

# Harvey® Premier

The Cardiopulmonary Patient Simulator

## User Guide and Technical Service Manual





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## General

The information provided in this manual is limited to what is required for the operation, maintenance and repair of Harvey Premier, the Cardiopulmonary Patient Simulator. This user and technical service manual provides a general understanding of the design and function of the simulator.

The Harvey manuals (*Harvey Learner Manual*, *Harvey Instructor Guide*) provided with every new unit should be consulted for detailed information on its educational use and patient findings.

### Note:

1. Only trained personnel should service Harvey, or personnel under close guidance from trained Harvey technicians. Service by others could invalidate any current warranty. Contact the Gordon Center before attempting to repair Harvey.
2. Harvey is for use by instructed or skilled personnel and in locations where children are not likely to be present.
3. While operating Harvey it must in a fixed installation and must be plugged into an AC outlet with a reliable PE (protective earth) connection.
4. Practice techniques for safe lifting and carrying to prevent back injuries while transporting Harvey.

For additional information about technical questions or service, please contact the University of Miami Gordon Center for Simulation and Innovation in Medical Education:

Telephone: +1-305-243-6491

<https://gordoncenter.miami.edu/harvey/>

Address: University of Miami Gordon Center for Simulation and Innovation in Medical Education  
PO Box 016960 (D-41)  
Miami, FL 33101 USA

or street address:

University of Miami Gordon Center for Simulation and Innovation in Medical Education  
1120 Northwest 14<sup>th</sup> Street, 1<sup>st</sup> Floor  
Miami, Florida 33136

## Technical Specifications

### Power Ratings

Input voltage:	100 - 240VAC
Input frequency:	50/60Hz
Maximum power:	5A

### Weight and Size

Manikin:	55 lbs (25 kg)	44"L x 14"H x 24"D (112cm x 36cm x 61cm)
Pelican Case (Optional):	95 lbs (43 kg)	51"L x 28"H x 26"D (130cm x 71cm x 66cm)

### Environmental Condition

Operating temperature:	+10°C - 30°C
Storage temperature:	-15C - 50C
Humidity:	15-90% RH(non-condensing)

### Declaration of Conformity

University of Miami Gordon Center, PO Box 016960 Miami, FL, USA 33101.

Declares under its sole responsibility that the product below:

Product Type: Medical Patient Simulator

Marketing Name: Harvey, the Cardiopulmonary Patient Simulator

Regulatory Model Number: UM2025

Conforms to the following product specifications:

### EMC

CENELEC EN 55032:2015+A11	IEC 61000-4-4 ed3.0 (2012-04)
CENELEC EN 55032:2015+A11	IEC 61000-4-5 ed3.1 (2017-08)
IEC 61000-3-2:2020	IEC 61000-4-6 ed4.0 (2013:10)
IEC 61000-3-3:2017	IEC 61000-4-8 ed2.0 (2009-09)
EC 61000-4-2:2008	IEC 61000-4-11:2020
IEC 61000-4-3 ed3.0 (with A1:2007+A2:2010)	

### Safety

IEC 62368-1:2018 Ed.3

The product specified above complies with the requirements of the following directives and carries the CE mark accordingly:

**2014/30/EU (EMC)** - Directive relating to electromagnetic compatibility. **2014/35/EU (LVD)** - Directive relating to the making available on the market of electrical equipment designed for use within certain voltage limits. **2011/65/EU (RoHS)** - Directive on restricting the use of certain hazardous substances in electrical and electronic equipment.

## General Simulator Handling

The Harvey Premier Simulator should be installed and serviced operated by trained personnel only. Treat the Harvey Premier Simulator as you would treat a real patient.

### Warnings:

- Never use the Patient Simulator outdoors in wet conditions, as this may pose a shock hazard or damage the simulator.
- Never use the Patient Simulator in temperatures exceeding 40°C (104°F), as this may cause overheating and shut down.
- The Patient Simulator should never be stored in temperatures below -15° C (5° F).
- The Patient Simulator will automatically shut down if the battery temperature exceeds 60°C (140°F).



Warning: Avoid pinch hazards - Do not remove protective bushings from the Patient Simulator bottom panel or use it without the external skins.



Warning: Avoid all sharp edges on the Patient Simulator to prevent personal injury.



### **Do not use the Harvey Premier Simulator if:**

- Skins are torn or not properly fastened.
- Internal or external cables or connectors are damaged.
- There are unusual sounds indicating mechanical damage.
- There are signs of electrical malfunction, such as an unresponsive Patient Simulator or unusual smell or smoke.

## Hygiene

- To maintain Patient Simulator skins, wash hands before use and place the Patient Simulator on a clean surface.
- Wear gloves as required during simulation scenarios.

## Preventing Stains on Patient Simulator Skins

- Avoid using colored plastic gloves, as they may cause discoloration of the Patient Simulator skin.
- Do not use felt-tipped markers, ink pens, acetone, iodine or other staining medications near the Patient Simulator. Take care not to place the Patient Simulator on newsprint or colored paper. All staining may be permanent.

## Transportation and Storage

Harvey Premier can be heavy; ensure that the Patient Simulator is properly secured during transportation to prevent personal injury or damage to the product.

## **Antivirus and Firewalls**

- The Harvey Premier Patient Simulator and Tablets are not supplied with Antivirus programs. It is the customer's responsibility to protect the simulation system components from unauthorized access.
- The Patient Simulator will revert to set-up settings each time the power is switched off.
- The customer should install all recommended Tablet updates from Google. General security measures should be taken before browsing the internet.
- It is recommended that the Harvey Premier Tablets are used only as Patient Simulator controllers. Downloading other Software programs onto these machines may introduce unexpected errors.

## **File Security and Backup of Data**

The customer is responsible for file security and backup routines for all simulation session data. All use and storage of simulation session data should be in accordance with local rules, regulations, or laws, and is the sole responsibility of the customer.

## **General System Overview - Components**

The Harvey Premier Cardiopulmonary Patient Simulator Training System consists of the following components that are provided to the user institution:

- Harvey Premier, the Cardiopulmonary Patient Simulator
- Manuals and guides:
  - Harvey Premier Instructor Guide
  - Harvey Premier Nurses Instructor Guide
  - Harvey Premier Learner Manual
  - Harvey Premier Nurses Learner Manual
  - Harvey Premier Technical Manual
- Standardized patient cases for teaching and/or assessment
- Software:
  - Harvey Premier curriculum program
  - Harvey Premier nurses' introductory program
  - Harvey Premier technical support files
- Tablet with preloaded curricula and software
- All relevant chargers and adapters
- Cleaning kit:
  - Lint Remover
  - Box of alcohol cleaning pads
  - Cotton swabs
- Optional accessories:
  - Pelican case for transport
  - Sound emitter & infrared headphone(s)
  - UMedic Multimedia Computer Curriculum in Cardiology (see appendix)
  - UMedic Essential Cardiac Auscultation (see appendix)
  - UMedic Essential Electrocardiography and Arrhythmia (see appendix)

## Receiving Harvey and Handling the Shipping

### Crate Shipping Case Inspection

Carefully inspect the condition of the shipping crate/case. Note if you see any damage, such as broken clasps or cracked plastic, which may indicate the case was dropped. If any damage is noted, take photos for your records and email them to the Gordon Center or your Harvey Premier distributor. If any damage is noted at the time of receiving the shipping case, please make a note on the shipping slip.

