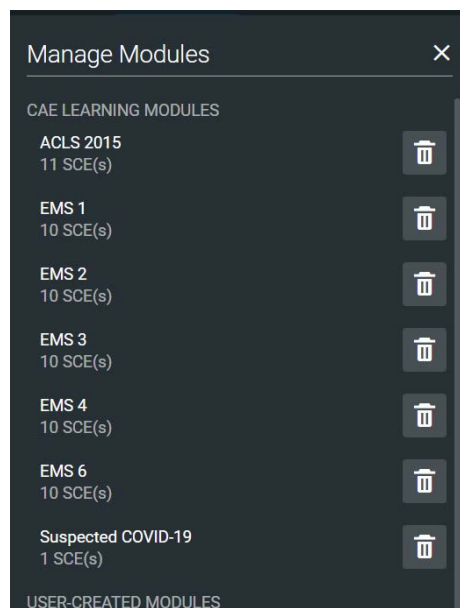
*More Menu*

3. Locate the correct learning module file on the external storage device or hard disk drive where the learning module is located. The file extension is **mlm**.
4. Select the file and click **Open**.

## Delete a Learning Module

To delete a learning module from Maestro:

1. From the SCE Manager screen, select the **More** button.
2. From the drop-down menu, select **Manage Modules**.



**Manage Modules Screen**

3. Click the **Trash** icon next to the module to be deleted.
4. When the message appears to confirm the selection, click **Delete All**.

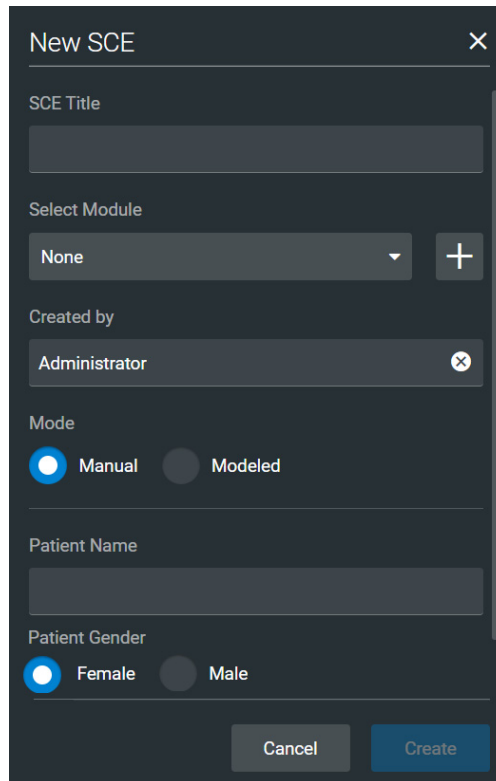
All of the SCEs in the learning module will be deleted.

# Create a Learning Module

To create a learning module:

1. From the SCE Manager screen, select **New SCE**.

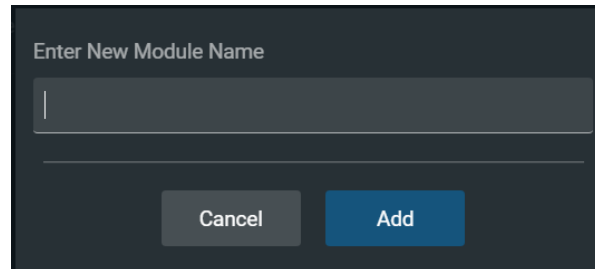
The New SCE screen appears.



*New SCE Screen*

2. Type a title for the SCE in the **SCE Title** field.
3. To select a module to add the SCE to, click on the dropdown arrow, then select a module. Or, select the + icon to create a new module.

If creating a new module, type a name for it in the Enter New Module Name screen. Then, click **Add**.



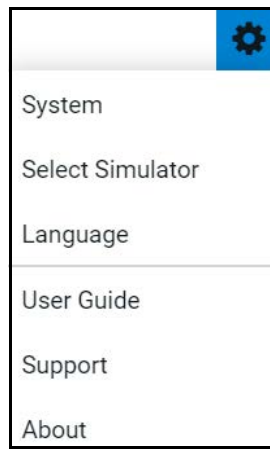
*New Module Name Screen*

4. Complete the remaining fields or select options as required. Click **Create**.

# ADMINISTRATIVE TOOLS

The Maestro software includes administrative tools to access and manage system settings, preferences, and library content. There are features that allow for managing and creating SCEs. Historical data associated with the simulation may be viewed or exported, serving as an effective debriefing tool.

Access Administrative tools menu via the **Gear** icon located on the upper-right corner of the Home page.



**Administrative Tools Menu**

From the Administrative tools menu select one of the following:

- **System:** Allows the user to set **Preferences**, access **Performance Metrics** and **License Manager, Maintenance**, and manage **Content Library**.
- **Select Simulator:** Allows the user to change the simulator selection from Ares, Juno or Embody. The simulator may also be chosen as the default simulator.
- **Language:** Change the Maestro language from the default English.
- **User Guide:** Provides a link to the online User Guide.
- **Support:** Provides a link to CAE support and contact information.
- **About:** Provides Maestro version.

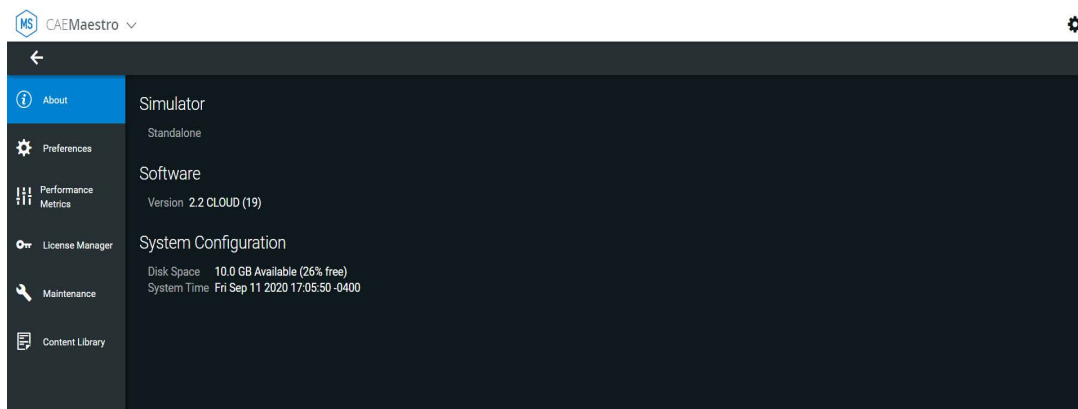
# System Administration

From the System Administration screen, users can access system information, set preferences, manage licenses, maintenance information, and the content library for Maestro.

To access the System Administration:

1. From the Home screen, click the **Gear** icon.
2. From the drop-down menu, select **System**.

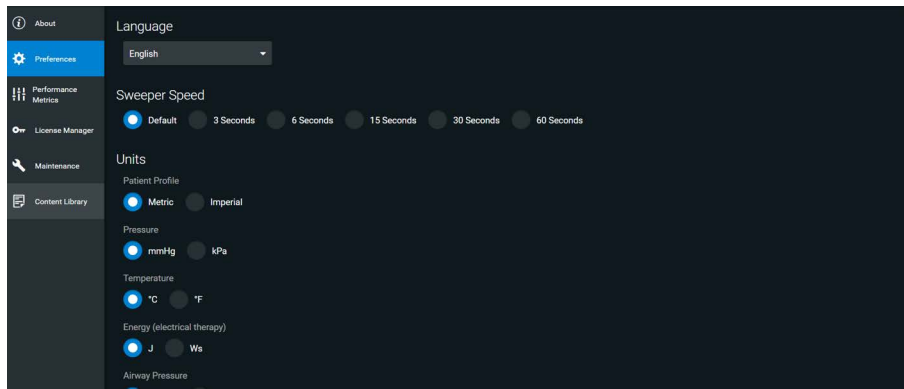
The System Administration screen appears.



*System Administration*

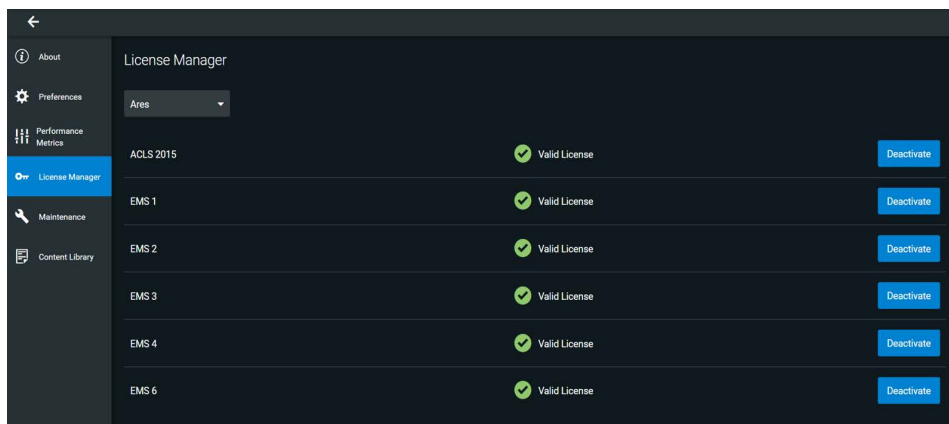
From this screen, users can select:

- **About:** View simulator type, software version and system configuration.
- **Preferences:** Allows the user to change settings for different software features.



**System Preferences**

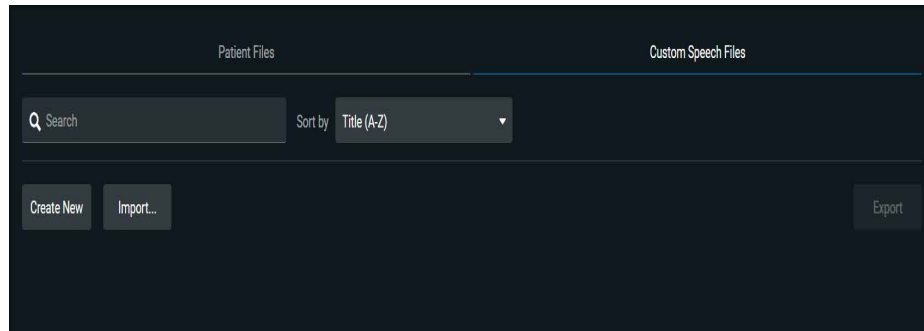
- **License Manager:** Provides access license information. From here, users can activate or deactivate licenses.



**License Manager**



- **Content Library:** Manage patient files or custom speech audio files.
  - Patient Files - See the section *Using the SCE Editor* for details on managing patient files.
  - Custom Speech Audio Files - The user can create new speech files or import existing files, search and sort the files.



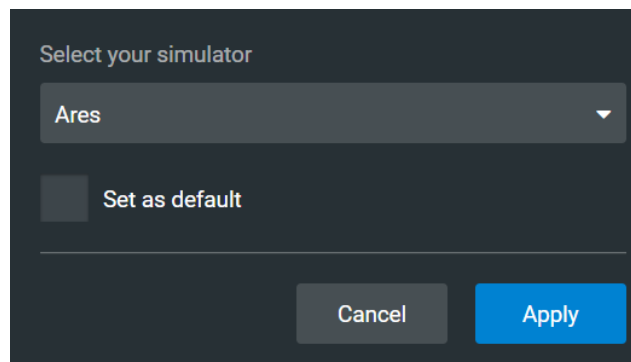
*Custom Speech Files Tab*

## Select a Simulator

Users can select a simulator and set it as the default when using Maestro.

To change the simulator type:

1. From the Home screen, click the **Gear** icon and select **Select Simulator**.



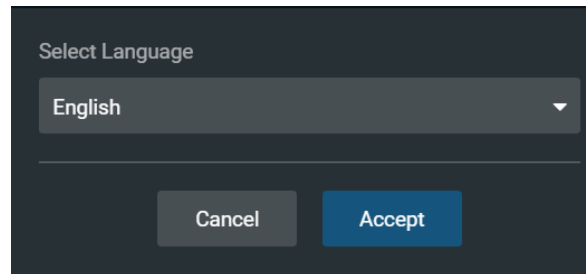
*Select Simulator Screen*

2. (Optional) Select **Set as default**.
3. Click **Apply**.

# Set the Default System Language

To set Maestro's language:

1. From the Home screen, click the **Gear** icon.
2. Select **Language**.



*Select Language Screen*

3. Click on the drop-down list to select the desired language.
4. Click **Accept**.

**Note:** Language can also be set from System > Preferences.

## Additional Administrative Tools

Users can access the CAEMaestro User Guide, support information, or system information.

From the Home screen, click the **Gear** icon, and then select one of the following:

- **User Guide:** a link is provided where a copy of the user guide may be downloaded.
- **Support:** for CAE Support contact information.
- **About:** to access information about the Maestro software version.

