

Using The HESS Fetal Monitor App

Healthcare Education Simulation Station

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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.

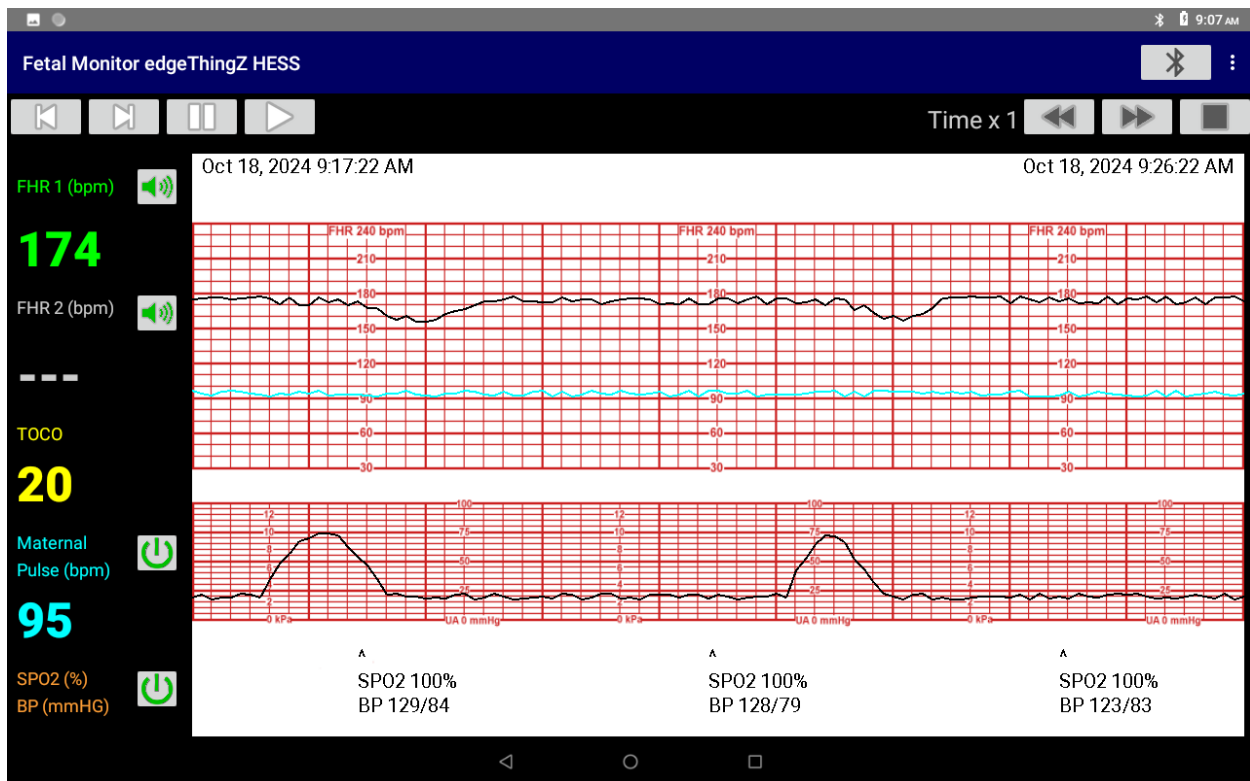
There is no representation and no responsibility for the accuracy of information contained within the HESS.

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

About The HESS Fetal Monitor App

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

The Fetal Monitor can be used to simulate vitals on both Manikins and Standardized Patients (actors) in an OB oriented learning exercise.



Tablets Suitable To Run The HESS Fetal Monitor App

The HESS Fetal 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 Fetal Monitor App screen elements correctly.

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

HESS Vitals Accepted By The HESS Fetal Monitor App

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

1. Contraction Vitals

The Contraction Vitals that the Fetal Monitor App recognizes and uses are the Contraction TOCO Peak (mmHG), the Contraction TOCO Peak Variability (mmHG), the Contraction TOCO Baseline (mmHG), the Contraction TOCO Baseline Variability (mmHG), the Contraction TOCO Type, the Contraction Duration (sec), the Contraction Interval and if there are Contraction Couplets.

Contraction Vitals Note:

- The Contraction Vitals “drive” the Fetal Monitor Strip. The Fetal Monitor App will only start “charting” labor progress AFTER it has received the Contraction Vitals – regardless of whether it has received either of the Fetal Heart Rate Vitals or the Maternal Pulse Oximetry/BP Vitals.

