Using The HESS ICU Monitor App

Healthcare Education Simulation Station

Revised 7/1/2025

www.BetterNurseEducation.com

PLEASE READ

DISCLAIMER

The information in the HESS is not intended or implied to be a substitute for professional medical expertise, advice, diagnosis or treatment.

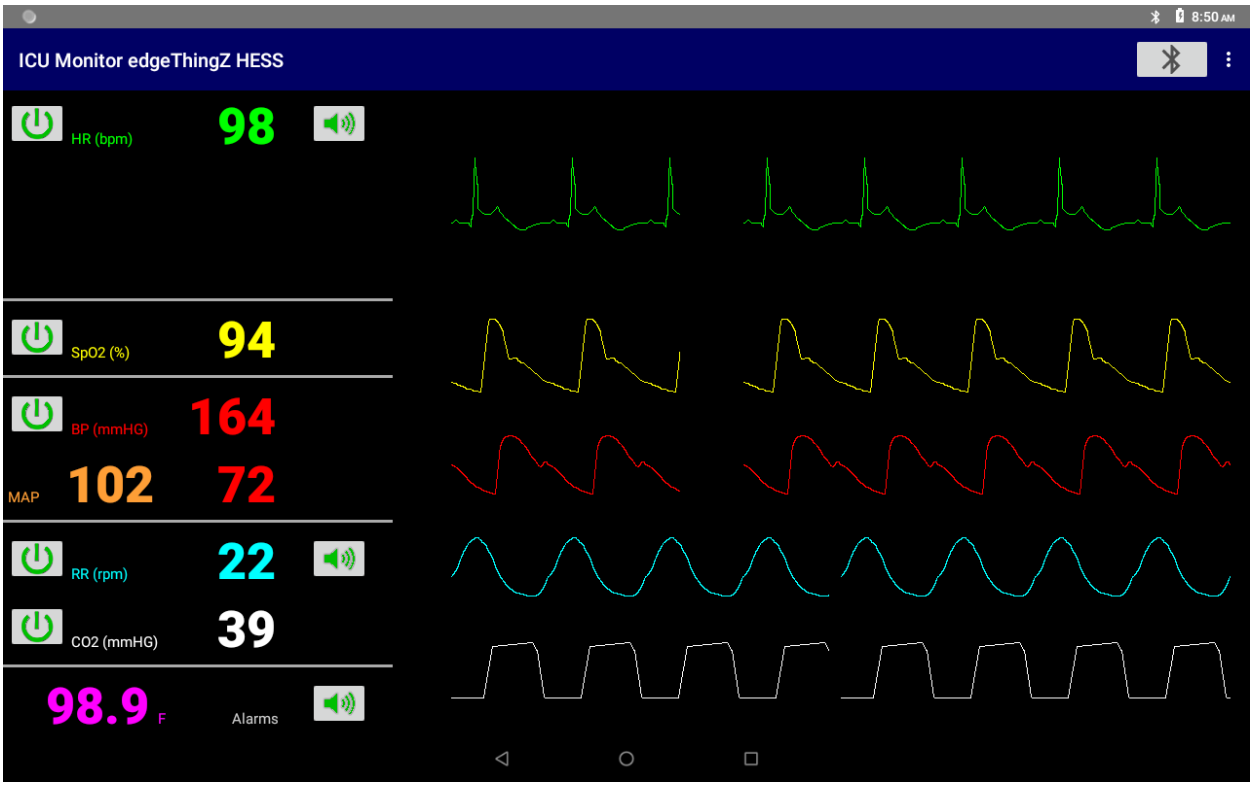
There is no representation and no responsibility for the accuracy of information contained within the HESS.

The HESS is only intended to be used as an instructional aide by qualified medical educational professionals.

About The HESS ICU Monitor App

The HESS ICU Monitor App was created to let healthcare professionals conduct learning exercises that involve a simulated ICU Monitor in a safe and “low stakes” environment.

The ICU Monitor can be used to simulate vitals on both Manikins and Standardized Patients (actors) in a learning exercise.



Tablets Suitable To Run The HESS ICU Monitor App

The HESS ICU Monitor App can run on Android tablets with Version 8 or above of the Android operating system and with a screen size of at least 10 inches.

Android tablets with screen sizes smaller than 10 inches may not display the ICU Monitor App screen elements correctly.