## SCE Management

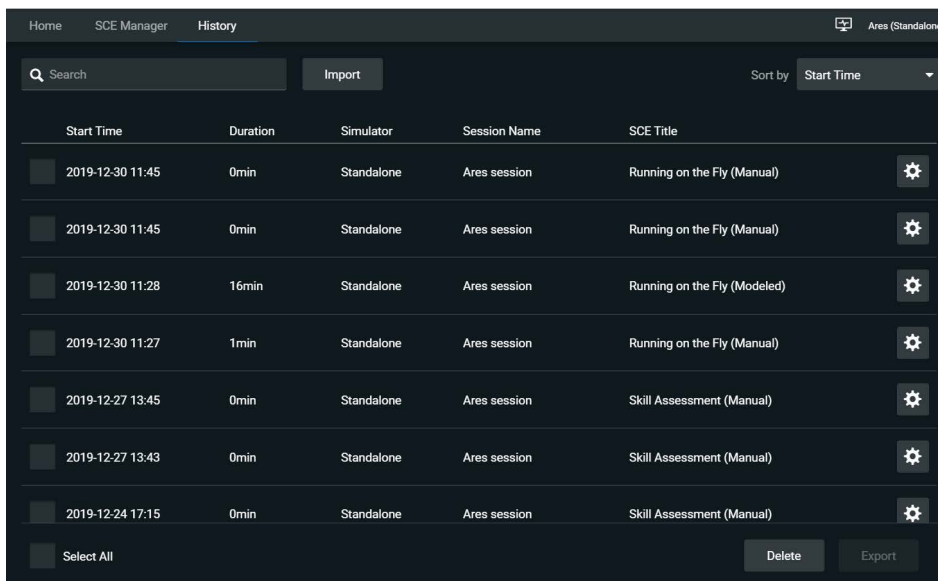
The SCEs in Maestro are managed in the SCE Manager screen. For more information on managing and modifying settings of the SCEs using the SCE Manager, see the *Using Maestro Evolve* section of this user guide.

## Session History

Session histories are retained so that the user may view or export various types of data associated with the simulation.

From the Home screen, select **History**.

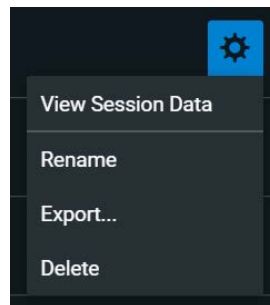
The History screen appears displaying a log of simulation event data.



Start Time	Duration	Simulator	Session Name	SCE Title	
2019-12-30 11:45	0min	Standalone	Ares session	Running on the Fly (Manual)	⚙️
2019-12-30 11:45	0min	Standalone	Ares session	Running on the Fly (Manual)	⚙️
2019-12-30 11:28	16min	Standalone	Ares session	Running on the Fly (Modeled)	⚙️
2019-12-30 11:27	1min	Standalone	Ares session	Running on the Fly (Manual)	⚙️
2019-12-27 13:45	0min	Standalone	Ares session	Skill Assessment (Manual)	⚙️
2019-12-27 13:43	0min	Standalone	Ares session	Skill Assessment (Manual)	⚙️
2019-12-24 17:15	0min	Standalone	Ares session	Skill Assessment (Manual)	⚙️
Select All					Delete Export

*History Screen*

Click the **Gear** icon for the History options menu.

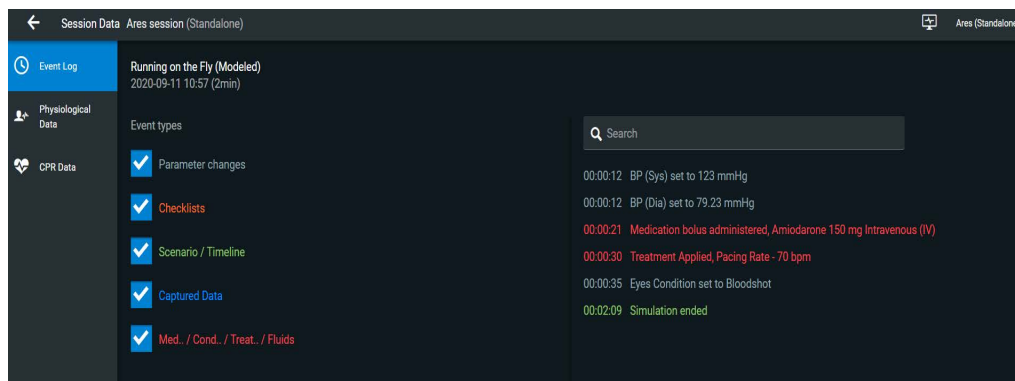


**History Options Menu**

To view session data:

1. Click the **Gear** icon for the desired simulation session.
2. Select **View Session Data**.

The Event Log appears. Click the **Physiological Data** or **CPR Data** tab to view associated data for the SCE.



**Event Log**

Users can also export data to a CSV or MSS file (session file in Maestro format) and store it on an external device. To export data from the History screen:

1. Select the **Gear** icon for the desired simulation session.
2. Select **Export**.

A CSV export will automatically generate Excel spreadsheet files in the user's Downloads folder. A separate worksheet will be created for the events, physiological data, and summary of the session.

THIS PAGE INTENTIONALLY LEFT BLANK

# SHARING MAESTRO EVOLVE WITH LEARNERS

Maestro Evolve provides capabilities for sharing simulated clinical experiences with learners in several ways:

- A planned training event
  - Invite participants in advance
  - Conduct virtual training
- Share simulations of virtual medical equipment
  - Ad-hoc in a classroom setting or virtual training
  - During a planned virtual training event

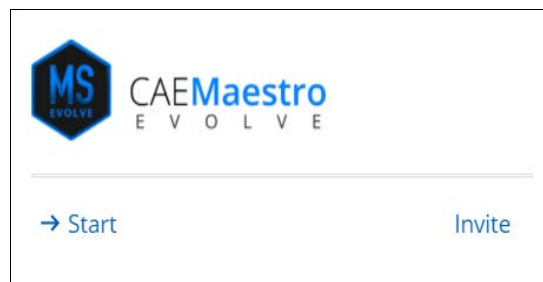
## Planned Training Event

For planned training events, Maestro Evolve provides the capability to invite the participants in advance, and to later conduct the actual training.

### Invite Learners

To invite the learners to a training event:

1. From the CAE Digital Learning Solutions window, on the CAEMaestro Evolve Module Menu, click **Invite**.



**Maestro Evolve Module Menu - Start and Invite**

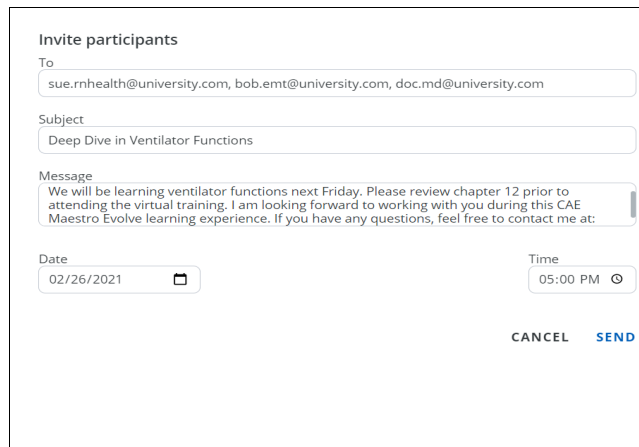
**Note:** In the event Maestro Evolve has previously been started, the following Open, Share, and Stop options will appear on the Maestro Evolve Module Menu.



**Maestro Evolve Module Menu - Open, Share, and Stop**

To return back to the Module Menu that has the Invite option, click **Stop**. Then click **Invite**.

The Invite Participants window appears.



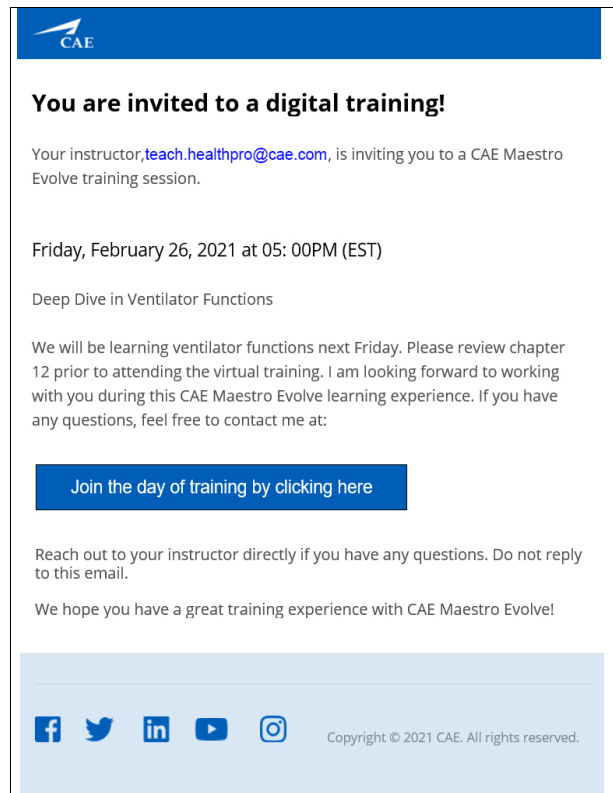
***Invite Participants Window***

2. Complete the information required.
  - Email addresses of participants
  - Subject
  - Date of Training Event
  - Time of Training Event
3. Click **SEND**.



The invited participants will receive an email containing the information specified in Maestro Evolve. Additionally, the email will contain links to the:

- Instructor's email address (or the individual who completed the invitation in Maestro Evolve) and
- Training event



***Invitation Email to Participant***

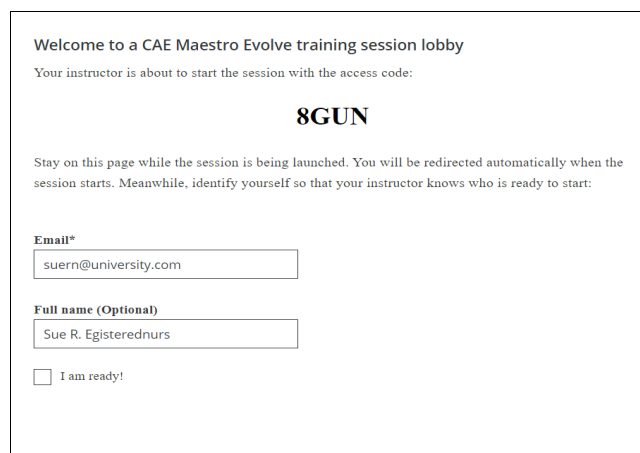
# Conduct Training Event

## *Participant*

On the day of the training, the participant will need to:

1. Open the invitation email sent from the instructor.
2. Click the link to join the training.

The participant will be directed to a “lobby” page displaying a system generated access code.



Welcome to a CAE Maestro Evolve training session lobby  
Your instructor is about to start the session with the access code:

**8GUN**

Stay on this page while the session is being launched. You will be redirected automatically when the session starts. Meanwhile, identify yourself so that your instructor knows who is ready to start:

**Email\***

**Full name (Optional)**

I am ready!

***Training Session Lobby Page***

3. The participant is directed to enter their:
  - Email address and
  - Name
4. Click the **I'm ready** box.

## Instructor

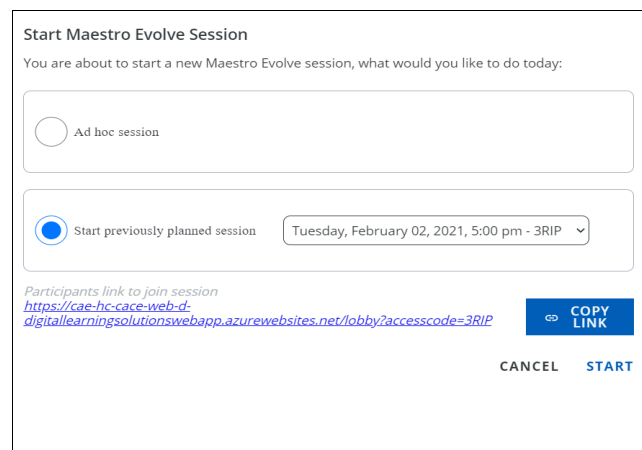
On the day of the training event, when the Instructor logs into Maestro Evolve,

1. From the CAE Digital Learning Solutions window, on the CAEMaestro Evolve Module Menu, click **Start**.



**Maestro Evolve Module Menu - Start and Invite**

The Start Maestro Evolve Session window appears.

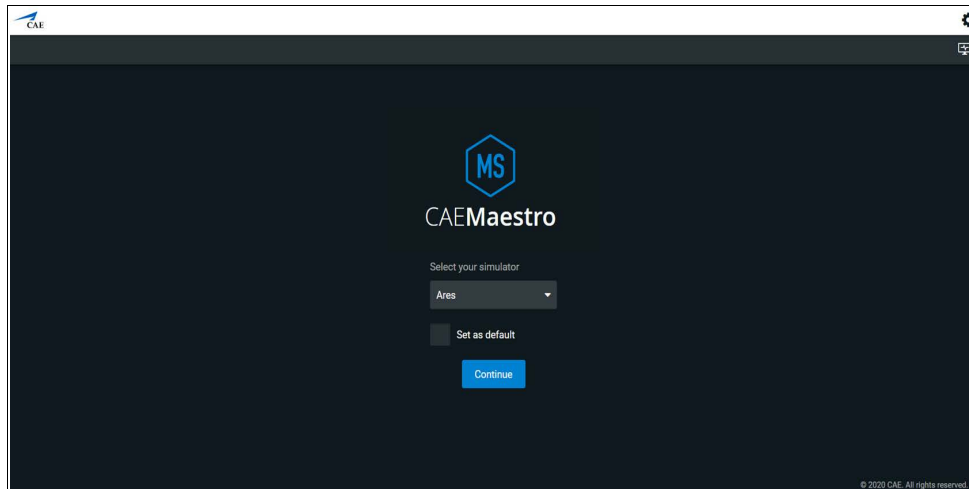


**Start Maestro Evolve Session - Previously Planned**

2. Select **Start previously planned session**.
3. If there is more than one previously planned training session, click on the drop-down list to select the specific date and time for the current training event.
4. For participants that may not have received an invitation, the instructor may select the **COPY LINK** button. This will allow the instructor to paste the link in an email or chat window for sending to the intended participant.
5. Click **START**.