Note: Before removing Harvey from the crate/case, please have a table available as specified on page 11.

### Removing Harvey from the Case

One individual is required at each end to lift Harvey out of the case. Place Harvey in the location it will be used for teaching and learning. You may store the case for later use (in the event Harvey is moved to another distant location).

## Important Safeguards

Before operating Harvey Premier, advise the users to follow these important safeguards:

1. Please treat Harvey Premier with the same respect you would a live patient – gently! (DO NOT PERFORM CPR!)
2. **Do Not** put pressure on the abdomen or place heavy objects on it.
3. Keep ink, marking materials, power cords, printed materials, and stethoscope tubing away from Harvey's skin, as marks cannot be removed. Wash your hands before using Harvey Premier and/ or use examination gloves.
4. **Do not** attempt to move Harvey Premier's hands or remove /reposition the blood pressure cuff.
5. Although Harvey Premier is very portable, exercise care when moving to protect internal circuitry and mechanics. Keep Harvey Premier horizontal at all times.

**Harvey Skin** - Harvey Premier's skin is latex-free.

## Installing Harvey Premier

### Table for Setting Harvey Premier

Harvey requires a 2.5 ft x 6 ft (75 cm x 183 cm) table or surface on which to be placed.

### Connecting Harvey Premier to Power Source

When removing Harvey from the shipping case, the AC power cord may be found towards the outer foot end of the case, inside a marked bag.

1. Connect the female end of the power cord to the 3-pin male power-in connector at the right end of Harvey. Plug the male end of the power cord into the power source. (Note: For international installations, Harvey Premier will be shipped with the appropriate plug adapter.)
2. Harvey Premier can be turned on by pressing the power button on the side panel located on the right thigh. The light will turn green while the Harvey is in operation.
3. Harvey Premier can be turned off by pressing the power button twice on the side panel located on the right thigh. The green light will turn off after a few seconds have passed.



**Note:** The Harvey should be turned off at the end of the training day.

# Harvey Premier User Controls and Tablet Interface

Harvey's controls and indicators are found on the tablet provided.

## Table of Contents

1. Overview
2. Screens and Components
3. Pulse Profile and Auscultation Description

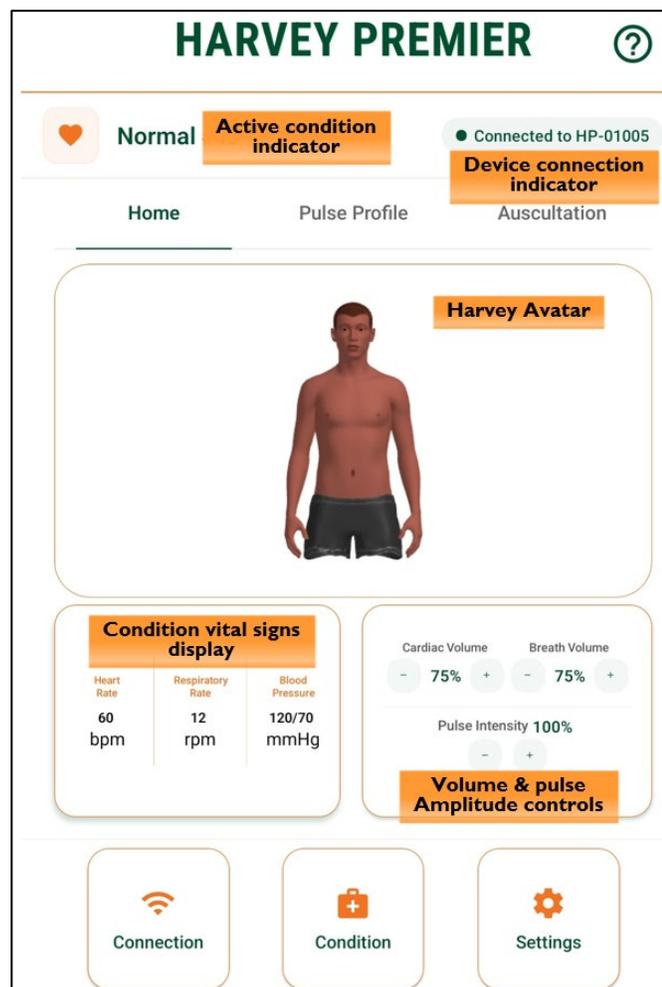
## 1. Overview

Harvey Premier's mobile application is designed to control and interact with the Harvey Cardiovascular Patient Simulator. The app provides controls to simulate various cardiac conditions for training purposes.

## 2. Screens and Components

### Home Screen

- Device connection indicator
- Active condition indicator
- Harvey avatar
- Condition vital signs display
- Volume and pulse amplitude controls
- **Connection** to Harvey button
- **Condition** selection button
- **Settings** button



## Device Connection

Communication between Harvey Premier and the tablet is based on WLAN communication. Harvey and PCs can also be connected to a LAN cable network, and WLAN disabled.

When first setting up Harvey Premier, use the control window panel on Harvey's right thigh, tap 'Find Network' to select the desired local area network – this will be an institutional network or using the included mobile router.

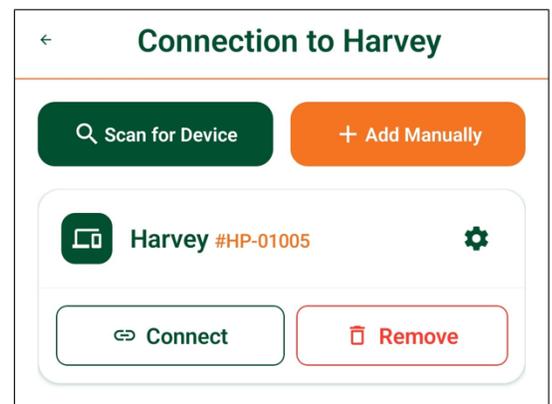


Once Harvey is connected to a network (or router), tap the 'Connection' button on the Home page and then tap "Scan for Device" on the tablet. The Harvey serial number assigned to that tablet should appear – "HP-01005". Tap "Connect."