The ICU Monitor App can be run on larger screen sizes if the educational exercise dictates using a larger tablet – such as displaying the ICU Monitor App screen on a monitor or projector.

HESS Vitals Accepted By The HESS ICU Monitor App

The HESS ICU Monitor App will recognize and use the following vitals transmitted from the HESS Instructor tablet.

1. EKG Vitals

The EKG Vitals that the ICU Monitor App recognizes and uses are the EKG Pulse Rate (BPM), the Primary EKG Waveform, the Primary EKG Pulse Rate Irregularity Percentage, the optional Alternate EKG Waveform and the optional Alternate EKG Pulse Rate Irregularity Percentage.

If the optional Alternate EKG Waveform is used, the number of Primary EKG Waveforms to show in sequence can be set - along with the number of Alternate EKG Waveforms to show in sequence. The "sets" of Primary and Alternate Waveform sequences will then alternate on the EKG Vitals display.

2. Pulse Oximetry Vitals

The Pulse Oximetry Vitals that the ICU Monitor App recognizes and uses are the Pulse Rate (BPM), Pulse Arrhythmia Type, Pulse Arrhythmia Rate, SPO2 (%) and the SPO2 Waveform.

3. Capnography Vitals

The Capnography Vitals that the ICU Monitor App recognizes and uses are the Respiration Rate (rpm), the End-Tidal Carbon Dioxide - EtCO2 (mmHG), and the Capnogram Waveform.

4. Blood Pressure Vitals

The Blood Pressure Vitals that the ICU Monitor App recognizes and uses are the BP Systolic Pressure (mmHG), BP Diastolic Pressure (mmHG), BP Pulse Rate (BPM) and the Arterial BP Waveform.

5. Body Temperature Vitals

The Body Temperature Vitals that the ICU Monitor App recognizes and uses are the Body Temperature (Degrees F or Degrees C).

The choice of Degrees F or Degrees C is set in the HESS Instructor App Settings.

Using The HESS ICU Monitor App

1. Starting the ICU Monitor App

The HESS ICU Monitor App can be started by touching the HESS ICU Monitor App icon on the Android tablet.

2. Starting the ICU Monitor Vitals Display

AFTER each specific set of ICU Monitor Vitals have been transmitted successfully from the HESS Instructor App, the “power” buttons next to each type of Vitals can be used to “toggle” the display of those specific Vitals on or off.

3. Suppressing Audio

The “sound” buttons in the Heart Rate and Capnography Vitals sections can be used to “toggle” the Heart Rate or Respiration Rate audio on or off.

The “sound” button next to the “Alarms” indicator can be used to silence alarm audio.

4. Defibrillator Usage

If the “Display Shock Button” option is set to “Yes” in the ICU Monitor Settings, the ICU Monitor Defibrillator section will be displayed. Within this section the learner can use the + / - buttons to set the desired charge in Joules and use the “SYNC” button to set the Defibrillator Sync Mode on or off.

AFTER EKG Vitals have been transmitted successfully from the HESS Instructor App and the EKG Waveform is being displayed, the red and white “shock” button can be used to deliver a simulated shock to the patient. The EKG Display will show the effect of the “shock” in the Waveform area. However, no changes to the EKG Waveform will actually occur until new EKG Vitals are transmitted successfully from the HESS Instructor App.

Note: The “SYNC” button choice is present for learning purposes only and does not affect how/where the “shock” Waveform will actually appear on the display)

HESS ICU Monitor App Settings

The HESS ICU Monitor App has the following Settings available via the Android “3 dots menu” in the upper right corner of the ICU Monitor App screen:

1. Pulse Rate Low And High Alarms

Sets values, that if the Pulse Rate (BPM) falls below or rises above, will trigger the ICU Monitor App to sound an audible alarm.

2. SPO2 Low And High Alarms

Sets values, that if the SPO2 (%) falls below or rises above, will trigger the ICU Monitor App to sound an audible alarm.

3. Respiration Rate Low And High Alarms

Sets values, that if the Respiration Rate (rpm) falls below or rises above, will trigger the ICU Monitor App to sound an audible alarm.

4. eTCO2 Low And High Alarms

Sets values, that if the EtCO2 (mmHG) falls below or rises above, will trigger the ICU Monitor App to sound an audible alarm.