Once the instructor has started the session, participants waiting in the lobby will be directed to the Embody screen.

6. Click **Open**. The Select Simulator window appears.



**Select Simulator Window**

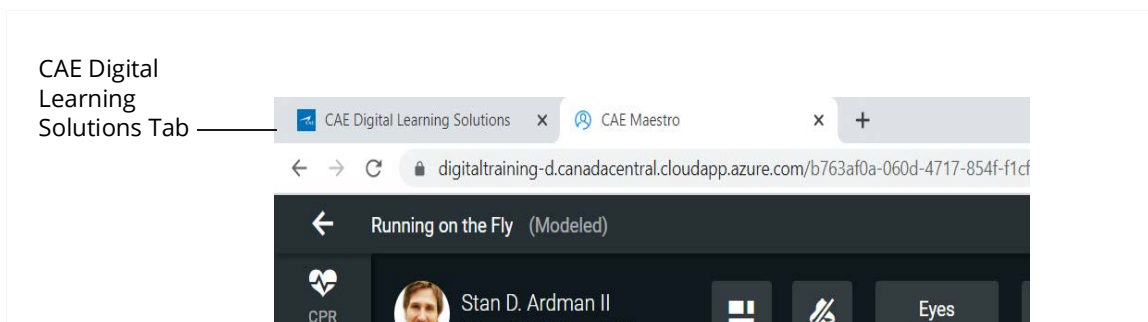
7. Continue with the simulation as planned to meet the learning objectives of the training event.

# Share Virtual Equipment

Maestro Evolve allows the Instructor to share selected components of the simulation experience with learners.

To share virtual equipment with learners:

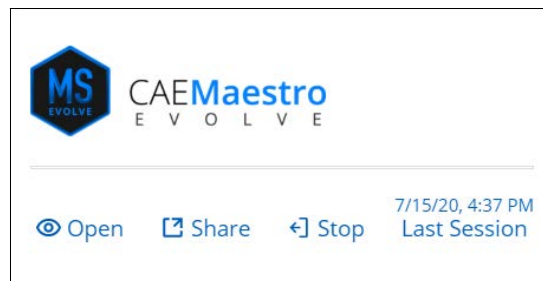
1. If the instructor has not begun a simulation, login to Maestro Evolve. Begin the simulation, setting appropriate parameters.
2. Keep the Maestro Evolve window open. At the top of the browser window, select the **CAE Digital Learning Solutions** tab.



**Browser Window Tabs**

The CAE Learning Digital Solutions page appears.

3. From the Maestro Evolve Module Menu on the CAE Digital Learning Solutions page, select **Share**.



**Maestro Evolve Module Menu - Open, Share, and Stop**

The Share Link to Maestro Evolve window appears.

Share link to Maestro Evolve

**Access Code**

QOQZ	COPY CODE
------	-----------

**Patient Monitor**

https://digitaltraining-q.canadace	COPY LINK
------------------------------------	-----------

**Defibrillator**

https://digitaltraining-q.canadace	COPY LINK
------------------------------------	-----------

**AED**

https://digitaltraining-q.canadace	COPY LINK
------------------------------------	-----------

**Ventilator**

https://digitaltraining-q.canadace	COPY LINK
------------------------------------	-----------

**Embody**

https://cae-hc-cae-web-q-embod	COPY LINK
--------------------------------	-----------

**Transport Ventilator**

https://digitaltraining-q.canadace	COPY LINK
------------------------------------	-----------

**Anesthesia Machine**

https://digitaltraining-q.canadace	COPY LINK
------------------------------------	-----------

*Share the following links with your students so they can view patient status*

CANCEL    DONE

### **Share Link to Maestro Evolve**

4. Select the virtual learning application to be shared with the learner(s). For example, Defibrillator or Ventilator.
5. Click the **COPY LINK** button associated with the selected virtual equipment.
6. Click **DONE**.
7. Paste the link into an application which would allow for communication with the student. Some examples are:
  - Email
  - Chat window

**Note:** This can be done by positioning the cursor in the application of choice and using the keyboard shortcut **CTRL+V**.

8. When the learner clicks the link, the application associated with the selected virtual equipment will launch, with the characteristics of the simulation in progress. The learner may then interact with the simulation from their device.

THIS PAGE INTENTIONALLY LEFT BLANK

# APPENDIX A - FAQ

This Frequently Asked Questions (FAQ) section addresses some common concerns and inquiries. For any questions not addressed here, please contact CAE Healthcare Customer Service. Contact information is provided on the last page of this guide.

## Maestro Evolve

**Q: When attempting to Sign In, I enter the code sent to me via email and a verification failed error appears.**

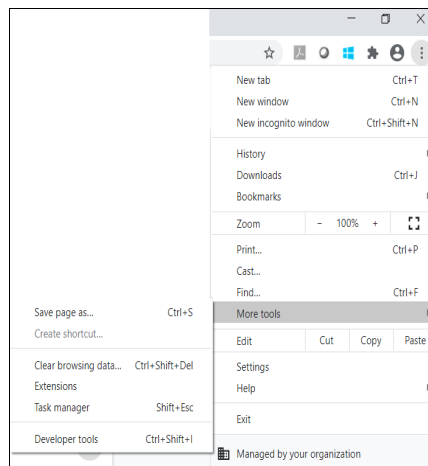
**A:** At the Enter Verification Code prompt window, click the **Send New Code** button. An email will be sent with a unique code.

1. Open the new email.
2. Retry signing in by entering the new code at the Sign In window.

**Q: I am able to sign in and launch Maestro, but I am receiving a *Bad Gateway* error message when attempting to launch one or more of the virtual applications.**

**A:** Close the browser window, relaunch the browser, and clear the data cache. For example, using Google Chrome:

1. Select the menu options from the top-right corner of the Google Chrome window.
2. Select **More Tools > Clear Browsing Data**.

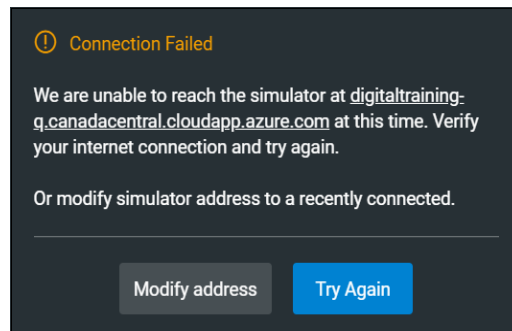


**Google Chrome More Tools**

3. Select the **Clear Data** button.
4. Retry signing in and launching the virtual application.



**Q:** I received a Connection Failed error message.



**Connection Failed Error Message**

**A:** Check the Internet connection and sign in again to Maestro Evolve.

# Ventilator

**Q: I am able to launch the Ventilator application. However, the screen is blank.**

**A:** Confirm that the Ventilator power is enabled in Equipment options.

**Q: I am able to launch the Ventilator application. However, I'm not seeing the data as expected.**

**A:** Confirm that the probes are enabled and the ventilator is connected to the patient.

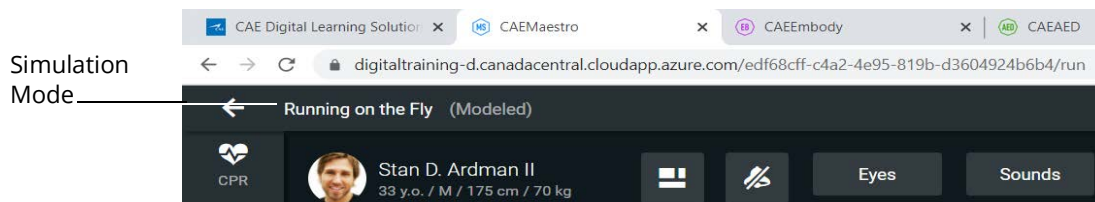
1. From the SCE Run screen, select the Equipment icon from the left control panel.
2. On the Ventilator Equipment parameters panel, enable probes and power.

**Q: I am able to sign in and launch Maestro, but I am unable to see many of the controls that are referred to the guide.**

**A:** It may be necessary to resize your browser window.

**Q: I am able to launch the Ventilator application. However, when I click on the power button, the screen is blank and nothing happens.**

**A:** Confirm that Maestro is running in the modeled mode. In the top left of the SCE Run screen, the Simulation Mode will be identified.



**Running on the Fly in Modeled Mode**

If modeled mode is not indicated, restart the simulation:

1. Close all open windows and exit Maestro Evolve.
2. Relaunch Maestro.
3. Select **Run On The Fly (Modeled)** from the Maestro Home screen.

**Q: I have started a simulation but CAEVentilator, CAETransportVentilator, or CAEAnesthesiaMachine are not available options on the Maestro Application drop-down menu.**

**A:** All ventilation equipment requires Maestro running in Modeled Mode. Verify that the simulation mode identified in the top left of the SCE Run screen is **Run On The Fly (Modeled)**.

## Embody

**Q: I do not see the Embody option on the Maestro application drop-down menu. How do I launch Embody?**

**A:** Embody is now launched from the Share Link options. See the section of this guide *Launch the Virtual Simulator* for more information.

# Hardware Questions

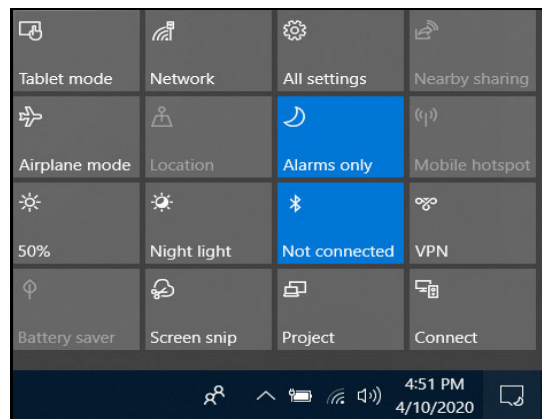
**Q: Can I connect multiple monitors to the system?**

**A:** Yes, using multiple monitors is optional.

When a secondary monitor is connected, the software defaults to dual monitor configuration. If the dual monitor software is not set up, both monitors have the same image.

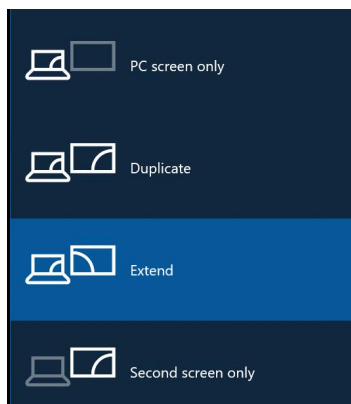
To configure the monitors.

1. Click the Windows Notification button on the bottom right hand corner of the monitor.
2. Click on **Project**. If you do not see the Project option, click **Expand** to view more options.



**Windows Notifications and Settings**

3. Click on **Extend**.



**Projection Options**

THIS PAGE INTENTIONALLY LEFT BLANK

# APPENDIX B- DEFIBRILLATOR CONTROLS AND DISPLAY OPTIONS

Available controls will vary based on the user’s role. The following tables provide the available selections and defaults (when applicable) for:

- Facilitator Controls
- Learner Controls
- Learner Parameters Displayed
- Associated Maestro Preferences

## Facilitator Controls

Defibrillator Facilitator Controls		
Parameter	Available Selections	Default
<b>ECG Cables</b>	None ECG 3 Lead ECG 12 Lead	None
<b>ECG Placement</b>	Correct Incorrect	Correct
<b>Therapy Pads Reversal (Available in AED Mode)</b>	On /Off	Off
<b>Therapy Pads (Available in AED Mode)</b>	On /Off	Off
<b>Pulse Oximeter SpO<sub>2</sub> (Plethysmograph)</b>	On /Off	Off
<b>NIBP Cuff</b>	On /Off	Off
<b>ABP Catheter</b>	On /Off	Off
<b>CO<sub>2</sub> Sample Line</b>	On /Off	Off
<b>Temperature Probe</b>	On /Off	Off
<b>Learner Layout Selection</b>	Generic Defibrillator	Generic Defibrillator
<b>Metronome Rate (Available in AED mode)</b>	100-120 beats per min.	100 beats per min.
<b>Power</b>	On /Off	Off
<b>Energy Select</b>	2-360 J	200 J

Defibrillator Facilitator Controls		
Parameter	Available Selections	Default
Pacing Rate	40-170 beats per min.	60 beats per min.
Pacing Current	0-200 mA	0 mA
AED Mode Metronome (Available in AED Mode)	On/Off	On
AED Mode Metronome C:V Ratio	30:2 15:2	30:2
Voice Instructions (Available in AED Mode)	On/Off	On