To manually add a network connection, tap the '+ Add Manually' button, and enter the following information:

- Device Name (for your reference)
- IP Address
- Port Number (default: 7890)

Tap "Add Device" to save and connect



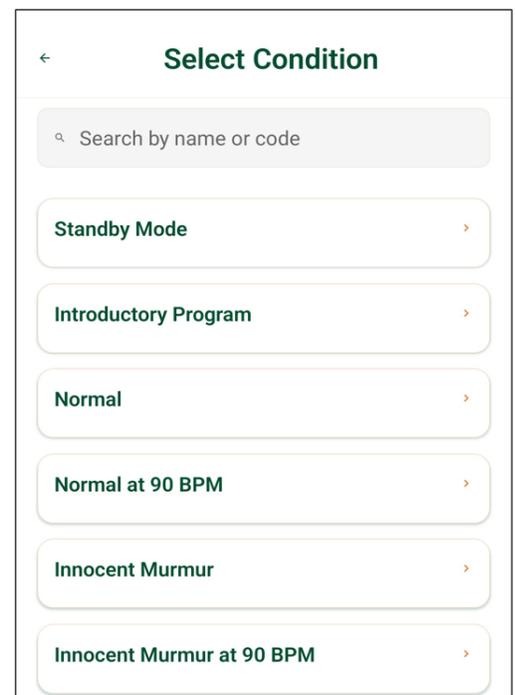
## Managing Saved Devices

- Swipe left on a device to delete it
- Tap and hold to edit device details
- Connected devices show a green status indicator
- Last connected device will auto-connect on app launch

## Condition Selection Screen

This displays and allows for the selection of Harvey's patient conditions. You may select the patient condition in several ways:

- Scroll through the list of conditions and tap on the one desired to load onto Harvey.
- Search for the patient condition by typing in the name of the desired condition in the top window.
- For legacy Harvey simulator users, search for the patient condition by typing in the code for that condition – e.g., Normal = "46".



Once the condition has been selected, return to the Main user interface page.

## Settings Screen

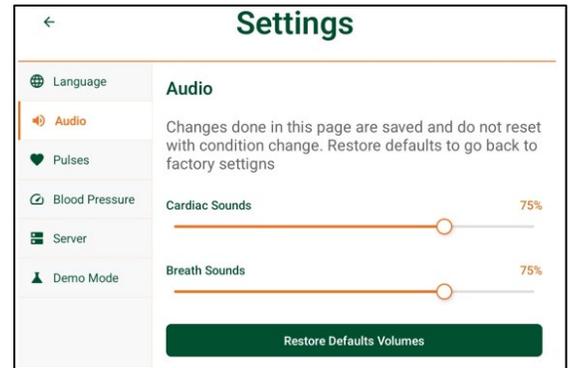
The setting control page has several functions to enable control of the app.

**Language** – choose the from the available language (the default is English).

**Audio** – Allows separate control of heart and lung sound volumes.

**Note:** Changes made here will affect the sound levels across all conditions. To temporarily adjust sound levels, use the controls on the main page instead.

Tap "Restore Default Volumes" to return to the original factory settings.

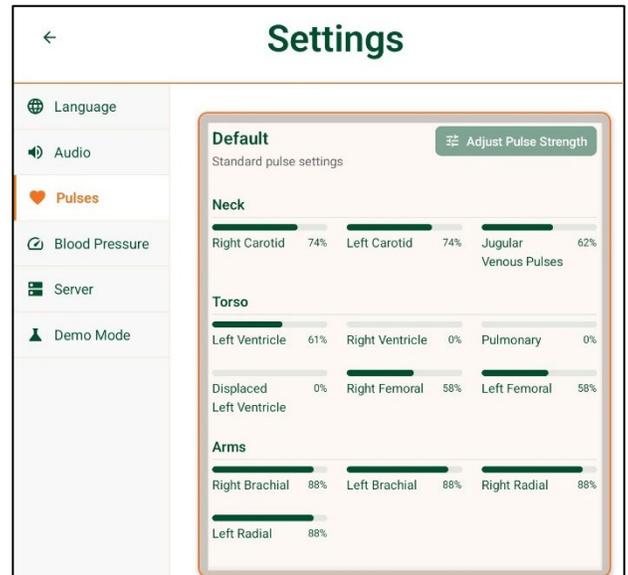


**Pulses** - allows separate control of the pulse amplitudes of the neck, torso and arms.

**Note:** Only those pulses that are activated for the active condition will be accessible for adjustment and will remain in effect for that condition. To temporarily adjust all the pulse amplitudes simultaneously, use the controls on the main page instead.

Access Pulse Calibration page by tapping the “Adjust Pulse Strength” button on the top right corner using the password ‘harveytech’

Tap "Restore Default Amplitudes" to return to the original factory settings.

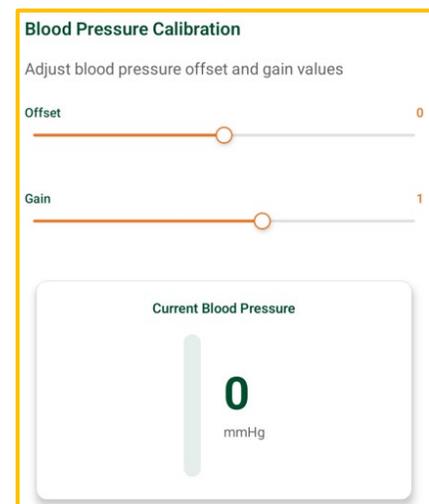


**Blood Pressure** – enables calibration of the blood pressure settings that may be impacted by altitude. If calibration is necessary, enter the password ‘harveytech’, and then deflate the blood pressure cuff completely.

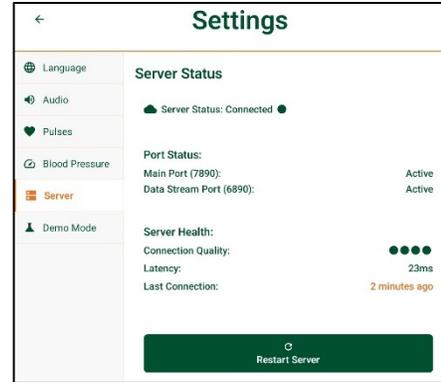
The “Current Blood Pressure” setting should read “0” mmHg. If the value is not ‘0’ (e.g., n, adjust the offset slider bar as follows:

- If the value is -n, increase the offset from 0 to n.
- If the value is n, decrease the offset from 0 to -n.

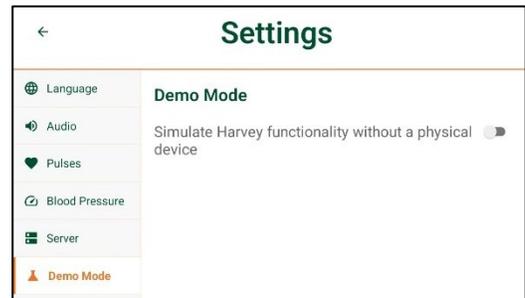
Continue adjusting the offset until the displayed value is 0. This ensures accurate blood pressure readings during operation,



**Server** – allows check of network connection status.

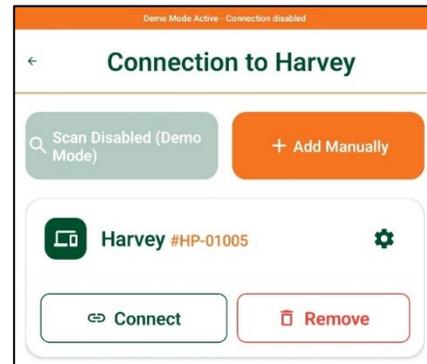


**Demo Mode** – allows a review of Harvey Premier’s features without being connected to the simulator. This can enable users to become familiar with the tablet features without having to use Harvey.

