Using The HESS Body Sounds App

Healthcare Education Simulation Station

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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 Body Sounds App

The HESS Body Sounds App was created to let healthcare professionals conduct learning exercises that involve auscultation or recognizing body sounds in a safe and “low stakes” environment.

The Body Sounds App can be used to simulate auscultation on both Manikins and Standardized Patients (actors) where a real Stethoscope would either render the healthy body sounds of the Standardized Patient or render no sounds from an artificial Manikin limb.

Tablets Suitable To Run The HESS Body Sounds App

The HESS Body Sounds App can run on Android tablets with Version 8 or above of the Android operating system and with a screen size of approximately 7 inches. The 7 inch screen size is a common Android tablet size that can allow the tablet to still be hand held.

Android tablets with screen sizes smaller than 7 inches may not display the Body Sounds App screen elements correctly.

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

HESS Vitals Accepted By The HESS Body Sounds App

The HESS Body Sounds App will recognize and use the following vitals transmitted from the HESS Instructor tablet.

1. Body Sounds Vitals

The Body Sounds Vitals that the Body Sounds App recognizes and uses are the Marker 1 Rate (per minute) and the Marker 1 Sound which defines the audible sound pattern.

Marker 1:

The Marker 1 Rate and the Marker 1 Sound combine to result in playing the "sound" repeatedly at the "rate". For example, if the "sound" is a heart sound and the "rate" is 60 per minute, the heart sound will play 60 times per minute – like a heart beating at 60 BPM.

The Marker 1 Rate and Marker 1 Sound do not actually require a "marker" on a Manikin or a Standardized Patient. "Marker 1" will play without any "marker" at all.

Marker 2 and Marker 3:

The Body Sounds Vitals transmitted also contain a Marker 2 Rate, a Marker 2 Sound, a Marker 3 Rate and a Marker 3 Sound. **These Marker 2 and Marker 3 rates and sounds will only work in conjunction with the Ink Sensor Smart Cable**.

The Ink Sensor Smart Cable can be used to place "markers" on a Manikin or a Standardized Patient (or other surfaces too…) using Luminescent Ink that illuminates under UV light. In most cases the Luminescent Ink is invisible to the naked eye – so the result is that invisible "markers" can be placed on a Manikin or a Standardized Patient so that the learner must place the Ink Sensor Smart Cable probe end in the right location to hear the sound (simulating the placement of a Stethoscope or a Doppler Probe, etc.).

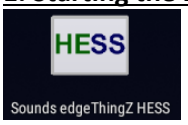
Therefore, the Ink Sensor Smart Cable controls WHEN the sound is played (based on the placement of the sensor flush against a flat surface resulting in the sensing of "darkness") and WHICH sound is played (based on which Marker is "seen" by the sensor at a specific location under UV light).

Again, WITHOUT the Ink Sensor Smart Cable to control "when" the sound should be played and "which" sound should be played, the Body Sounds App simply defaults to playing the Marker 1 Sound at the Marker 1 Rate automatically.

More information about using the Marker 2 and Marker 3 sounds in conjunction with the Ink Sensor Smart Cable can be found in the **HESS Ink Sensor Smart Cable** sections of this guide and also at **www.BetterNurseEducation.com.**

Using The HESS Body Sounds App

1. Starting the Body Sounds App



The HESS Body Sounds App can be started by touching the HESS Body Sounds App icon on the Android tablet.

2. Listening To The Body Sounds Without The Ink Sensor Smart Cable

AFTER the Body Sounds Vitals have been transmitted successfully from the HESS Instructor App, the Body Sounds App will start playing the Marker 1 Sound at the Marker 1 Rate automatically.

3. Listening To The Body Sounds WITH The Ink Sensor Smart Cable

AFTER the Body Sounds Vitals have been transmitted successfully from the HESS Instructor App, the learner can place the Ink Sensor Smart Cable probe end flush against a surface – such as the skin of a Manikin or a Standardized Patient.

In the case where ONLY "**Enable Smart Cable**" is set to "Yes" in the Body Sounds App Settings, the sensor will sense "darkness" and the Marker 1 Sound will begin to play at the Marker 1 Rate.