# Learner Controls

Defibrillator Learner Controls		
Parameter	Available Selections/Action	Default
<b>Power</b>	On/Off	Off
<b>Analyze</b>	Activates automated external defibrillator (AED) mode/analyzing status.	N/A
<b>Manual Mode</b>	Exits AED mode if analyze button is pressed.	N/A
<b>Energy Select</b>	2-360 J	200 J
<b>Charge</b>	Charges defibrillator to selected energy level.	N/A
<b>Shock</b>	Administers shock.	N/A
<b>Disarm</b>	Disarms energy for shock.	N/A
<b>Sync</b>	On/Off	Off
<b>Pacer</b>	On/Off	Off
<b>Pause Pacer</b>	On (Requires Hold) Off (Hold Released)	N/A
<b>Pacing Rate</b>	40-170 ppm	60 ppm
<b>Pacing Current</b>	0-200 mA	0 MA
<b>NIBP</b>	Manual 1 minute 2 minutes 3 minutes 5 minutes 10 minutes 15 minutes 30 minutes 60 minutes	Manual
<b>12-lead</b>	12-lead report generated	N/A
<b>Up</b>	Navigation button	N/A
<b>Down</b>	Navigation button	N/A



Defibrillator Learner Controls		
Parameter	Available Selections/Action	Default
<b>Back</b>	Navigation button	N/A
<b>Confirm</b>	Navigation button	N/A
<b>Scale</b>	Adjustment of scale level for waveforms.	N/A
<b>Color</b>	Adjustment of color for vitals.	N/A
<b>Layout</b>	Adjustment of display layout of the vitals.	N/A
<b>CPR</b>	Off 30:2 15:2	Off
<b>Alarms</b>	Off On Suspend for 20 seconds Suspend for 1 minute Suspend for 2 minutes Suspend for 5 minutes	On
<b>Alarm Level</b>	Available for each vital with an alarm.	
<b>Alarm Sound</b>	On/Off	On
<b>HR/PR Detection Sound</b>	On/Off	Off
<b>Display Lock</b>	Locked/Unlocked	Unlocked

# Learner Display

Defibrillator Learner Display	
Parameter	Values
Temperature	24.8-45.2 °C
Pulse Rate (PR) from SpO <sub>2</sub>	25-240 bpm
SpO <sub>2</sub>	0-100%
NIBP	Systolic: 30-255 mmHg Diastolic: 15-220 mmHg Mean: 20-235 mmHg
Pulse Rate (PR) from NIBP	30-240 bpm
ABP	Systolic: 0-300 mmHg Diastolic: 0-300 mmHg Mean: 0-300 mmHg
Pulse Rate (PR) from ABP	30-240 bpm
End-tidal CO <sub>2</sub> (EtCO <sub>2</sub> )	0-100 mmHg
Respiration Rate (RR)	0-100 bpm (breaths/min)
Heart Rate (HR) from ECG	20-300 bpm
STJ Level	-10.00-10.00 mm
PR Interval	0.000-1.000 s
QRS Interval	0.000-1.000 s
QT/QTc Interval	0.000-1.000 s
P-QRS-T Axes	-360-360 °
Shocks Delivered	0-50
Gain	1 mV
Speed	25 mm/sec
Status Messages - Active mode, instructions, indications	N/A
Elapsed Time	hh:mm:ss
Current Date and Time	dd/mm/yyyy, hh:mm AM/PM
Battery Status	N/A
Connection Status	N/A
Alarm Indicators	N/A

## Associated Maestro Preferences

Maestro Preferences Associated with Defibrillator		
Parameter	Available Selections	Default
Energy (electrical therapy)	J Ws	J
CO <sub>2</sub>	mmHg kPa %	mmHg

# APPENDIX C - AED CONTROLS AND DISPLAY OPTIONS

Available controls will vary based on the user’s role. The following tables provide the available selections and defaults (when applicable) for:

- Facilitator Controls
- Learner Controls
- Learner Parameters Displayed
- Associated Maestro Preferences

## Facilitator Controls

AED Facilitator Controls		
Parameter	Available Selections	Default
Therapy Pads	On /Off	Off
Learner Layout Selection	Generic Defibrillator	Generic Defibrillator
Metronome Rate	100-120 beats per min.	100 beats per min.
Power	On /Off	Off
Energy Select	2-360 J	200 J
Metronome	On/Off	On
Voice Instructions	On/Off	On

## Learner Controls

AED Learner Controls		
Parameter	Available Selections/Action	Default
Power	On/Off	Off
Shock	Administers shock	N/A

## Learner Display

AED Learner Display	
Parameter	Values
Shocks Delivered	0-50
Status Messages - instructions, indications	N/A
Elapsed Time	hh:mm:ss
Current Date and Time	dd/mm/yyyy, hh:mm AM/PM
Battery Status	N/A
Connection Status	N/A
Alarm Indicators	N/A

## Associated Maestro Preferences

Maestro Preferences Associated with AED		
Parameter	Available Selections	Default
Energy (electrical therapy)	J Ws	J

# APPENDIX D - VENTILATOR CONTROLS AND DISPLAY OPTIONS

Available controls will vary based on the user’s role and the equipment that is used (e.g. not all controls are available when using the Transport Ventilator that may be available in the Ventilator). The following tables provide selections and defaults (when applicable) for:

- Facilitator Controls
- Learner Controls
- Learner Parameters Displayed
- Learner Display Options
- Associated Maestro Preferences

## Facilitator Controls

Ventilator Facilitator Controls		
Parameter	Selections	Default
Breathing Circuit	On /Off	Off
Pulse Oximeter SpO <sub>2</sub> - Plethysmograph	On /Off	Off
CO <sub>2</sub> Attachment - Capnograph	On /Off	Off
Edi Catheter	On /Off	Off
Breathing Circuit Disconnect	On /Off	Off
Leak	0-100%	0%
NAVA Mode - Neurally Adjusted Ventilatory Assist Mode	Enabled/Disabled	Disabled
Power	On /Off	Off
Pi - Inspiratory Pressure	0-80 cmH <sub>2</sub> O	20 cmH <sub>2</sub> O
Pi Backup	0-80 cmH <sub>2</sub> O	20 cmH <sub>2</sub> O
ΔP <sub>supp</sub> - Support Pressure	0-80 cmH <sub>2</sub> O	20 cmH <sub>2</sub> O
PEEP - Positive End Expiratory Pressure	0-50 cmH <sub>2</sub> O	5 cmH <sub>2</sub> O
End Inspiration - Percent of Peak Flow	0-70%	30%
Flow Trigger	0.2-20.0 L/min	3 L/min
VT - Tidal Volume	100-4000 ml	500 ml

Ventilator Facilitator Controls		
Parameter	Selections	Default
VT Backup	100-4000 ml	500 ml
FiO <sub>2</sub> - Oxygen Concentration of the Delivered Gas	0-100%	40%
Tpause - Pause Time	0.0-1.5 seconds	0s
I:E Inspiratory time:expiratory time ratio	1.0:1.0 to 1.0:4.0 (I:E)	1:2
I:E Inspiratory time:expiratory time ratio backup	1.0:1.0 to 1.0:4.0 (I:E)	1:2
Ti - Inspiratory Time (non-functional)	0.1-5.0 seconds	N/A
Ti Backup (non-functional)	0.1-5.0 seconds	N/A
RR - Respiratory Rate	4-150 breaths per minute	15 breaths per min.
RR Backup	4-150 breaths per minute	15 breaths per min
Ti rise - Inspiratory Rise Time	0.1-0.4 seconds	0.2s
Ta - Apnea Time	15-45 seconds	20s
Edi Trigger (Depends on if NAVA mode is enabled or disabled)	0.1-2.0 $\mu$ V	0.5 $\mu$ V
NAVA Level (Depends on if NAVA mode is enabled or disabled)	0-15 cmH <sub>2</sub> O/ $\mu$ V	0.5 cmH <sub>2</sub> O/ $\mu$ V
Type of Ventilation	Invasive Non-invasive	Invasive
Ventilation Mode	<ul style="list-style-type: none"> <li>• Volume-controlled Ventilation (VCV)</li> <li>• Pressure-controlled Ventilation (PCV)</li> <li>• Continuous Positive Airway Pressure + Pressure Support (CPAP+PS)</li> <li>• Volume Support Ventilation (VSV)</li> <li>• Neurally Adjusted Ventilatory Assist (NAVA)</li> <li>• Synchronized Intermittent-Mandatory Ventilation Volume Control (SIMV VC)</li> </ul>	Volume-controlled Ventilation (VCV)

Ventilator Facilitator Controls		
Parameter	Selections	Default
Ventilation Status	Start Standby	Standby



# Learner Controls

Ventilator Learner Controls		
Parameter	Selections	Default
Pi - Inspiratory Pressure	0-80 cmH <sub>2</sub> O	20 cmH <sub>2</sub> O
Pi Backup	0-80 cmH <sub>2</sub> O	20 cmH <sub>2</sub> O
ΔPsupp - Support Pressure	0-80 cmH <sub>2</sub> O	20 cmH <sub>2</sub> O
PEEP - Positive end-expiratory Pressure	0-50 cmH <sub>2</sub> O	5 cmH <sub>2</sub> O
End Inspiration - Percent of Peak Flow	0-70%	30%
Flow Trigger	0.2-20.0 L/min	3.0 L/min
VT - Tidal Volume	100-1500ml	500 ml
VT Backup	100-1500 ml	500 ml
FiO <sub>2</sub> - Oxygen Concentration of the Delivered Gas	21-100%	40%
Tpause- Pause Time	0.0-1.5 seconds	0s
Inspiratory Hold	Input Control	N/A
Expiratory Hold	Input Control	N/A
I:E Inspiratory time:expiratory time ratio	1.0:1.0 to 1.0:4.0 (I:E)	1:2
I:E Inspiratory time:expiratory time ratio backup	1.0:1.0 to 1.0:4.0 (I:E)	1:2
Ti rise - Inspiratory Rise Time	0.1-0.4 seconds	0.2s
Tapnea - Apnea Time	15-45 seconds	20s
Edi Trigger (Depends on if NAVA mode is enabled or disabled)	0.1-2.0 μV	0.5 μV
NAVA Level (Depends on if NAVA mode is enabled or disabled)	0-15 cmH <sub>2</sub> O/μV	0.5 cmH <sub>2</sub> O/μV
Type of Ventilation	Invasive Non-invasive	Invasive

Ventilator Learner Controls		
Parameter	Selections	Default
<b>Ventilation Mode</b>	<ul style="list-style-type: none"> <li>• Volume-controlled Ventilation (VCV)</li> <li>• Pressure-controlled Ventilation (PCV)</li> <li>• Continuous Positive Airway Pressure + Pressure Support (CPAP+PS)</li> <li>• Volume Support Ventilation (VSV)</li> <li>• Neurally Adjusted Ventilatory Assist (NAVA)</li> <li>• Synchronized Intermittent-Mandatory Ventilation Volume Control (SIMV VC)</li> </ul>	Volume-controlled Ventilation (VCV)
<b>Ventilation Setup</b>	Setup options will vary depending upon the ventilation mode selected.	N/A
<b>Ventilation Status</b>	Start Standby	Standby
<b>Power</b>	On/Off	On
<b>Display Lock/Unlock</b>	Locked/Unlocked	Unlocked
<b>Navigation Dial and Select</b>	Navigate and select the highlighted option.	N/A
<b>Scale</b>	Adjustment of scale level for vital signs.	N/A
<b>Layout</b>	Adjustment of display layout of the vital signs.	N/A
<b>Alarms Silencer</b>	Silences all alarms for 2 minutes.	N/A
<b>Alarm Level</b>	Available for indicated vital signs.	N/A
<b>Alarm Sound (Silences for 2 minutes)</b>	On/Off	On

## Learner Parameters Displayed

Ventilator Learner Display	
Parameter	Values
<b>Pmean - Mean airway pressure</b>	-20-200 cmH <sub>2</sub> O
<b>Ppeak - Peak airway pressure</b>	-20-200 cmH <sub>2</sub> O
<b>Pplateau</b>	-20-200 cmH <sub>2</sub> O
<b>PEEP - Positive end-expiratory Pressure</b>	-20-200 cmH <sub>2</sub> O
<b>Pi - Inspiratory Pressure (waveform value)</b>	-20-200 cmH <sub>2</sub> O
<b>Insp Flow - Peak Inspiratory Flow</b>	-400-400 L/min
<b>Exp Flow - Peak Expiratory Flow</b>	-400-400 L/min
<b>Flow Trig</b>	0.2 -20.0
<b>MVe - Expiratory Minute Volume</b>	0-100 L/min
<b>MVi - Inspiratory Minute Volume</b>	0-100 L/min
<b>MV - Minute Volume</b>	0-100 L/min
<b>MVspont - Spontaneous Expiratory Minute Volume</b>	0-100 L/min
<b>VT<sub>e</sub> - Expiratory Tidal Volume</b>	0-6000 ml
<b>VT<sub>i</sub> - Inspiratory Tidal Volume</b>	0-6000 ml
<b>Leak - Leakage percent</b>	0-100%
<b>VT - Tidal Volume</b>	0-6000 ml
<b>FiO<sub>2</sub> - Oxygen Concentration of the Delivered Gas</b>	0-100%
<b>RR<sub>sp</sub> - Spontaneous Respiratory Rate</b>	0-150 breaths per minute
<b>Te - Expiratory Time</b>	0.10-0.80 seconds
<b>I:E - Inspiratory:Expiratory Ratio</b>	1.0:600 to 150:1.0 (I:E)
<b>T<sub>pause</sub> - Pause Time</b>	0.0-1.5 seconds
<b>Ti - Inspiratory Time</b>	0.2-10.0 seconds
<b>RR - Respiratory Rate</b>	0-150 breaths per minute
<b>Ti rise - Inspiratory Rise Time</b>	0.0-0.4 seconds
<b>C<sub>stat</sub> - Static Compliance</b>	0-500 ml/ cmH <sub>2</sub> O
<b>C<sub>dyn</sub> - Dynamic Compliance</b>	0-200 ml/ cmH <sub>2</sub> O