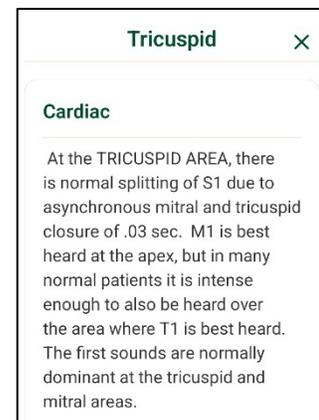
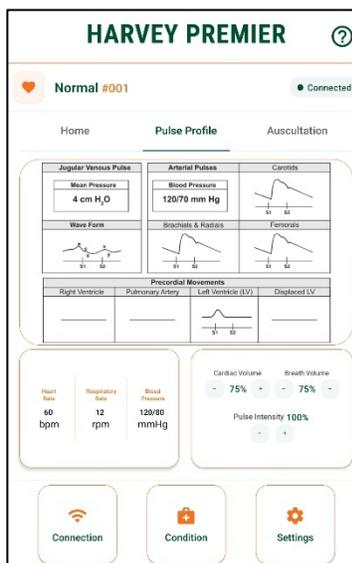
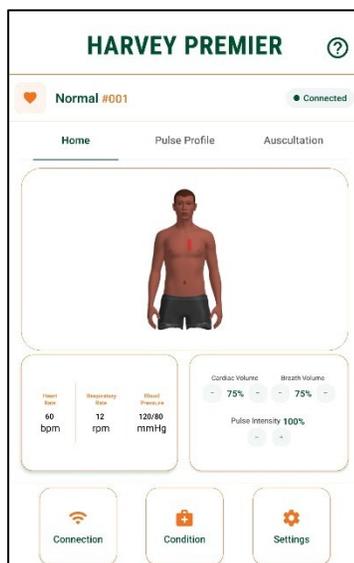


To activate the Demo Mode, click the toggle button to the right.

The following screen will appear indicating that the network scan is disabled and the tablet is no longer connected to Harvey. You can then navigate back to the home page and select different screens to familiarize yourself with Harvey’s features.



Below are sample screens that are available in the Demo Mode:

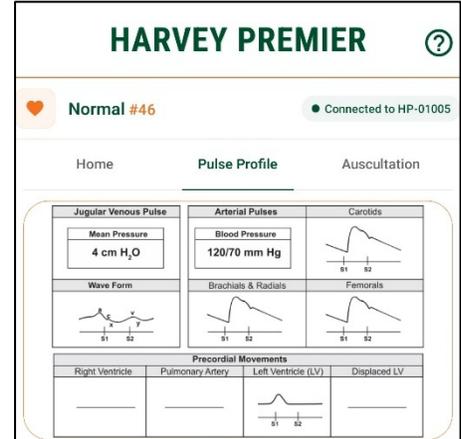


### 3. Pulse Profile and Auscultation Description

#### Pulse Profile Description

Tap the Pulse Profile tab on the Home page to see the graphic depiction of the pulses in the active patient condition.

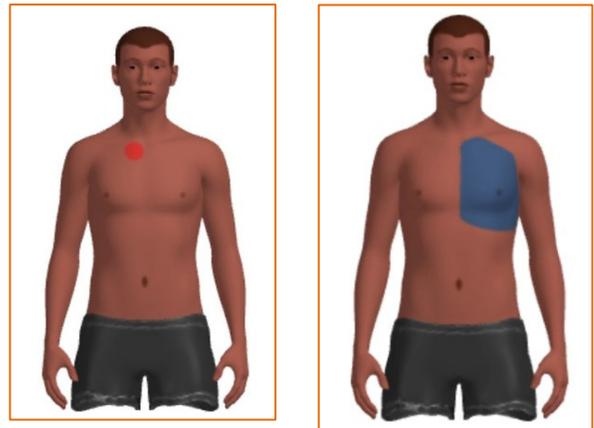
For detailed information and descriptions of the pulse profiles, select “Tap for description” icon.



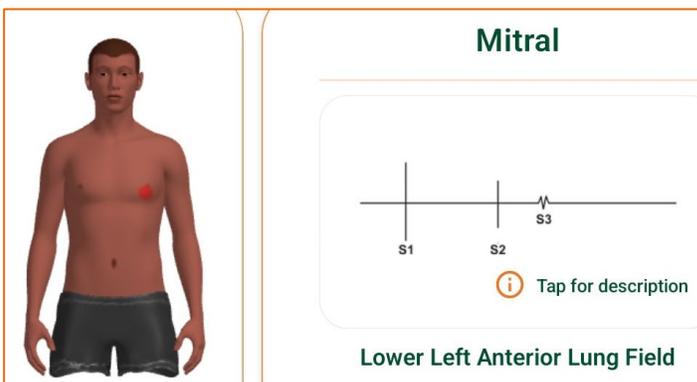
#### Auscultation Description

Position the stethoscope over the desired area (see next page for the available areas and zones). The active zone will highlight on the Harvey avatar. Listen to the corresponding heart and/or lung sounds.

Tap the Auscultation tab on the Home page to see the graphic depiction of the heart sounds.



For detailed information and description of the heart and lung sounds, select the “Tap for description” icon.



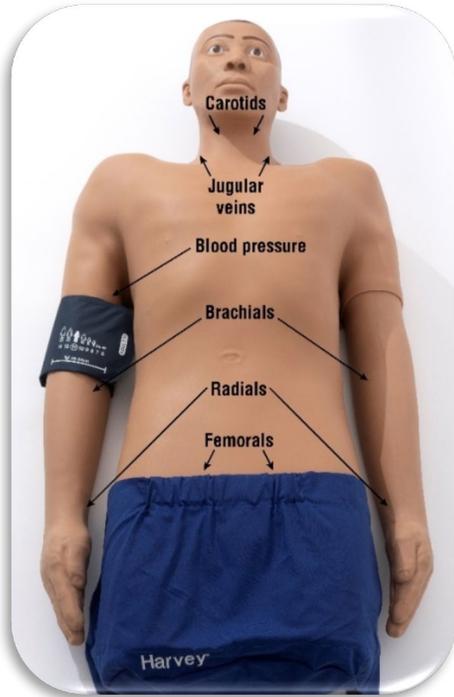
#### Cardiac

At the MITRAL AREA, an S3 reflects deceleration of blood into the left ventricle just after the rapid filling phase, associated with tensing and vibration of the mitral apparatus. This sound is low in frequency and occurs in diastole about .16 sec. after A2. Children and young adults often have normal or physiologic S3 filling sounds.