5. BP Systolic Low And High Alarms

Sets values, that if the BP Systolic Pressure (mmHG) falls below or rises above, will trigger the ICU Monitor App to sound an audible alarm.

6. BP Diastolic Low And High Alarms

Sets values, that if the BP Diastolic Pressure (mmHG) falls below or rises above, will trigger the ICU Monitor App to sound an audible alarm.

7. BP Mean Arterial Pressure (MAP) Low And High Alarms

Sets values, that if the BP Mean Arterial Pressure (MAP) (mmHG) falls below or rises above, will trigger the ICU Monitor App to sound an audible alarm.

8. Body Temperature Low And High Alarms

Sets values, that if the Body Temperature (Degrees) falls below or rises above, will trigger the ICU Monitor App to sound an audible alarm.

HESS ICU Monitor App Settings

9. Flip Display

Flips the ICU Monitor App screen to enable easier access to tablet ports – such as the charging port or the audio jack – during use.

10. Pulse Rate Display Refresh

Sets the time between "refreshes" of the Pulse Rate Vital on the display. The setting can be for an "Immediate" refresh – or set to only "refresh" periodically (every 1-5 seconds). This option can increase realism and reduce learner distraction when the Pulse Rate is changing rapidly.

11. Display Shock Button

Displays or hides the ICU Monitor Defibrillator section.

12. Suppress EtCO2 Display

If set to "Yes", the ICU Monitor will not display the EtCO2 Vitals nor the Capnography Waveform.

13. Device Address

The ICU Monitor App receiving address for the Vitals – which must match the transmission address for the Vitals in the HESS Instructor App. Device Addresses are 4 characters made up of the characters 0-9 and A-F. **DO NOT USE** "0000" or "FFFF" as Device Addresses. "0000" and "FFFF" have special uses within the HESS. Using these special Device Addresses can cause unpredictable results.

HESS ICU Monitor App Usage Notes

1. Bluetooth Reset Button

If, after numerous attempts, the ICU Monitor App is still not receiving Vitals transmissions – even though the Instructor transmission and the Device receiving addresses match – the "Bluetooth Reset" button in the upper right corner of the screen can be used to reset the Android tablet's Bluetooth functions. This often will resolve Bluetooth oriented issues without having to stop or disrupt the app.

2. EKG Heart Rate Overrides Pulse Oximetry Heart Rate and BP Heart Rate

When there are multiple heart rates transmitted to the ICU Monitor App, the order of precedence for the heart rate is 1) EKG Heart Rate, 2) Pulse Oximetry Heart Rate, 3) BP Heart Rate. EKG Vitals will also override Pulse Oximetry Arrhythmia Vitals.

3. Issues When Using Very Low Heart Rates

The cardiac portion of the ICU Monitor App is "driven" by a simulated cardiac cycle. The ICU Monitor App will finish any currently established cardiac cycle before moving to new Vitals values even if the new Vitals transmissions have been successfully received. In cases of very low heart rates – such as 10 BPM or lower – it can take some time before changes appear. As an example, in an extreme case of a heart rate set to 1 BPM, the cardiac cycle would be 60 seconds in duration and it could take 1-2 minutes for changes transmitted to take effect. This can make the app appear unresponsive even though it is working properly.

4. Issues When Using Very Low Respiration Rates

The respiratory portion of the ICU Monitor App is "driven" by a simulated respiratory cycle. The ICU Monitor App will finish any currently established respiratory cycle before moving to new Vitals values even if the new Vitals transmissions have been successfully received. In cases of very low respiration rates – such as 5 rpm or lower – it can take some time before changes appear. As an example, in an extreme case of a respiration rate set to 1 rpm, the respiratory cycle would be 60 seconds in duration and it could take 1-2 minutes for changes transmitted to take effect. This can make the app appear unresponsive even though it is working properly.

5. When Done, "Power Off" Tablets – Don't Just "Suspend" Them

The Android tablets should be completely "powered off" when stored or the battery will drain to 0% charge. Completely drained batteries can then take 20-30 minutes of charging just to get the tablet to power up for usage. Even if the tablet screen is dark it can be misleading because the tablet may only be "suspended". Pressing the power button for ½ second will indicate if the tablet is completely powered off – by either "unsuspending" the tablet screen if the tablet is only "suspended" – or remaining dark if the tablet is completely powered off.