Ventilator Learner Display	
Parameter	Values
Ri - Inspiratory Flow Resistance	0-500 cmH <sub>2</sub> O/(L/s)
Re - Expiratory Flow Resistance	0-500 cmH <sub>2</sub> O/(L/s)
RSB - Rapid Shallow Breathing Index	0.1-600.0 1/(L*min)
RCE- Expiratory Time Constant	0-3 seconds
RCi - Inspiratory Time Constant	0-3 seconds
EtCO <sub>2</sub> - End Tidal CO <sub>2</sub>	0-100 mmHg
VeCO <sub>2</sub> - Exhaled CO <sub>2</sub> Volume	0-1000 ml
ViCO <sub>2</sub> - Inspired CO <sub>2</sub> Volume	0-1000 ml
RREtCO <sub>2</sub> - Respiratory Rate From EtCO <sub>2</sub>	0-100 breaths per minute
SpO <sub>2</sub> - Oxygen Saturation	0-100%
PRSpO <sub>2</sub> - Pulse rate from SpO <sub>2</sub> probe	0-275 beats per minute
Edipeak	0-50 μV
Edimin	0-50 μV
Pressure Waveform	-20 to 200 cmH <sub>2</sub> O
Flow Waveform	-400 to 400 L/min
Volume Waveform	0 to 6000 ml
Pressure Volume Loop	-20 to 200 cmH <sub>2</sub> O and 0 to 6000 ml
Flow Pressure Loop	-400 to 400 L/min and -20 to 200 cmH <sub>2</sub> O
Volume Flow Loop	0 to 6000 ml and -400 to 400 L/min
Edi Waveform	0-50 μV
SpO <sub>2</sub> (Plethysmograph) Waveform	0-100%
CO <sub>2</sub> (Capnograph) Waveform	0-100%
Status Messages Area - Alarms, Stand-by or Active, Ventilation Details, Patient Information	N/A
Alarm Indicators	N/A
Trigger Indicators - Flow and Edi Waveform Trigger Indicators	N/A
Current Date and Time	N/A
Battery Status	N/A

Ventilator Learner Display	
Parameter	Values
Connection Status	N/A

## Learner Display Options

Ventilator Display Option	Selections
Waves and Numerics	3 Waveforms and 8 Numerics
Loop Graph, Waves and Numerics	3 Loops and 2 Waveforms and 8 Numerics
All Numerics	35 Numerics
Waves and Numerics	4 Waveforms and 8 Numerics

## Associated Maestro Preferences

Maestro Preferences Associated with Ventilator		
Parameter	Selections	Default
Airway Pressure	cmH <sub>2</sub> O mBar	cmH <sub>2</sub> O
CO <sub>2</sub>	mmHg kPa %	mmHg

# APPENDIX E - TRANSPORT VENTILATOR CONTROLS AND DISPLAY OPTIONS

Available controls will vary based on the user's role and the equipment that is used (e.g. not all controls are available when using the Transport Ventilator that may be available in the Ventilator). The following tables provide selections and defaults (when applicable) for:

- Facilitator Controls
- Learner Controls
- Learner Parameters Displayed
- Learner Display Options
- Associated Maestro Preferences

## Facilitator Controls

Transport Ventilator Facilitator Controls		
Parameter	Selections	Default
Breathing Circuit	On /Off	Off
Pulse Oximeter SpO <sub>2</sub> - Plethysmograph	On /Off	Off
CO <sub>2</sub> Attachment - Capnograph	On /Off	Off
Breathing Circuit Disconnect	On /Off	Off
Leak	0-100%	0%
Power	On /Off	Off
Pi - Inspiratory Pressure	0-80cmH <sub>2</sub> O	20 cmH <sub>2</sub> O
Pi Backup	0-80cmH <sub>2</sub> O	20 cmH <sub>2</sub> O
ΔPsupp - Support Pressure	0-80cmH <sub>2</sub> O	20 cmH <sub>2</sub> O
PEEP - Positive End Expiratory Pressure	0-50 cmH <sub>2</sub> O	5 cmH <sub>2</sub> O
End Inspiration - Percent of Peak Flow	0-70%	30%
Flow Trigger	0.2-20.0 L/min	3 L/min
VT - Tidal Volume	100-1500 ml	500 ml
VT Backup	100-1500 ml	500 ml
FiO <sub>2</sub> - Oxygen Concentration of the Delivered Gas	0-100%	40%

## Appendix E - Transport Ventilator Controls CAEMaestro Evolve

Transport Ventilator Facilitator Controls		
Parameter	Selections	Default
<b>Tpause - Pause Time</b>	0.0-1.5 seconds	0s
<b>I:E Inspiratory time:expiratory time ratio</b>	1.0:1.0 to 1.0:4.0 (I:E)	1:2
<b>I:E Inspiratory time:expiratory time ratio backup</b>	1.0:1.0 to 1.0:4.0 (I:E)	1:2
<b>RR - Respiratory Rate</b>	4-150 breaths per minute	15 breaths per min.
<b>RR Backup</b>	4-150 breaths per minute	15 breaths per min
<b>Ti rise - Inspiratory Rise Time</b>	0.1-0.4 seconds	0.2s
<b>Ta - Apnea Time</b>	15-45 seconds	20s
<b>Type of Ventilation</b>	Invasive Non-invasive	Invasive
<b>Ventilation Mode</b>	<ul style="list-style-type: none"> <li>• Volume-controlled Ventilation (VCV)</li> <li>• Pressure-controlled Ventilation (PCV)</li> <li>• Continuous Positive Airway Pressure + Pressure Support (CPAP + PS)</li> <li>• Volume Support Ventilation (VSV)</li> <li>• Neurally Adjusted Ventilatory Assist (NAVA)</li> <li>• Synchronized Intermittent-Mandatory Ventilation Volume Control (SIMV VC)</li> </ul>	Volume-controlled Ventilation (VCV)
<b>Ventilation Status</b>	Start Standby	Standby

# Learner Controls

Transport Ventilator Learner Controls		
Parameter	Selections	Default
<b>Pi - Inspiratory Pressure</b>	0-80cmH <sub>2</sub> O	20 cmH <sub>2</sub> O
<b>Pi Backup</b>	0-80cmH <sub>2</sub> O	20 cmH <sub>2</sub> O
<b>ΔPsupp - Support Pressure</b>	0-80cmH <sub>2</sub> O	20 cmH <sub>2</sub> O
<b>PEEP - Positive end-expiratory Pressure</b>	0-50 cmH <sub>2</sub> O	5 cmH <sub>2</sub> O
<b>End Inspiration - Percent of Peak Flow</b>	0-70%	30%
<b>Flow Trigger</b>	0.2-20.0 L/min	3.0 L/min
<b>VT - Tidal Volume</b>	100-1500 ml	500 ml
<b>VT Backup</b>	100-1500 ml	500 ml
<b>FiO<sub>2</sub> - Oxygen Concentration of the Delivered Gas</b>	21-100%	40%
<b>Tpause- Pause Time</b>	0.0-1.5 seconds	0s
<b>I:E Inspiratory time:expiratory time ratio</b>	1.0:1.0 to 1.0:4.0 (I:E)	1:2
<b>I:E Inspiratory time:expiratory time ratio backup</b>	1.0:1.0 to 1.0:4.0 (I:E)	1:2
<b>Ti rise - Inspiratory Rise Time</b>	0.1-0.4 seconds	0.2s
<b>Tapnea - Apnea Time</b>	15-45 seconds	20s
<b>Type of Ventilation</b>	Invasive Non-invasive	Invasive



## Appendix E - Transport Ventilator Controls CAEMaestro Evolve

Transport Ventilator Learner Controls		
Parameter	Selections	Default
<b>Ventilation Mode</b>	<ul style="list-style-type: none"> <li>• Volume-controlled Ventilation (VCV)</li> <li>• Pressure-controlled Ventilation (PCV)</li> <li>• Continuous Positive Airway Pressure + Pressure Support (CPAP + PS)</li> <li>• Volume Support Ventilation (VSV)</li> <li>• Neurally Adjusted Ventilatory Assist (NAVA)</li> <li>• Synchronized Intermittent-Mandatory Ventilation Volume Control (SIMV VC)</li> </ul>	Volume-controlled Ventilation (VCV)
<b>Ventilation Setup</b>	Setup options will vary depending upon the ventilation mode selected.	N/A
<b>Ventilation Status</b>	Start Standby	Standby
<b>Power</b>	On/Off	On
<b>Display Lock/Unlock</b>	Locked/Unlocked	Unlocked
<b>Navigation Dial and Select</b>	Navigate and select the highlighted option.	N/A
<b>Scale</b>	Adjustment of scale level for vital signs.	N/A
<b>Layout</b>	Adjustment of display layout of the vital signs.	N/A
<b>Alarms Silencer</b>	Silences all alarms for 2 minutes.	N/A
<b>Alarm Level</b>	Available for each vital sign.	N/A
<b>Alarm Sound (Silences for 2 minutes)</b>	On/Off	On

# Learner Parameters Displayed

Transport Ventilator Learner Display	
Parameter	Values
<b>Pmean - Mean airway pressure</b>	-20-200 cmH <sub>2</sub> O
<b>Ppeak - Peak airway pressure</b>	-20-200 cmH <sub>2</sub> O
<b>PEEP - Positive end-expiratory Pressure</b>	-20-200 cmH <sub>2</sub> O
<b>Insp Flow - Peak Inspiratory Flow</b>	-400-400 L/min
<b>Exp Flow - Peak Expiratory Flow</b>	-400-400 L/min
<b>MVe - Expiratory Minute Volume</b>	0-100 L/min
<b>MVi - Inspiratory Minute Volume</b>	0-100 L/min
<b>MV - Minute Volume</b>	0-100 L/min
<b>VT<sub>e</sub> - Expiratory Tidal Volume</b>	0-6000 ml
<b>VT<sub>i</sub> - Inspiratory Tidal Volume</b>	0-6000 ml
<b>Leak - Leakage percent</b>	0-100%
<b>VT - Tidal Volume</b>	0-6000 ml
<b>FiO<sub>2</sub> - Oxygen Concentration of the Delivered Gas</b>	0-100%
<b>Te - Expiratory Time</b>	0.10-0.80 seconds
<b>I:E - Inspiratory:Expiratory Ratio</b>	1.0:600 to 150:1.0 (I:E)
<b>T<sub>pause</sub> - Pause Time</b>	0.0-1.5 seconds
<b>Ti - Inspiratory Time</b>	0.2-10.0 seconds
<b>RR- Respiratory Rate</b>	0-150 breaths per minute
<b>Ti rise - Inspiratory Rise Time</b>	0.0-0.4 seconds
<b>EtCO<sub>2</sub> - End Tidal CO<sub>2</sub></b>	0-100 mmHg
<b>RREtCO<sub>2</sub> - Respiratory Rate From EtCO<sub>2</sub></b>	0-100 breaths per minute
<b>SpO<sub>2</sub> - Oxygen Saturation</b>	0-100%
<b>PRSpO<sub>2</sub> - Pulse rate from SpO<sub>2</sub> probe</b>	0-275 beats per minute
<b>Pressure Waveform</b>	-20 to 200 cmH <sub>2</sub> O
<b>Flow Waveform</b>	-400 to 400 L/min
<b>Volume Waveform</b>	0-6000 ml

## Appendix E - Transport Ventilator Controls CAEMaestro Evolve

Transport Ventilator Learner Display	
Parameter	Values
Pressure Volume Loop	-20 to 200 cmH <sub>2</sub> O to 0-6000 ml
Pressure Flow Loop	-20 to 200 cmH <sub>2</sub> O to -400 to 400 L/min
Volume Flow Loop	0-6000 ml to -400 to 400 L/min
SpO <sub>2</sub> (Plethysmograph) Waveform	0-100%
CO <sub>2</sub> (Capnograph) Waveform	0-100%
Status Messages Area - Alarms, Stand-by or Active, Ventilation Details, Patient Information	N/A
Alarm Indicators	N/A
Trigger Indicators - Flow and Edi Waveform Trigger Indicators	N/A
Current Date and Time	N/A
Battery Status	N/A
Connection Status	N/A

## Learner Display Options

Transport Ventilator Display Option	Selections
Waves and Numerics	2 Waveforms and 6 Numerics
Loop Graph and Numerics	2 Loops and 6 Numerics
All Numerics	23 Numerics

## Associated Maestro Preferences

Maestro Preferences Associated with Transport Ventilator		
Parameter	Selections	Default
Airway Pressure	cmH <sub>2</sub> O mBar	cmH <sub>2</sub> O
CO <sub>2</sub>	mmHg kPa %	mmHg

# APPENDIX F - ANESTHESIA MACHINE CONTROLS AND DISPLAY

Available controls will vary based on the user’s role and the equipment that is used (e.g. not all controls are available when using the Transport Ventilator that may be available in the Ventilator). The following tables provide selections and defaults (when applicable) for:

- Facilitator Controls
- Learner Controls
- Learner Parameters Displayed
- Learner Display Options
- Associated Maestro Preferences