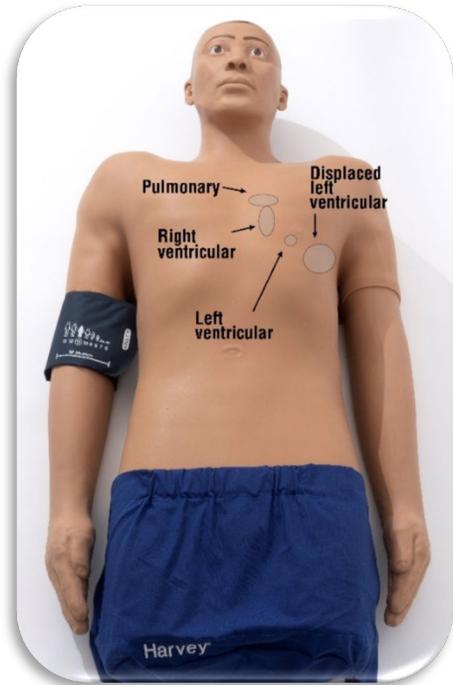
## Inspecting and Testing Harvey

Identify the locations of Harvey's findings in the figures below.

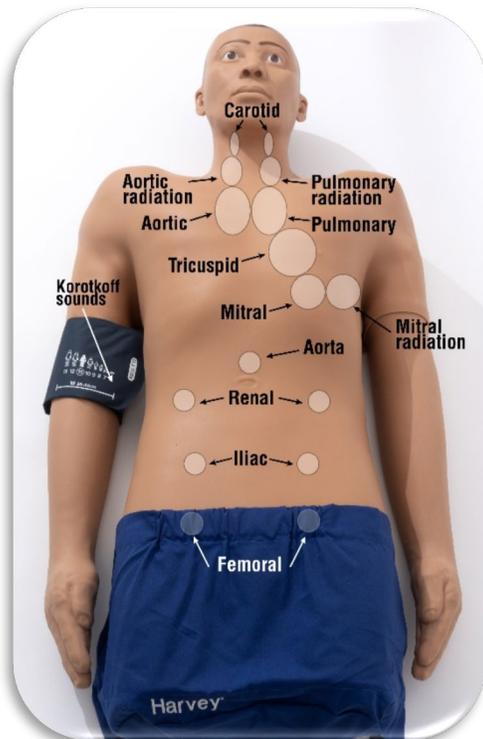
### Arterial and Venous Pulses



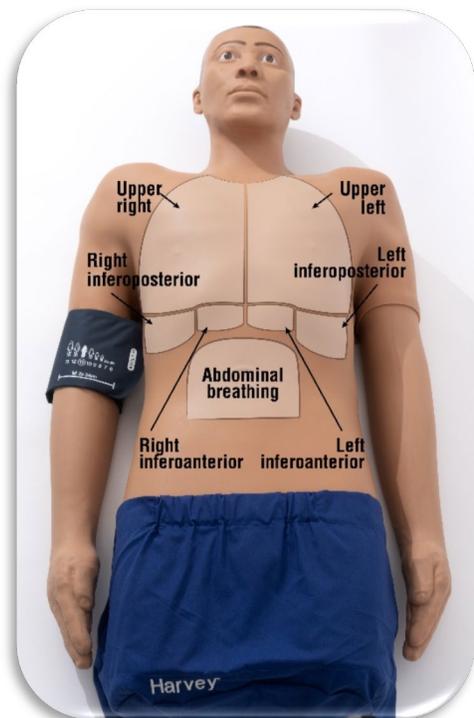
### Precordial Movements



### Cardiac Auscultation



### Pulmonary Auscultation



Complete the checklist to confirm all of the features are in proper functioning order.

<b>Inspection and Test Checklist</b>		
#	First use condition <b>Normal</b> (HR of 60 bpm and RR of 12 rpm) and then <b>Normal</b> (HR of 90 bpm and RR of 15 rpm) unless otherwise noted.	Tested
<b>Skin:</b>		
1	Inspect skin on head, neck, chest, arms and femoral areas for overall appearance. Note any marks – use soap and water or alcohol and cleaning cloth to remove	
<b>Venous Pulses:</b>		
2	Confirm presence of left and right jugular venous pulses. These are visualized, NOT palpated.	
<b>Arterial Pulses:</b>		
3	Confirm presence of left and right carotid pulses. Palpate lightly to avoid dampening of pulse.	
4	Confirm presence of left and right brachial pulse. The right pulse is located underneath the blood pressure cuff. Palpate lightly to avoid dampening of pulse.	
5	Confirm presence of left and right radial pulses. Palpate lightly to avoid dampening of pulse.	
6	Confirm presence of left and right femoral pulses. Palpate lightly to avoid dampening of pulse.	
<b>Blood Pressure:</b>		
7	Confirm that Korotkoff sounds are heard between 120 – 70 mm Hg when blood pressure cuff is deflated.	
<b>Precordial Impulses:</b>		
8	Confirm presence of left ventricular impulse. Palpate lightly to avoid dampening of impulse.	
9	Confirm presence of displaced left ventricular impulse in condition Mitral Regurgitation. Palpate lightly to avoid dampening of impulse.	
10	Confirm presence of displaced right ventricular impulse in condition Mitral Stenosis. Palpate lightly to avoid dampening of impulse.	
11	Confirm presence of displaced pulmonary impulse in condition Mitral Stenosis. Palpate lightly to avoid dampening of pulse.	
<b>Respiratory Movement:</b>		
12	Confirm presence of gradual rise and fall of abdomen. Note any sudden shuddering movements or loud noises.	

<b>Inspection and Test Checklist</b>		
<b>#</b>	First use condition Normal (HR of 60 bpm and RR of 12 rpm) and then Normal (HR of 90 bpm and RR of 15 rpm) unless otherwise noted.	<b>Tested</b>
<b>Sounds:</b>		
13	Confirm presence of heart and lung sounds at aortic area.	
14	Confirm presence of heart and lung sounds at pulmonary area.	
15	Confirm timing of inspiration (abdomen rising) is synchronized with the splitting of the second heart sound at pulmonary area.	
16	Confirm presence of heart and lung sounds at tricuspid area.	
17	Confirm presence of heart and lung sounds at mitral area.	
18	Confirm presence of heart and lung sounds at mitral radiation area in <i>Chronic Mitral Regurgitation</i> .	
19	Confirm presence of heart sounds at aortic and pulmonary radiation areas, and the carotid areas in the neck in <i>Severe Aortic Stenosis</i> .	
20	Confirm presence of heart sounds at right and left carotid areas in <i>Severe Aortic Stenosis</i> .	
21	Confirm presence of carotid bruit at the upper left carotid area in <i>Angina</i> .	
22	Confirm presence of lung sounds at right upper area.	
23	Confirm presence of lung sounds at right inferoposterior area.	
24	Confirm presence of lung sounds at right inferoanterior area.	
25	Confirm presence of lung sounds at left upper area.	
26	Confirm presence of lung sounds at left inferoposterior area.	
27	Confirm presence of lung sounds at left inferoanterior area.	
<b>Audio Output:</b>		
28	Confirm presence of sounds from audio output located at the control panel next to Harvey's right thigh. Use any output device to hear sounds (speaker, headphones).	