2. Fetal Heart Rate 1 Vitals

The Fetal Heart Rate 1 Vitals that the Fetal Monitor App recognizes and uses are the Fetal Heart Rate (BPM), Decel Magnitude (BPM), Late Decel Shift (%), Prolonged Decel Shift (%), Sinusoidal FHR, Fetal Heart Rate Variability (BPM), Accel Type, Accel Magnitude (BPM), Accel Width (sec), Accel Frequency (%), Variable Decel Type, Variable Decel Magnitude (BPM), Variable Decel Width (sec) and Variable Decel Frequency(%).

3. Fetal Heart Rate 2 Vitals (if Twins)

The Fetal Heart Rate 2 Vitals that the Fetal Monitor App recognizes and uses are the Fetal Heart Rate (BPM), Decel Magnitude (BPM), Late Decel Shift (%), Prolonged Decel Shift (%), Sinusoidal FHR, Fetal Heart Rate Variability (BPM), Accel Type, Accel Magnitude (BPM), Accel Width (sec), Accel Frequency (%), Variable Decel Type, Variable Decel Magnitude (BPM), Variable Decel Width (sec) and Variable Decel Frequency(%).

Fetal Heart Rate Vitals Notes:

- Accel and Variable Decel Types can be “Periodic” or “Episodic”. Periodic Accels or Variable Decels will only occur with a Contraction while Episodic Accels or Variable Decels can occur with a Contraction OR within a Contraction Interval. The “Frequency” of the Accels or Variable Decels determines the percentage of the Contractions or Contraction Intervals that will display an Accel or Variable Decel (e.g. 100%, 20%, etc.).
- Using the 125% Prolonged Decel Shift and Slow Return option will result in a VERY long period of time before the Fetal Monitor Strip will return to the regular transmitted vitals. During this time, new transmissions will not change the Fetal Monitor App display.

HESS Vitals Accepted By The HESS Fetal Monitor App

4. Pulse Oximetry Vitals

The Pulse Oximetry Vitals that the Fetal Monitor App recognizes and uses are the Pulse Rate (BPM), and the SPO2 (%). These vitals are treated as Maternal Vitals.

5. Blood Pressure Vitals

The Blood Pressure Vitals that the Fetal Monitor App recognizes and uses are the BP Systolic Pressure (mmHG) and the BP Diastolic Pressure (mmHG). These vitals are treated as Maternal Vitals.

Fetal Monitor Vitals Notes:

- The Fetal Monitor Strip of the Fetal Monitor App is “driven” by simulated contraction cycles and contraction intervals. The Fetal Monitor App will finish any currently established contraction cycle OR any currently established contraction interval before moving to new Vitals values even if the new Vitals transmissions have been successfully received. In cases of very long contraction cycles or contraction intervals – Contraction Intervals can be as long as 10 minutes – it can take some time before changes appear. As an example, in an extreme case of a contraction duration set to 120 seconds and a contraction interval set to “9-10 minutes”, it could take over 12 minutes for changes transmitted to take effect. This can make the app appear unresponsive even though it is working properly. While these are extreme cases, Instructors should plan and practice how Vitals changes will be handled during a live learning exercise.

Using The HESS Fetal Monitor App

1. Starting the Fetal Monitor App



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

2. Starting the Fetal Monitor Vitals Display

The Fetal Monitor App will start “charting” labor progress AFTER the Contraction Vitals have been transmitted successfully from the HESS Instructor App.

The Fetal Monitor App Fetal Heart Rate audio sounds will begin AFTER either of the Fetal Heart Rate Vitals have been transmitted successfully from the HESS Instructor App.



AFTER Pulse Oximetry Vitals have been transmitted successfully from the HESS Instructor App, the “power” button in the Maternal Pulse section can be used to “toggle” the display / charting of the Maternal Pulse Rate and Maternal SPO2 (%) on or off. The SPO2 (%) is displayed along the bottom of the screen at intervals.

AFTER Blood Pressure Vitals have been transmitted successfully from the HESS Instructor App, the “power” button in the BP (mmHG) section can be used to “toggle” the display of the Maternal Blood Pressure on or off. The Maternal Blood Pressure is displayed along the bottom of the screen at intervals.

3. Suppressing Audio



The “sound” buttons in the two Fetal Heart Rate Vitals sections can be used to “toggle” the respective Fetal Heart Rate audio sounds on or off.

Using The HESS Fetal Monitor App

4. Controlling The Fetal Monitor Strip Display



The “Pause” button can be used to “freeze” the Fetal Monitor Strip display for viewing while labor continues. The Vitals and sound audio will continue.



The “Stop” button can be used to temporarily completely “stop” the Fetal Monitor App from running. The Vitals and sound audio will stop also.



The “Play” button can be used to “un-freeze” or “re-start” the Fetal Monitor Strip after Pausing or Stopping.