## Facilitator Controls

Anesthesia Machine Facilitator Controls		
Parameter	Selections	Default
Breathing Circuit	On /Off	Off
Pulse Oximeter SpO <sub>2</sub> - Plethysmograph	On /Off	Off
CO <sub>2</sub> Attachment - Capnograph	On /Off	Off
Breathing Circuit Disconnect	On /Off	Off
Leak	0-100%	0%
Power	On /Off	Off
Pi - Inspiratory Pressure	0-80 cmH <sub>2</sub> O	20 cmH <sub>2</sub> O
Pi Backup	0-80 cmH <sub>2</sub> O	20 cmH <sub>2</sub> O
ΔPsupp - Support Pressure	0-80 cmH <sub>2</sub> O	20 cmH <sub>2</sub> O
PEEP - Positive End Expiratory Pressure	0-70 cmH <sub>2</sub> O	5 cmH <sub>2</sub> O
End Inspiration - Percent of Peak Flow	0-70%	30%
Flow Trigger	0.2-20.0 L/min	3 L/min
VT - Tidal Volume	100-1500 ml	500 ml
VT Backup	100-1500 ml	500 ml
Tpause - Pause Time	0.0-1.5 seconds	0s
I:E Inspiratory time:expiratory time ratio	1.0:1.0 to 1.0:4.0 (I:E)	1:2

## Appendix F - Anesthesia Machine Controls CAEMaestro Evolve

Anesthesia Machine Facilitator Controls		
Parameter	Selections	Default
<b>I:E Inspiratory time:expiratory time ratio backup</b>	1.0:1.0 to 1.0:4.0 (I:E)	1:2
<b>RR - Respiratory Rate</b>	4-150 breaths per minute	15 breaths per min.
<b>RR Backup</b>	4-150 breaths per minute	15 breaths per min
<b>Ti rise - Inspiratory Rise Time</b>	0.1-0.4 seconds	0.2s
<b>Ta - Apnea Time</b>	15-45 seconds	20s
<b>Type of Ventilation</b>	Invasive Non-invasive	Invasive
<b>Ventilation Mode</b>	<ul style="list-style-type: none"> <li>• Volume-controlled Ventilation (VCV)</li> <li>• Pressure-controlled Ventilation (PCV)</li> <li>• Continuous Positive Airway Pressure + Pressure Support (CPAP+PS)</li> <li>• Volume Support Ventilation (VSV)</li> <li>• Synchronized Intermittent-Mandatory Ventilation Volume Control (SIMV VC)</li> </ul>	Pressure-controlled Ventilation (PCV)
<b>Ventilation Status</b>	Start Standby	Standby
<b>Soda Lime Canister Consumed</b>	On Off	Off
<b>Auxiliary Common Gas Outlet (ACGO) Open</b>	On Off	Off
<b>APL</b>	0-70 cmH <sub>2</sub> O	0 cmH <sub>2</sub> O
<b>O<sub>2</sub> Flow</b>	0.2-15.0 L/min	0.2 L/min
<b>N<sub>2</sub>O Flow</b>	0.0-10.0 L/min	0.0 L/min
<b>Air Flow</b>	0.0-15.0 L/min	0.0 L/min
<b>Volume Percent of Isoflurane</b>	0.0-6.0%	0%
<b>Volume Percent of Sevoflurane</b>	0.0-8.0%	0%

<b>Anesthesia Machine Facilitator Controls</b>		
<b>Parameter</b>	<b>Selections</b>	<b>Default</b>
<b>Volume Percent of Desflurane</b>	0.0-6.0%	0%
<b>Manual Ventilation</b>	On Off	Off

### Learner Controls

Anesthesia Machine Learner Controls		
Parameter	Selections	Default
Pi - Inspiratory Pressure	0-80 cmH <sub>2</sub> O	20 cmH <sub>2</sub> O
Pi Backup	0-80 cmH <sub>2</sub> O	20 cmH <sub>2</sub> O
ΔPsupp - Support Pressure	0-80 cmH <sub>2</sub> O	20 cmH <sub>2</sub> O
PEEP - Positive end-expiratory Pressure	0-70 cmH <sub>2</sub> O	5 cmH <sub>2</sub> O
End Inspiration - Percent of Peak Flow	0-70%	30%
Flow Trigger	0.2-20.0 L/min	3.0 L/min
VT - Tidal Volume	100-4000 ml	500 ml
VT Backup	100-4000 ml	500 ml
FiO <sub>2</sub> - Oxygen Concentration of the Delivered Gas	21-100%	40%
Tpause- Pause Time	0.0-1.5 seconds	0s
Inspiratory Hold (Rebreather Bag)	Input Control	N/A
I:E Inspiratory time:expiratory time ratio	1.0:1.0 to 1.0:4.0 (I:E)	1:2
I:E Inspiratory time:expiratory time ratio backup	1.0:1.0 to 1.0:4.0 (I:E)	1:2
Ti rise - Inspiratory Rise Time	0.1-0.4 seconds	0.2s
Tapnea - Apnea Time	15-45 seconds	20s
Type of Ventilation	Invasive Non-invasive	Invasive
Ventilation Mode	<ul style="list-style-type: none"> <li>• Volume-controlled Ventilation (VCV)</li> <li>• Pressure-controlled Ventilation (PCV)</li> <li>• Continuous Positive Airway Pressure + Pressure Support (CPAP+PS)</li> <li>• Volume Support Ventilation (VSV)</li> <li>• Synchronized Intermittent-Mandatory Ventilation Volume Control (SIMV VC)</li> </ul>	Pressure-controlled Ventilation (PCV)

Anesthesia Machine Learner Controls		
Parameter	Selections	Default
<b>Ventilation Setup</b>	Setup options will vary depending upon the ventilation mode selected.	N/A
<b>Ventilation Status</b>	Start Standby	Standby
<b>Power</b>	On/Off	On
<b>Display Lock/Unlock</b>	Locked/Unlocked	Unlocked
<b>Navigation Dial and Select</b>	Navigate and select the highlighted option.	N/A
<b>Scale</b>	Adjustment of scale level for vital signs.	N/A
<b>Layout</b>	Adjustment of display layout of the vital signs.	N/A
<b>Alarms Silencer</b>	Silences all alarms for 2 minutes.	N/A
<b>Alarm Level</b>	Available for each vital sign.	N/A
<b>Alarm Sound (Silences for 2 minutes)</b>	On/Off	On
<b>Rebreather Bag</b>	Full Squeeze Half Squeeze	N/A
<b>Soda Lime Canister Reveal</b>	On Off	Off
<b>Auxiliary Common Gas Outlet (ACGO) Open</b>	On Off	Off
<b>APL</b>	0-70 cmH <sub>2</sub> O	0 cmH <sub>2</sub> O
<b>O<sub>2</sub> Flow</b>	0.2-15.0 L/min	0.2 L/min
<b>N<sub>2</sub>O Flow</b>	0.0-10.0 L/min	0.0 L/min
<b>Air Flow</b>	0.0-15.0 L/min	0.0 L/min
<b>Volume Percent of Isoflurane</b>	0.0-6.0%	0%
<b>Volume Percent of Sevoflurane</b>	0.0-8.0%	0%
<b>Volume Percent of Desflurane</b>	0.0-6.0%	0%
<b>O<sub>2</sub> +</b>	On Off	Off



## Appendix F - Anesthesia Machine Controls CAEMaestro Evolve

---

Anesthesia Machine Learner Controls		
Parameter	Selections	Default
<b>Manual Ventilation</b>	On Off	Off

# Learner Parameters Displayed

Anesthesia Machine Learner Display	
Parameter	Values
<b>Pmean - Mean airway pressure</b>	-20-200 cmH <sub>2</sub> O
<b>Ppeak - Peak airway pressure</b>	-20-200 cmH <sub>2</sub> O
<b>Pplateau</b>	-20-200 cmH <sub>2</sub> O
<b>PEEP - Positive end-expiratory Pressure</b>	-20-200 cmH <sub>2</sub> O
<b>Insp Flow - Peak Inspiratory Flow</b>	-400-400 L/min
<b>Exp Flow - Peak Expiratory Flow</b>	-400-400 L/min
<b>MVe - Expiratory Minute Volume</b>	0-100 L/min
<b>MVi - Inspiratory Minute Volume</b>	0-100 L/min
<b>MV - Minute Volume</b>	0-100 L/min
<b>MVspont - Spontaneous Expiratory Minute Volume</b>	0-100 L/min
<b>VT<sub>e</sub> - Expiratory Tidal Volume</b>	0-6000 ml
<b>VT<sub>i</sub> - Inspiratory Tidal Volume</b>	0-6000 ml
<b>Leak - Leakage percent</b>	0-100%
<b>VT - Tidal Volume</b>	0-6000 ml
<b>RR<sub>sp</sub> - Spontaneous Respiratory Rate</b>	0-150 breaths per minute
<b>Te - Expiratory Time</b>	0.10-0.80 seconds
<b>I:E - Inspiratory:Expiratory Ratio</b>	1.0:600 to 150:1.0 (I:E)
<b>T<sub>pause</sub> - Pause Time</b>	0.0-1.5 seconds
<b>Ti - Inspiratory Time</b>	0.2-10.0 seconds
<b>RR - Respiratory Rate</b>	0-150 breaths per minute
<b>Ti rise - Inspiratory Rise Time</b>	0.0-0.4 seconds
<b>C<sub>stat</sub> - Static Compliance</b>	0-500 ml/ cmH <sub>2</sub> O
<b>C<sub>dyn</sub> - Dynamic Compliance</b>	0-200 ml/ cmH <sub>2</sub> O
<b>Ri - Inspiratory Flow Resistance</b>	0-500 cmH <sub>2</sub> O/(L/s)
<b>Re - Expiratory Flow Resistance</b>	0-500 cmH <sub>2</sub> O/(L/s)
<b>RSB - Rapid Shallow Breathing Index</b>	0.1-600.0 1/(L*min)
<b>RC<sub>e</sub> - Expiratory Time Constant</b>	0-3 seconds

## Appendix F - Anesthesia Machine Controls CAEMaestro Evolve

Anesthesia Machine Learner Display	
Parameter	Values
RCi - Inspiratory Time Constant	0-3 seconds
EtCO <sub>2</sub> - End Tidal CO <sub>2</sub>	0-100 mmHg
VeCO <sub>2</sub> - Exhaled CO <sub>2</sub> Volume	0-1000 ml
ViCO <sub>2</sub> - Inspired CO <sub>2</sub> Volume	X
RREtCO <sub>2</sub> - Respiratory Rate From EtCO <sub>2</sub>	0-100 breaths per minute
SpO <sub>2</sub> - Oxygen Saturation	0-100%
PRSpO <sub>2</sub> - Pulse rate from SpO <sub>2</sub> probe	0-275 beats per minute
Pressure Waveform	-20 to 200 cmH <sub>2</sub> O
Flow Waveform	-400 to 400 L/min
Volume Waveform	0 to 6000 ml
Pressure Volume Loop	-20 to 200 cmH <sub>2</sub> O and 0-6000 ml
Flow Pressure Loop	400 to 400 L/min and -20 to 200 cmH <sub>2</sub> O
Volume Flow Loop	0 to 6000 ml and -400 to 400 L/min
SpO <sub>2</sub> (Plethysmograph) Waveform	0-100%
CO <sub>2</sub> (Capnograph) Waveform	0-100%
Fraction of inspired oxygen	0-100%
End tidal oxygen	0-100%
Fraction of inspired nitrous oxide	0-100%
End tidal nitrous oxide	0-100%
Fraction of inspired isoflurane	0.0-6.0%
End tidal isoflurane	0.0-6.0%
Fraction of inspired sevoflurane	0.0-8.0%
End tidal sevoflurane	0.0-8.0%
Fraction of inspired desflurane	0.0-20.0%
End tidal desflurane	0.0-20.0%
Minimum alveolar concentration	0.0-100.0 MAC
TOTAL - Total gas flow	0.0-40.0 L/min
O <sub>2</sub> - Oxygen gas flow	0.2-15.0 L/min

Anesthesia Machine Learner Display	
Parameter	Values
N <sub>2</sub> O - N <sub>2</sub> O gas flow	0.0-10.0 L/min
Air - Air gas flow	0.0-15.0 L/min
Status Messages Area - Alarms, Stand-by or Active, Ventilation Details, Patient Information	N/A
Alarm Indicators	N/A
Trigger Indicators - Flow and Edi Waveform Trigger Indicators	N/A
Current Date and Time	N/A
Battery Status	N/A
Connection Status	N/A

## Learner Display Options

Ventilation Display Option	Selections
Waves and Numerics	2 Waveforms and 6 Numerics
Loop Graph and Numerics	2 Loops and 6 Numerics
All Numerics	35 Numerics

## Associated Maestro Preferences

Maestro Preferences Associated with Anesthesia Machine		
Parameter	Selections	Default
Airway Pressure	cmH <sub>2</sub> O mBar	cmH <sub>2</sub> O
CO <sub>2</sub>	mmHg kPa %	mmHg
Color Preference	ISO USA	ISO

THIS PAGE INTENTIONALLY LEFT BLANK

# APPENDIX G - MEDICATIONS

The following table describes the medications available for administration in the Maestro software. Each medication is listed along with:

- Any effects on the patient’s physiology (modeled or log-only)
- The medication category
- The units used for dosages
- The route of administration.