## Accessory Technologies in the Use of Harvey

### Sound Transmission System

We strongly encourage user institutions to obtain a sound transmission system consisting of a classroom emitter and a minimum of 10 headphones. Because this will enable multiple users to hear the auscultatory findings at the same time, it enhances teacher- student interaction and is necessary for group instruction. Depending on the audio system and the number of headphones obtained, any number of users, from a small group to a large auditorium, may auscultate simultaneously.



**Teaching a small group through the use of an infrared system**

### Classroom Emitter

Up to 30 individuals can interact with Harvey through the Classroom Infrared Emitter, each wearing a HeartMan Infrared Headphone. The sound clarity is very similar to a standard stethoscope.

### Auditorium Emitter

The auditorium infrared sound system transmits sounds to a small or large audience, with each individual wearing a HeartMan infrared headphone. A single three-panel infrared array accommodates small classrooms or auditoriums seating up to 175 people, while a dual three-panel infrared array system will likely be needed for larger auditoriums seating up to 500 people.

### HeartMan Infrared Headphone

The HeartMan Infrared Headphone works with these classroom and auditorium systems to allow simultaneous listening in clinical and educational settings.

### Speaker Sound Transmission System

An institution may choose to use a 2:1 speaker system (2 small, medium/higher frequency speakers and 1 subwoofer or lower frequency speaker) that may be connected to Harvey's audio output. One may also connect Harvey to an existing room's audio system (classroom, simulation room, auditorium, etc.). To connect a sound system to Harvey's audio output requires a cable with a male mono 1/4-inch plug (or mono to stereo adapter). Multiple systems exist, and it is important to test these in advance to guarantee that all sound frequencies are transmitted accurately. This may not work with all audio systems, as some may not be able to support low frequency sounds.

## Video Capture Systems

When utilizing Harvey in a classroom setting, use one of the modalities described above for audio transmission. Having the learners visualize findings will aid in their understanding and learning of the cardiopulmonary conditions presented by Harvey. One may consider using a two-camera or one-camera system. The cameras may be fixed to the ceiling or other structure and should be of the Pan Tilt Zoom (PTZ) type, for added flexibility. Ensure the cameras are well placed and vibration is not an issue, in addition to having a clear and sharp image. Video lag may be an issue in some systems. It is important to test this ahead of time.

### Images of system using two simultaneous video cameras

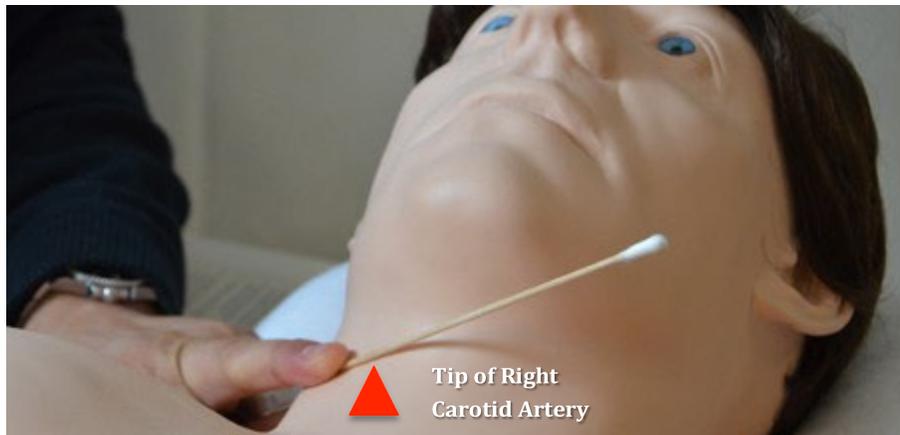


### Image of system using one video camera



When using the video camera to demonstrate Harvey's findings, one may use a cotton swab to show the wave form and intensity of all venous, arterial and precordial impulses. To do this, follow these steps:

1. Locate the tip of the impulse you desire to show.
2. Locate the tip of the cotton swab approximately ½ inch behind the impulse.
3. Place the tip of one finger on the tip of the swab, as illustrated below.



4. Repeat steps 1 - 3 as needed.

To enhance visualization of the movement of the respiratory cycle, you may place a very light object on Harvey's abdomen. This object may be a coin or similar object.

## Overview of Instructional Materials

### Learner Manual

This manual reviews all of the bedside findings for each of the 50 patient scenarios provided with Harvey. They include graphics of the heart sounds and murmurs, with explanations of their pathophysiology. This manual may be used by instructors as a guide for teaching, or by students as a study guide for learning.

### Instructor Guide

This guide provides practical information about the most effective uses of Harvey for learning and testing. It provides advice to administrators and instructors on logistical, educational and technical issues of using the simulator, and it provides suggestions for research projects. It is based on the University of Miami's Gordon Center's 50-year experience in developing and using Harvey, as well as the results from a worldwide survey of Harvey users.

### Nurses Learner Manual

This manual provides focused and guided instructions to teach nursing students and practicing nurses to: 1) identify key assessments when caring for a cardiopulmonary patient; and 2) discuss the basic underlying pathophysiology associated with the assessment findings. It includes all the findings in the Harvey Nurses Curriculum, for learners and instructors.

## **Nurses Instructor Guide**

This guide outlines the optimal use of Harvey for those who teach learners in nursing. The information in this guide is based on our consortium's 50-year experience in developing and using Harvey, the results of a worldwide survey of Harvey users, and the contributions of nurse-educators with experience in simulation-based training.

## **Harvey Standardized Patient (SP) Cases**

Ten SP cases are provided with Harvey. An SP may provide a full history, with the bedside findings provided by Harvey. Each SP case is composed of:

- Standardized Patient History
- Rater Checklist
- SP Checklist

## **Harvey Slide Curriculum**

The Harvey curriculum consists of menu-driven presentations for use in self-assessment. There is a presentation for each of Harvey's patient scenarios. The curricula discuss the history, physical findings, electrocardiograms, angiography, hemodynamics, therapy, pathology and epidemiology for each case. They guide the learner through each case and conclude with a summary of the condition.

## **Nurses Introductory Program**

This program is an excellent resource for nursing students to learn the basics of cardiopulmonary assessment. It is accessible after the curricular programs have been installed.

## Demonstrating Harvey's Findings by Condition

The following table summarizes the key findings that should be demonstrated for faculty. The most essential and common conditions are listed first. If the time allowed to demonstrate Harvey is limited, use the conditions in bold type and marked with an asterisk (demo in approx. 10 min).