The “Back” and “Forward” buttons can be used to “scroll” through the Fetal Monitor Strip to see older portions of the strip. The Fetal Monitor App can hold approximately 4000 data points before beginning to drop data from the oldest part of the strip.

The Date/Time indicators at the top of the strip can provide navigational cues regarding the position of the display within the full strip. The “Play” button will immediately return the display to the current Vitals position.



The Time Multiplier buttons can be used to increase or decrease the speed that the Vitals appear on the Fetal Monitor Strip. The Fetal Monitor Strip can proceed in “real time” using “Time x 1” or proceed faster (2, 5 or 10 times “real time” speed). This option is to facilitate learning efficiency within the time constraints of a learning exercise. The Fetal Heart Rate audio sounds remain in “real time” regardless of the Time Multiplier setting.

HESS Fetal Monitor App Settings

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

1. Fetal Monitor Background Shading

Allows enabling a light background shading in the Fetal Heart Rate area of the display between either 120-160 BPM or 110-160 BPM to facilitate visually identifying a healthy Fetal Heart Rate range.

2. Maternal Pulse Variability

Enables setting variability of 0-20 bpm in the displayed Maternal Pulse Rate to increase realism.

3. Maternal SPO2 Variability

Enables setting variability of 0-20 % in the displayed Maternal SPO2 to increase realism.

4. Maternal BP Variability

Enables setting variability of 0-20 mmHG in the displayed Maternal Blood Pressure to increase realism.

5. Flip Display

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

6. Fetal Monitor Data Rate

Sets the time between “refreshes” of the Vitals on the Fetal Monitor Strip display. A setting of 5 seconds between “refreshes” is most consistent with real Fetal Monitoring systems.

Setting 2.5 seconds or 1 second between “refreshes” will result in more defined and clear data curves on the Fetal Monitor Strip which can benefit less experienced learners in identifying key visual Fetal Monitor Strip elements related to Contractions, Variabilities, Accels, Decels, etc.

7. Device Address

The Fetal 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 Fetal Monitor App Usage Notes

1. Bluetooth Reset Button



If, after numerous attempts, the Fetal 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. Contraction Vitals “Drive” the Fetal Monitor Strip

The Contraction Vitals “drive” the Fetal Monitor Strip. The Fetal Monitor App will only start “charting” labor progress AFTER it has received the Contraction Vitals – regardless of whether it has received either of the Fetal Heart Rate Vitals or the Maternal Pulse Oximetry/BP Vitals.

3. Time To See Changes To Transmitted Vitals

The Fetal Monitor Strip of the Fetal Monitor App is “driven” by simulated contraction cycles and contraction intervals. The Fetal Monitor App will finish any currently established contraction cycle OR any currently established contraction interval before moving to new Vitals values even if the new Vitals transmissions have been successfully received. In cases of very long contraction cycles or contraction intervals – Contraction Intervals can be as long as 10 minutes – it can take some time before changes appear. As an example, in an extreme case of a contraction duration set to 120 seconds and a contraction interval set to “9-10 minutes”, it could take over 12 minutes for changes transmitted to take effect. This can make the app appear unresponsive even though it is working properly. While these are extreme cases, Instructors should plan and practice how Vitals changes will be handled during a live learning exercise.

4. When Using Contraction Couplets

If the Contraction Couplets option is set to “Yes” in the Contraction Vitals, the Fetal Monitor App will place the Coupled Contractions at approximately 45-60 seconds apart. If the Contraction Interval is also set to less than 2.0-2.5 minutes, the Contraction Couplets may appear as normal single Contractions with a short interval. Therefore, Contraction Couplets are best viewed with longer Contraction Intervals.

5. When Using Prolonged Decel Delay and Slow Return

Using the 125% Prolonged Decel Shift and Slow Return option will result in a VERY long period of time before the Fetal Monitor Strip will return to the regular transmitted vitals. During this time, new transmissions will not change the Fetal Monitor App display. This can make the app appear unresponsive even though it is working properly.

HESS Fetal Monitor App Usage Notes

6. When Using Accels Or Variable Decels With Short Contractions Or Short Contraction Intervals

Accel and Variable Decel Types can be “Periodic” or “Episodic”. Periodic Accels or Variable Decels will only occur with a Contraction while Episodic Accels or Variable Decels can occur with a Contraction OR within a Contraction Interval.

The “Width” of the Accels or Variable Decels is specified as the number of seconds that the Accel or Variable Decel will last from start to finish. If the “Width” of the Accel or Variable Decel specifies that it will take more seconds than are available within the Contraction or the Contraction Interval in which it is supposed to appear - then the Accel or Variable Decel WILL NOT APPEAR with that Contraction or within that Contraction Interval. This can make the app appear as if it is incorrectly handling Accels or Variable Decels even though it is working properly.

7. 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.