Medication	Modeled or Log Only	Category	Dosage Options	
			Units	Route
Acetaminophen	L	Analgesic	mg	PO
Activated Charcoal	L	Adsorbant	g	PO
Adenosine	M	Cardiovascular Emergency	mg	IV
Albuterol	L	Respiratory	mg	Inhaler Nebulizer
Alfentanil	M	Analgesic Narcotic	mcg/kg	IV
Amiodarone	M	Cardiovascular Emergency	mg mg/min	IV
Aspirin	L	Cardiovascular Analgesics NSAID Metabolic	mg	PO
Atropine	M	Cardiovascular Emergency	mg	IO, IV
Betamethasone	M	Corticosteroid	mg	IM
Bicarbonate	M	Cardiovascular Emergency Toxicology	mEq	IV
Bretylium	M	Cardiovascular	mg/min mg/kg	IV
Calcium Chloride	M	Cardiovascular Emergency Toxicology	g mg	IV, IO
Captopril	L	Cardiovascular	mg	PO

Medication	Modeled or Log Only	Category	Dosage Options	
			Units	Route
Cisatracurium	M	Neuromuscular Blocker	mg/kg mg	IV
Curare (d-Tubocurarine)	M	Neuromuscular Blocker	mg	IM, IV
Dextrose 50%	L	Anti-Hypoglycemic Metabolic	mg	IV
Diazepam	M	Hypnotic	mg	IO
Digoxin	M	Cardiovascular	mcg	IV
Diltiazem	M	Cardiovascular	mg	IV, IO
Diphenhydramine	L	Histamine Blocker	mg	IV, IO, IM
Dobutamine	M	Cardiovascular Emergency	mcg/kg/min	IV, IO
Dopamine	M	Cardiovascular	mcg/kg/min	IV, IO
Doxacurium	M	Neuromuscular Blocker	mg/kg	IV
Droperidol	M	Antagonists Antiemetics	mg	IV
Edrophonium	M	Antiemetics	mg	IM, IV
Epinephrine	L	Cardiovascular	mg	IM, IV, SC
Epinephrine 1:1,000	L	Respiratory	mg	IM
Epinephrine 1:10,000	M	Cardiovascular	mcg	IO, IV
Esmolol	L	Cardiovascular	mg	IV
Etomidate	L	Hypnotic	mg/kg	IV
Fentanyl	L	Analgesic Narcotic	mcg	IM, IO, PO, Transdermal
Flumazenil	L	Antagonist	mg	IV
Furosemide	L	Diuretic	mg	IO, IV, PO
Glucagon	L	Metabolic Toxology	mg	IO, IV, PO
Glycoipyrrolate	M	Antagonist	mg/kg	IM, IV
Hydralazine	L	Cardiovascular	mg	IV, IM
Ipratropium	L	Respiratory	mcg	Nebulizer
Isoproterenol	M	Cardiovascular	mg	IM, IO, IV

Medication	Modeled or Log Only	Category	Dosage Options	
			Units	Route
Ketamine	M	Analgesic Hypnotic	mg	IM, IO, IV, Intranasal
Labetalol	M	Cardiovascular	mg	IV
Lidocaine	M	Cardiovascular	mg	IM, IV, IO
Lorazepam	M	Hypnotic	mg	IV
Magnesium Sulfate	L	Emergency Tocolytics	g g/hr	IV, IM
Mannitol	L	Diuretic	g	IV
Mark 1 Kit	L	Antagonist Toxicology	Kit	IM
Meloxicam	L	Analgesic NSIAID	mg	PO
Meperidine	M	Analgesic Narcotic	mg	IV
Methohexital	M	Hypnotic	mg/kg	IV
Methyldopa	L	Cardiovascular	mg	PO
Methylprednisolone	L	Corticosteroid	mg/kg	IV/IO, IM
Metocurine	M	Neuromuscular Blocker	mg	IV
Metoprolol	M	Cardiovascular	mg	IV
Midazolam	M	Hypnotic	mg/kg	IM, IO, IV
Mivacurium	M	Neuromuscular Blocker	mg/kg	IV
Morphine	M	Analgesic Emergency Narcotic	mg	IM, IO, IV
Naloxone	M	Antagonist Toxicology	mg	IM, IO, IV
Neostigmine	M	Antagonist Neuromuscular Blockade	mg	IV
Nitroglycerin	M	Cardiovascular Emergency	mcg/min	IV Paste Patch SL Spray
Nitroprusside	M	Cardiovascular	mcg/kg/min	IV, IO



Medication	Modeled or Log Only	Category	Dosage Options	
			Units	Route
Norepinephrine	M	Cardiovascular	mcg/min	IV, IO
Odansetron	L	Antiemetics	mg	IV
Oral Glucose	L	Metabolic	g	PO
Pancuronium	M	Neuromuscular Blocker	mg/kg	IV
Phentolamine	M	Cardiovascular	mg	IV
Phenylephrine	M	Cardiovascular	mcg/min	IV
Prednisone	L	Corticosteroid	mg	IV
Procainamide	M	Cardiovascular	mg/min	IV
Promethazine	L	Histamine Blocker	mg	IV
Propofol	M	Hipnotic	mg	IV
Propranolol	M	Cardiovascular	mg	IV
Quindine	M	Cardiovascular Narcotic	mg/kg	IV
Remifentanyl	M	Analgesics	mcg/kg mcg/kg/min	IV
Rocuronium	M	Neuromuscular Blocker	mg/kg mcg/kg/min	IV
Succinylcholine	M	Neuromuscular Blocker	mg/kg	IO, IV
Sufentanyl	M	Analegesic Narcotic	mcg/kg	IV
Sugammadex	L	Blockagde Reversal Neuromuscular Blocker	mg/kg	IV
Terbutaline	L	Respiratory	mcg/min	IV, PO, SC
Thiopental	L	Hypnotic	mg mg/kg	IV
Urapidil	L	Cardiovascular	mg mg/min	IV
Vasopressin	M	Cardiovascular	units munits/min	IV, IO
Vecuronium	M	Neuromuscular Blocker	mg/kg/min	IO, IV
Verapamil	M	Cardiovascular Emergency	mg	IO, IV

# APPENDIX H - PATIENT PARAMETERS

The Maestro software has a number of parameters that control the physiological features of the simulation. The parameters are grouped by category: Cardiovascular, Respiratory, Neurological, Fluids, Sounds, and Pulse.

## Parameter Descriptions

The following is a brief description of each parameter. Each parameter description lists the default settings for the Stan D. Ardman and Norma L. Female patients as well as the ranges, if available, for all patients.

### Cardiovascular: Basic Parameters

#### *Arterial Blood Pressure*

The **Blood Pressure** parameter is used to set the value of the blood pressure(Manual mode) or override the physiological modeling for blood pressure in Modeled mode. The systolic and diastolic blood pressures can both be set to fixed numeric values, regardless of interventions performed. Resetting the parameter to **Modeled** returns control of the underlying blood pressure to the physiological models. The set change can also be programmed to occur over time using the onset control.

**Default:** 116/77

**Range:**

- Systolic: 0 mmHg - 300 mmHg
- Diastolic: 0 mmHg - 300 mmHg

#### *Central Venous Pressure (CVP)*

The **CVP** parameter is used to set the CVP baseline and atrial contraction amplitude to fixed numeric values. Once set, intravascular volume changes have no effect on the CVP. In addition, once an override is applied, changes in tidal volume have no effect on the CVP waveform with the exception of an apneic patient where the minimum and maximum would be the same value since there is no inspiration or expiration. Depending on the volume status of the patient, the minimum/maximum value can be shifted up or down.

The available CVP controls are as follows:

- Minimum Diastolic: Baseline of the CVP at the end of an inspiration
- Maximum Diastolic: Baseline of the CVP at the end of an exhalation
- Pulse Amplitude: Size of the CVP wave during atrial contraction

For the override to take effect, the **Central Venous Catheter** must be set to the *Intrathoracic Vein*.

For example, with the minimum diastolic set to 5 mmHg, maximum diastolic set to 15 mmHg and pulse amplitude set to 2 mmHg, the CVP baseline is 15 mmHg, dipping to 5 mmHg with each inhalation, and the amplitude of the wave is 2 mmHg with each atrial contraction. The CVP baseline remains the same even in the event of intravascular volume changes and the depth of each dip due to inhalation remains at 5 mmHg even in the event of tidal volume changes. However, if the respiratory rate increases or decreases, the frequency of the dips will show a corresponding increase or decrease. The set change can also be programmed to occur over time using the onset control.

**Default:** Modeled or Manual mode as follows

- Minimum Diastolic: -2 mmHg
- Maximum Diastolic: 2 mmHg
- Pulse Amplitude: 3 mmHg

**Range:**

- Minimum Diastolic: -10 mmHg - 25 mmHg
- Maximum Diastolic: -10 mmHg - 25 mmHg
- Pulse Amplitude: 0 mmHg - 50 mmHg

### ***Pulmonary Artery Pressure (PAP)***

The **PAP** parameter is used to set the pulmonary artery pressure or to override the physiological modeling for pulmonary artery pressure in Modeled mode. The systolic and diastolic pressures can both be set to fixed numeric values, regardless of interventions performed. Resetting the parameter to **Modeled** returns control of the underlying pulmonary artery pressure to the physiological model. The set change can also be programmed to occur over time using the onset control.

**Default:** Modeled or 18/6 (Manual mode)

**Range:**

- Systolic: 0 mmHg - 50 mmHg
- Diastolic: 0 mmHg - 50 mmHg

### ***Pulmonary Capillary Wedge Pressure (PCWP)***

The **PCWP** parameter is used to display the patient's pulmonary capillary wedge pressure. It is used to simulate the pressure as measured by wedging a pulmonary catheter with an inflated balloon into a small pulmonary arterial branch. The set change can also be programmed to occur over time using the onset control.

**Default:** Modeled or 6 mmHg

**Range:** -10 mmHg - 100 mmHg

## ***Heart Rate***

The **Heart Rate** parameter is used to set the heart rate to a given (fixed) number of beats per minute. Once the heart rate is set to a numeric value, administered drugs or intravascular volume changes have no effect on the heart rate but continue to influence other components of the physiological models (in Modeled mode). Use this parameter to “fix” or set the heart rate to a specific number. In Manual mode, the set change can also be programmed to occur over time using the onset control.

**Default:** Modeled or 71 bpm (Manual mode)

**Range:** beats per minute - beats per minute

## ***Cardiac Rhythm***

The **Cardiac Rhythm** parameter is used to change the patient’s underlying cardiac rhythm displayed on the Patient Status Display or the CAE Patient Monitor. To change the cardiac rhythm, click the **Cardiac Rhythm** parameter and select the desired rhythm from the available list. If a number appears following the cardiac rhythm on the list, this overrides the heart rate to the rate indicated.

**Default:** Sinus

### **A**

Asystole

Atrial Enlargement, Left

Atrial Enlargement, Right

Atrial Fibrillation

Atrial Flutter

Atrial Tachycardia

AV Block, First-Degree

AV Block, Second-Degree, Mobitz I

AV Block, Second-Degree, Mobitz II

AV Block, Third-Degree

AV Block, Third-Degree (Wide Complex)

### **B**

Bundle Branch Block, Incomplete Right

Bundle Branch Block, Left

Bundle Branch Block, Right

### H

Hypercalcemia

Hyperkalemia (Mild)

Hyperkalemia (Moderate)

Hyperkalemia (Severe)

Hypertrophy, Biventricular

Hypertrophy, Left Ventricular

Hypertrophy, Right Ventricular

Hypocalcemia

Hypokalemia

Hypothermia

### I

Idioventricular

### J

Junctional

### L

Long QT Syndrome

Low QRS voltage

### M

Modeled

Myocardial Ischemia, Mild

Myocardial Ischemia, Moderate

Myocardial Ischemia, Severe

### N

NSTEMI

### P

Paroxysmal Junctional Tachycardia

Pericarditis

Premature Atrial Contraction

## **S**

Sinus

ST Elevation with Chest Pain

ST Segment Elevation

STEMI Anterior

STEMI Anterolatera

STEMI Inferior

STEMI Lateral

STEMI LBBB

STEMI Posterior

STEMI Septal

Supraventricular Tachycardia

## **T**

Torsade de Pointes

Trifascicular Block

## **V**

Ventricular Fibrillation, Coarse

Ventricular Fibrillation, Fine

Ventricular Tachycardia

Ventricular Tachycardia, RV Outflow Tract

## **W**

Wellen's Syndrome

Wide Complex Tachycardia

WPW Syndrome, Left Lateral Pathway

## ***Cardiac Output***

The **Cardiac Output** parameter displays the volume of blood pumped by the heart per minute. **Cardiac Output** is a function of heart rate (the number of heart beats per minute) and stroke

volume (the volume of blood pumped out of the heart with each beat). **Cardiac Output** does not affect the rest of the physiology. For example, if cardiac output is set to zero, it will be shown on the CAE Patient Monitor as zero, but the patient will still have a blood pressure and pulses. In Manual mode, the set change can also be programmed to occur over time using the onset control.

**Default:** Modeled or 5.25.9 L/min :

**Range:** 0 L/min - 30 L/min

### *Pulseless Electrical Activity*

The **Pulseless Electrical Activity** parameter triggers a clinical condition characterized by unresponsiveness and lack of palpable pulse in the presence of organized cardiac electrical activity. It is either ON or OFF.

**Default:** OFF

### *PVC Probability*

The **PVC Probability** parameter represents the percentage of cardiac cycles containing a premature ventricular contraction (contraction of the ventricles that occurs earlier than usual due to abnormal electrical activity of the ventricles).

The **PVC Probability** is used to set the frequency of PVCs within any cardiac rhythm. The set change can also be programmed to occur over time using the onset control.