Condition (Page # in Learner Manual)	Finding(s) to Highlight	
	Impulses	Sounds
Normal at 60 bpm* (26)	<u>Arterial:</u> normal throughout <u>Venous:</u> normal "a" & "v" waves <u>Precordial:</u> normal contour & location	<u>Heart - 4 classic areas:</u> <ul style="list-style-type: none"> <li>• S2 splitting with respiration</li> <li>• Third sound at apex</li> </ul> <u>Lung:</u> Vesicular sounds throughout <u>Blood Pressure:</u> 120/70 mmHg
Normal at 90 bpm* (28)	<u>Heart &amp; impulse:</u> rate of 90 per min <u>Respiratory:</u> rate of 15 per min	
Aortic Stenosis* (82)	<u>Arterial:</u> diminished carotid and peripheral pulses <u>Precordial:</u> contour = sustained systolic & presystolic (S4)	<u>Heart:</u> <ul style="list-style-type: none"> <li>• Aortic - long murmur with radiation to neck</li> <li>• Apex - transmission of murmur with an audible ejection sound &amp; fourth sound (S4)</li> </ul>
Aortic Regurgitation, chronic* (74)	<u>Arterial:</u> <ul style="list-style-type: none"> <li>• Carotid bifid</li> <li>• Brisk peripheral pulses</li> </ul> <u>Precordial:</u> brisk impulse at displaced left ventricle	<u>Heart:</u> <ul style="list-style-type: none"> <li>• Tricuspid - diastolic murmur at tricuspid area</li> <li>• Aortic - systolic murmur + diastolic murmur</li> <li>• Apex - mid-diastolic murmur at apex (Austin-Flint murmur)</li> </ul> <u>Blood Pressure:</u> 160/35 mmHg
Mitral Stenosis with Severe Tricuspid Regurgitation* (68)	<u>Arterial:</u> diminished throughout <u>Venous:</u> systolic "CV" wave <u>Precordial:</u> <ul style="list-style-type: none"> <li>• RV - sustained systolic &amp; early diastolic (S3)</li> <li>• Pulmonary - sustained</li> </ul>	<u>Heart:</u> <ul style="list-style-type: none"> <li>• Tricuspid - holosystolic murmur + S3 + mid- diastolic murmur at tricuspid area that increases with inspiration</li> <li>• Apex - long diastolic murmur with loud S1 and openingsnap</li> </ul> <u>Lung:</u> inspiratory crackles and expiratory wheezes throughout all lung fields
Hypertension (36)	<u>Precordial:</u> sustained systolic & presystolic (S4)	<u>Heart:</u> Fourth sound at apex
Angina (40)	<u>Precordial:</u> normal & presystolic (S4)	<u>Heart:</u> Fourth sound (S4) at apex <u>Neck:</u> Left carotid bruit
Innocent Murmur (30)		<u>Heart:</u> Pulmonic - short systolic murmur & normal S2 splitting
Mitral Valve Prolapse (48)		<u>Heart:</u> Apex - mid-systolic click & late systolic murmur
Mitral Valve Prolapse, isolated click & murmur (52)		<u>Heart:</u> <ul style="list-style-type: none"> <li>• Tricuspid- isolated mid-systolic click</li> <li>• Apex - isolated late systolic murmur</li> </ul>

Condition (Page # in Learner Manual)	Finding(s) to Highlight	
	Impulses	Sounds
Mitral Regurgitation, mild (58)		<u>Heart:</u> Holosystolic murmur at apex
Mitral Regurgitation, chronic (54)	<u>Precordial:</u> <ul style="list-style-type: none"> <li>Displaced LV - sustained systolic &amp; early diastolic (S3)</li> <li>RV - late systolic – making “rocking” motion</li> </ul>	<u>Heart:</u> Apex - holosystolic murmur & S3 & mid-diastolic murmur
Mitral Regurgitation, acute (62)	<u>Arterial:</u> Brisk pulses throughout <u>Venous:</u> Giant “a” wave <u>Precordial:</u> <ul style="list-style-type: none"> <li>LV - S4 + sustained + S3)</li> <li>RV - sustained)</li> </ul>	<u>Heart:</u> <ul style="list-style-type: none"> <li>Apex - holosystolic murmur + S3 + S4 at the apex</li> <li>Tricuspid - S4 + S3 during inspiration</li> </ul> <u>Lung:</u> Inspiratory crackles in all lung fields
Cardiomyopathy (92)	<u>Arterial:</u> diminished pulses <u>Venous:</u> Giant “a” wave <u>Precordial:</u> <ul style="list-style-type: none"> <li>DLV - S4 + sustained + S3</li> <li>RV - S4 + sustained + S3</li> </ul>	<u>Heart:</u> <ul style="list-style-type: none"> <li>Apex - holosystolic murmur + S3 + S4</li> <li>Tricuspid - S4 &amp; S3 during inspiration</li> </ul> <u>Lung:</u> Inspiratory crackles in posterior, inferior lung fields
Hypertrophic Obstructive Cardiomyopathy ( 90)	<u>Arterial:</u> <ul style="list-style-type: none"> <li>Carotid - bifid</li> <li>Peripheral - hyperdynamic</li> </ul> <u>Precordial:</u> S4 + double systolic (“triple ripple”)	<u>Heart:</u> <ul style="list-style-type: none"> <li>Pulmonic - paradoxical splitting</li> <li>Aortic, pulmonic &amp; tricuspid - systolic ejection murmur</li> <li>Apex: Holosystolic murmur + S4 + S3</li> </ul>
Atrial Septal Defect (112)	<u>Venous:</u> Equal “a” and “v” waves <u>Precordial:</u> Hyperdynamic pulmonary and RV impulses	<u>Heart:</u> <ul style="list-style-type: none"> <li>Pulmonic - systolic ejection murmur + fixed splitting</li> <li>Tricuspid - mid-diastolic murmur</li> </ul>
Coarctation of the Aorta (120)	<u>Arterial:</u> Hyperdynamic carotid and diminished and delayed femoral pulses	<u>Heart:</u> <ul style="list-style-type: none"> <li>All: Systolic ejection murmur</li> <li>Aortic: Diastolic murmur</li> </ul>

## Technical Guides and Videos

These sets of Harvey guides are to be supplemented with Harvey instructional videos, which will be available online.

### Preventive Maintenance and Calibration

#### Cleaning Harvey's Skin

Harvey should be cleaned on a regular basis, depending on the frequency of use (daily, weekly, monthly and quarterly). Users should avoid having ink, food or drinks near Harvey. The institution should advise users to wash their hands with soap and water, or alcohol- based gel, prior to use. If any ink or dirt markings are present, these should be cleaned as soon as possible to reduce the risk of these becoming permanent.

For general cleaning, please follow these steps:

1. Assemble the supplies (cleaning kit provided with Harvey: alcohol prep pads, terry cloth rags.
2. Use a clean cloth with rubbing alcohol (ethyl alcohol), or an alcohol prep pad (if the area to clean is small), and gently rub over the affected area to avoid tearing of skin.
3. Allow sufficient time for the skin to dry thoroughly.
4. Use lint roller to remove any excess dirt or dust.