**Default:** Modeled or 0 (Manual mode)

**Range:** 0% - 90%

### *Hemoglobin*

The **Hemoglobin** parameter is used to set a fixed hemoglobin value. Hemoglobin does not affect the rest of the physiology. The value set will be shown on the CAE Patient Monitor if selected in one of the numeric fields. In Manual mode, the set change can also be programmed to occur over time using the onset control.

**Default:** Modeled or 14.4 (Manual mode)

**Range:** 10.0 g/dL - 20.0 g/dL

### *Respiratory: Basic Parameters*

#### *Apnea*

The **Apnea** parameter triggers a clinical condition characterized by no spontaneous breathing. Lung sounds and vocal sounds will cease when apnea is enabled. It is either ON or OFF.

**Default:** OFF

## ***Bronchial Occlusion (Left and Right)***

Turning on the **Bronchial Occlusion** parameter completely obstructs the right or left bronchi, simulating a lower airway obstruction (e.g., mucus plug).

Right and left bronchi can be occluded individually.

Improper intubation creates a mainstem occlusion, yielding an inability to ventilate the lungs. However, the right and left bronchi are not occluded individually.

**Default:** OFF

## ***Respiratory Rate***

The **Respiratory Rate** parameter is used to set the respiratory rate to a given number of breaths per minute. In Modeled mode, when the Respiratory Rate is set, arterial oxygen and carbon dioxide values have no effect on the resulting respiratory rate, but continue to influence other components of the physiological models. The patient continues to breathe at the set number of breaths per minute, regardless of the arterial oxygen or carbon dioxide levels.

For example, when the respiratory rate is set to 10 breaths per minute, the respiratory rate remains at 10 breaths per minute, regardless of arterial oxygen or carbon dioxide levels.

**Default:** Modeled or (Manual mode)

**Range:** 0 breaths per minute - 40 breaths per minute

## ***SpO<sub>2</sub>***

The SpO<sub>2</sub> parameter overrides the physiology and sets a fixed numeric value, regardless of the oxygen applied. Resetting to **Modeled** returns control of the underlying SpO<sub>2</sub> to the physiological models. If SpO<sub>2</sub> is set to less than 75%, the eyes will automatically close when in the Auto mode. In Manual mode, the set change can also be programmed to occur over time using the onset control.

**Default:** 98%

**Range:** 0% - 100%

## ***EtCO<sub>2</sub>***

The EtCO<sub>2</sub> parameter is used to set the end-tidal CO<sub>2</sub> to a fixed numeric value, measured in mmHg, regardless of the minute ventilation. The end exhalation point of the capnogram waveform will also reflect the set end-tidal CO<sub>2</sub> value. Setting the EtCO<sub>2</sub> has no effect on the arterial carbon dioxide values (PaCO<sub>2</sub>), respiratory rate or tidal volume.

For example, when the EtCO<sub>2</sub> is set to 50 mmHg, the numeric end-tidal CO<sub>2</sub> will display 50 mmHg and the capnogram waveform rises to an end-tidal of 50 mmHg. However, the respiratory rate and tidal



volume will remain the same unless the Respiratory Rate and/or the Tidal Volume parameter(s) is adjusted. When in Manual mode, the set change can also be programmed to occur over time using the onset control.

**Default:** Modeled

**Range:** 0 mmHg – 100 mmHg

### *Tidal Volume*

The **Tidal Volume** parameter sets the tidal volume to a given volume per breath. Once Tidal Volume is set to a numeric value, arterial oxygen and carbon dioxide values have no effect on the tidal volume, but continue to influence other components of the physiological models (in Modeled mode).

For example, with the tidal volume set to 600 mL, the tidal volume remains a constant (set) 600 mL even in the event of falling arterial oxygen levels. In such situations, the patient can only respond to arterial oxygen or carbon dioxide levels by altering the respiratory rate. In Manual mode, the set change can also be programmed to occur over time using the onset control.

**Default:** Modeled or 500mL (Manual mode)

**Range:** 0 mL - 2500mL

### *I to E Ratio (1:X)*

The **I to E Ratio (1:X)** parameter can be used to change the ratio of inspiratory time:expiratory time (I:E). The I to E Ratio does not affect physiology. The set change also be programmed to occur over time using the onset control.

**Default:** 2.0

**Range:** 0.5 - 7.0

### *Intrapleural Volume (Vol): (Left and Right)*

The **Intrapleural Vol** parameters allow intrapleural volume to accumulate, for example, as happens during pneumothorax, hydrothorax or hemothorax.

To simulate a pneumothorax, set the corresponding **Intrapleural Vol** to a value greater than 0 mL. Breath sounds are automatically diminished on the appropriate side due to decreased ventilation of the affected lung.

**Default:** 0 mL

**Range:** 0 mL - 2500 mL

## Neurological

### Eyes

#### Blink Mode

#### Condition

Eight (8) eye conditions are available for selection in the neurological patient controls window.

**Default:** None

**Options:**

- Normal (both eyes)
- Jaundice (both eyes)
- Bloodshot (both eyes)
- Hemorrhage (right eye)
- Hemorrhage (both eyes)
- Keyhole Pupil (right eye)
- Droopy Eyelids (both eyes)
- Cataracts (both eyes)

#### Control Eyes Together

Both eyes can be controlled together by enabling the **Control Eyes Together** parameter. When this option is selected, any change made to one eye, will automatically be made to the other eye.

**Default:** Disabled

#### Light Reactivity Speed

The **Light Reactivity** parameter determines the speed at which the eyes react to light when the **Reactive pupils** parameter is set to **Yes**. **Light Reactivity** can be set to **None, Brisk, or Sluggish**.

**Default:** Brisk

#### Condition

Eight (8) eye conditions are available for selection in the neurological patient controls window.

**Default:** None

**Options:**

- Normal (both eyes)
- Jaundice (both eyes)
- Bloodshot (both eyes)
- Hemorrhage (right eye)
- Hemorrhage (both eyes)
- Keyhole Pupil (right eye)
- Droopy Eyelids (both eyes)
- Cataracts (both eyes)

**Light Reactivity Speed**

The **Light Reactivity** parameter determines the speed at which the eyes react to light when the **Reactive pupils** parameter is set to **Yes**. **Light Reactivity** can be set to **None, Brisk, or Sluggish**.

**Default:** Brisk

**Panning**

**Panning** enables random eye movement (left to right).

**Default:** ON

**Pupil Control**

The pupil control parameters are used to control the diameter of the pupils in the eyes.

**Default:** 5 mm

**Pupil Diameter**

The pupil diameter parameters are used to control the diameter of the pupils in the eyes. Settings allow the user to fix one or both pupils to a specific size.

**Default:** 5 mm

**Range:** 2 mm -6mm

***Intracranial Pressure (ICP)***

The ICP parameter is used to set the ICP displayed as a numeric value on the Patient Status Display and on the CAE Patient Monitor.

**Default:** 9.3mmHg

**Range:** 0 mmHg - 65 mmHg

### ***Temperature: Body***

The temperature measured at the body surface can be set using this parameter and can be displayed on the Patient Status Display and the CAE Patient Monitor. Body temperature is not linked to the physiologic models, however, changes can be made “on the fly” or scripted using the Scenario Designer. The set change can also be programmed to occur over time using the onset control.

**Default:** 36.5°C

**Range:** 32.0°C - 42.0°C

### ***Temperature: Blood***

The arterial blood temperature can be set using the **Temperature: Blood** parameter. The arterial blood temperature can then be displayed on the Patient Status Display and the CAE Patient Monitor. The set change can also be programmed to occur over time using the onset control.

**Default:** 37°C

**Range:** 32.0°C - 42.0°C

## ***Fluids***

### ***Bleeding***

#### **Fluid Loss Blood**

When used, the **Fluid Loss Blood** parameter allows users to apply a decrease in total blood volume. Blood loss proportionally decreases both the red blood cell volume and the plasma volume according to the current hematocrit.

**Range:** 0 mL - 6000 mL

#### **Fluid Loss Plasma**

When used, the **Fluid Loss Plasma** parameter reflects a decrease in plasma volume. Plasma loss decreases the plasma volume without changing the red blood cell volume. It refers collectively and generically to all fluid losses, including evaporative, transcellular, bowel and third space fluid losses.

**Range:** 0 mL - 6000 mL

## Infusion

### Colloid Infusion

When used, the **Colloid Infusion** parameter reflects an addition to the plasma volume without changing the red blood cell volume. Colloids include modified fluid gelatin starch solutions, dextran and human albumin.

**Range:** 0 mL - 6000 mL

### Crystalloid Infusion

When used, the **Crystalloid Infusion** parameter reflects an addition to the plasma volume without changing the red blood cell volume. The term crystalloid is used to describe salt solutions for infusion (e.g., normal saline, dextrose in water, Ringer's Lactate).

**Range:** 0 mL - 6000 mL

### PRBC Infusion

Packed red blood cells are a preparation of 70% red blood cells and 30% liquid plasma, often administered in severe anemia to restore adequate levels of hemoglobin and red cells without overloading the vascular system with excess fluids.

**Range:** 0 mL - 6000 mL

### Whole Blood Infusion

The term whole blood is used to refer to blood that has not been separated into its various components. It represents a preparation of 40% red blood cells and 60% liquid plasma.

**Range:** 0 mL - 6000 mL

## Sounds

A variety of simulated sounds are available to create a realistic experience. Click the **Sounds** button on the Run screen to access the Sounds controls.

### *Heart Sounds*

Heart sounds can be adjusted by clicking on the Sound icon on the Run screen. When the Sounds panel appears, select **Heart Sounds**. The Heart Sounds menu will appear.

Independent control of the type and volume of heart sounds may be selected in each anatomical region.

**Locations:**

- Aortic
- Mitral
- Pulmonic
- Tricuspid

To affect the heart sounds simultaneously in all anatomical regions, select **All** and the desired sound.

**Default:** Normal

**Type:**

- Normal
- S3
- S4
- S3 and S4
- Early Systolic Murmur

**Note:** The volume control slider can be used to adjust the amplitude of the sound.

## *Lung Sounds*

Normal and abnormal breath sounds are selected using this parameter. Breath sounds are synchronized with ventilation of the left and right lungs.

Breath sounds can be adjusted by clicking on the Sound icon on the Run screen. When the Sounds panel appears, select **Lung Sounds**. The Lung Sounds menu will appear.

Independent control of the type and volume of heart sounds may be selected in each anatomical region.

**Locations:**

- Left Upper
- Left Lower
- Right Upper
- Right Lower

To change breath sounds, select the desired sound from the **Lung Sounds** menu.

**Default:** Normal

**Type:**

- Normal
- Crackles
- Diminished
- Gurgling
- Pleural Rub

**NOTE:** The volume control slider can be used to adjust the amplitude of the sound.

***Bowel Sounds***

Bowel sounds can be adjusted by clicking on the Sound icon on the Run screen. When the Sounds panel appears, select **Bowel Sounds**. The Bowel Sounds menu will appear.

**Normal, Hypoactive, Hyperactive** and absent bowel sounds (**None**) are selected using this parameter.

**Type:**

- Normal
- Hypoactive
- Hyperactive

Independent control of the type and volume of bowel sounds may be selected in each anatomical region.

**Locations:**

- Left Upper
- Right Upper
- Left Lower
- Right Lower

To affect the bowel sounds simultaneously in all anatomical regions, select All Bowel Sounds and the desired sound.

**Default:** Normal

**Note:** The volume control slider underneath each area may be used to adjust the amplitude of the sound. The volume control slider is only enabled while connected to a simulator.

### *Korotkoff*

**Default:** OFF

### *Pulse*

All pulses are enabled by default, unless altered by an SCE. To change a pulse setting, click the **Pulse** icon on the Run screen. Click the desired pulse location on the image.

Pulse	Default	Range
Brachial Right	ON	Not Applicable
Brachial Deficit	80 mmHg	0 - 300
Left Femoral	ON	Not Applicable
Right Femoral	ON	Not Applicable
Femoral Deficit	70 mmHg	0 - 300
Carotid	ON	Not Applicable
Carotid Deficit	60 mmHg	0 - 300
Radial Right	ON	Not Applicable
Radial Right Deficit	90 mmHg	0 - 300

The pulse can be turned ON or OFF, and the pulse intensity can be set to:

- Absent
- Weak
- Normal
- Bounding

The pulse deficit can be changed from the default to another value. When the systolic pressure falls below the set pulse deficit, the pulse will turn off.







For more information about CAE products, contact your regional sales manager or the CAE distributor in your country, or visit [caehealthcare.com](http://caehealthcare.com).

Tel +1 941-377-5562 or 866-233-6384

For customer service, please contact CAE.

**Customer Service Headquarters - United States**

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

Phone 1-866-462-7920

Email: [srqcustomerservice@cae.com](mailto:srqcustomerservice@cae.com)

**Customer Service - Canada**

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

Phone 1-877-223-6273

Email: [can.service@cae.com](mailto:can.service@cae.com)

**Customer Service - Europe, Middle East, and Africa**

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

Phone +49 (0) 6131 4950354

Email: [international.service@cae.com](mailto:international.service@cae.com)

**Customer Service - United Kingdom and Ireland**

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

Phone +44 (0)800-917-1851

Email: [uk.service@cae.com](mailto:uk.service@cae.com)

**Customer Service - Latin America**

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

Phone +55 11 5069-1510

Email: [la.service@cae.com](mailto:la.service@cae.com)

**Customer Service - Asia Pacific**

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

Phone +49 (0) 6131 4950354

Email: [ap.service@cae.com](mailto:ap.service@cae.com)