If these procedures do not work, contact the Technical Lab at the Gordon Center.

#### Calibrating the Blood Pressure

See page 14 for instructions to calibrate the blood pressure.

#### Calibrating the Impulses (Venous, Arterial and Precordial)

Adjustments might be needed after Harvey is moved, or for the preferences of the faculty members teaching with Harvey. Adjustments may be made by two methods:

##### Temporary Adjustments:

To temporarily adjust all the pulse amplitudes simultaneously, use the controls on the main page.

Note: This method will equally increase or decrease all of Harvey's impulses.

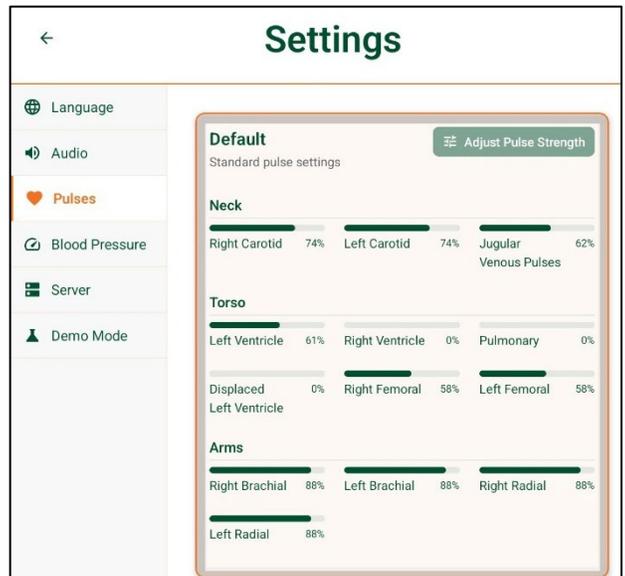
## Permanent Adjustments

Allows separate control of the pulse amplitudes of the neck, torso and arms. Click the “Settings” button on the Home page.

**Note:** Only those pulses that are activated for the active condition will be accessible for adjustment and will remain in effect for that condition

Access Pulse Calibration page by tapping the “Adjust Pulse Strength” button on the top right corner using the password ‘harveytech’

Tap "Restore Default Amplitudes" to return to the original factory settings.



## Replacing the Stethoscope

To replace Harvey's stethoscope, the required steps are:

1. Power Harvey off
2. Disconnect old stethoscope from the side panel
3. Plug in new stethoscope
4. Once the stethoscope has been installed, power Harvey and check for functionality.

## Replacing the Blood Pressure Cuff

To replace Harvey's blood pressure cuff, please follow these steps:

1. Locate and disconnect the sphygmomanometer's bulb assembly and tubes (A).



2. Locate and disconnect the clear tube that goes through the Harvey from the sphygmomanometer (B).



3. Connect the new blood pressure cuff in the appropriate orientation. Then follow these steps in reverse order to connect other components.
4. Check for functionality.

## Appendix

### Optional Educational Materials

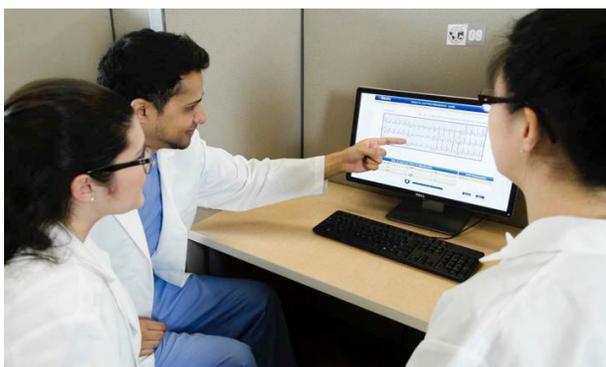
#### UMedic Programs Overview

UMedic programs are created by a consortium of cardiologists, neurologists, and educators known as the M.I.A.M.I. Group (the Miami International Alliance for Medical- Education Innovation). UMedic programs are updated periodically and include pertinent and common findings, the most current procedures for patient evaluation, and current medical and surgical therapy when appropriate. The UMedic programs have been proven to teach bedside skills while providing all elements of the complete patient evaluation and treatment. Depending on the content presented, these programs use multiple learning strategies, some of which are as follows: interactive case-based presentations, voice overs, graphics, animations, interactive exercises, and recordings of a faculty member teaching. All UMedic programs come with a site license that allows the institution to use these programs with an unlimited number of learners.

#### UMedic Multimedia Computer Curriculum in Cardiology

This is a series of interactive web-based programs, accessible on PC or MAC operating systems. Bedside skills are taught through video demonstrations of Harvey. UMedic Cardiology may be used as a stand-alone system or in conjunction with Harvey in the self-learning mode.

Throughout each patient-centered, self-learning program, the student is guided by a physician-instructor, who provides continuity. In addition, video demonstrations, animations, narrative explanations, and feedback are provided throughout each program. These features help standardize learning and save additional faculty/instructor time.



**Small group using UMedic**



**Student using Harvey with UMedic**

For additional information and a demonstration, use the following link:

<https://gordoncenter.miami.edu/Harvey/>

## **UMedic Essential Cardiac Auscultation**

This is an interactive and engaging web-based program, accessible on PC or MAC operating systems. Essential Cardiac Auscultation teaches the most important findings (The "Big 12") and their associated pathophysiology. The "Big 12" were chosen from national surveys of program directors and are emphasized by certification boards. They are presented through the use of Harvey, graphics, animations, and audio samples.

Essential Cardiac Auscultation is ideal for healthcare learners and practitioners at all levels (physicians, physician assistants, nurses and nurse practitioners). It teaches cardiac auscultation and pathophysiology in a cost-effective manner and has been tested at multiple centers.

The content is divided into four sections, as follows:

- **Orientation** - reviews goals and approach to cardiac auscultation
- **Learning** - presents findings on Harvey
- **Practice** - allows repetitive practice of all findings at different heart rates
- **Self-testing** - provides immediate feedback and a summary of findings to review

For additional information and a demonstration, use the following link: \_

<https://gordoncenter.miami.edu/umedic/>

## **UMedic Essential Electrocardiography (ECG) and Arrhythmia**

This is a series of interactive and engaging web-based programs, accessible on PC or MAC operating systems. These programs teach a systematic approach to ECG interpretation, and pattern and arrhythmia recognition. Content is divided into three separate programs as follows:

- **Essential ECG I** is a learning-focused, introductory program on interpreting the normal ECG.
- **Essential ECG II** is a case-based program on interpreting the most important ECG patterns. It consists of learning, practicing and testing modules.
- **Essential ECG III** is a program on interpreting the most important arrhythmias. It consists of learning, practicing and testing modules.

The Essential ECG series is ideal for healthcare learners and practitioners at all levels (physicians, physician assistants, nurses and nurse practitioners). ECG I should be considered for basic nurses, and ECG II and III are best for advanced practice nurses.

For additional information and a demonstration, use the following link:

<https://gordoncenter.miami.edu/umedic/>



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