In the case where "**Enable Smart Location**" is ALSO set to "Yes" in the Body Sounds App Settings, the sensor will attempt to "see" one of the three "learned" Markers under UV light. If/When the sensor "sees" one of the learned Markers, the appropriate sound (Marker 1, Marker 2 or Marker 3) will play at the appropriate rate.

NOTE: Most tablets do not have speakers of sufficient quality to produce listenable Body Sounds. Earbuds or headphones should be plugged into the tablet's audio jack to hear the Body Sounds during a learning exercise. The tablet volume level may also need to be adjusted.

HESS Body Sounds App Settings

The HESS Body Sounds App has the following Settings available via the Android "3 dots menu" in the upper right corner of the Body Sounds App screen:

1. Flip Display

Flips the Body Sounds App screen to enable easier access to tablet ports – such as the charging port, Smart Cable (USB) port or the audio jack – during use.

2. Suppress Background Sound

Turns the Body Sounds App background sounds on or off. Background sounds make the audio sounds of the Body Sounds App more realistic, but also more challenging for less experienced learners.

3. Device Address

The Body Sounds 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 Body Sounds App Settings

The HESS Body Sounds App has the following Smart Cable Oriented Settings:

4. Enable Smart Cable

Requires use of the Ink Sensor Smart Cable.

With "Enable Smart Cable" set to "Yes", the Body Sounds App requires the learner to place the Ink Sensor Smart Cable "probe end" against a flat surface so that "darkness" is sensed. Once "darkness" is sensed, the Body Sounds App will play the audio sounds for Marker 1.

DO NOT select "Yes" for this option unless an Ink Sensor Smart Cable is being used in the learning exercise.

5. Enable Smart Location

Requires use of the Ink Sensor Smart Cable **AND** "Enable Smart Cable" set to "Yes".

Smart Location requires a surface Marker color to be learned by the Body Sounds App and will only play the audio sounds when the Ink Sensor Smart Cable senses BOTH:

a) "darkness" ("probe end" against a flat surface), **AND**
b) a learned Marker color at the specific location of the Marker on the surface.

See the **Setting The Ink Sensor Smart Cable Marker Color** section for more information.

DO NOT select "Yes" for this option unless an Ink Sensor Smart Cable is being used in the learning exercise.

6. View Marker Sensor Data

Displays the status of the Marker data being sensed by the Ink Sensor Smart Cable – so that Instructors can diagnose and troubleshoot the Ink Sensor Smart Cable setup and function.

7. Smart Cable Vendor ID

Used ONLY if a "non-HESS" (3rd Party) Ink Sensor Smart Cable has been built to be used as the Ink Sensor Smart Cable. This should be zero if using a genuine HESS Ink Sensor Smart Cable OR if not using a Smart Cable.

8. Smart Cable Product ID

Used ONLY if a "non-HESS" (3rd Party) Ink Sensor Smart Cable has been built to be used as the Ink Sensor Smart Cable. This should be zero if using a genuine HESS Ink Sensor Smart Cable OR if not using a Smart Cable.

HESS Body Sounds App Usage Notes

1. Bluetooth Reset Button

If, after numerous attempts, the Body Sounds 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. Issues When Using Very Low Sound Rates

The Body Sounds App is "driven" by a sound rate that simulates a body function cycle – such as a heart rate or a respiratory rate. The Body Sounds App will finish any currently established cycle before moving to new Vitals values even if the new Vitals transmissions have been successfully received. In cases of very low sound rates – such as 10 per minute or lower – it can take some time before changes appear. As an example, in an extreme case of a heart sound rate set to 1 BPM, the 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.

3. 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.

HESS Ink Sensor Smart Cable

The HESS Ink Sensor Smart Cable was created to attach to an Android tablet running the Body Sounds App.

To use the Ink Sensor Smart Cable, the Settings of the Body Sounds App must have the "Enable Smart Cable" option set to "Yes".

To attach the Ink Sensor Smart Cable, insert the USB plug of the Ink Sensor Smart Cable into a suitable USB Adapter cable - which should be plugged into the USB port of the tablet running the Body Sounds App. Such a USB Adapter cable allows attachments with full sized USB plugs to be used with tablets – which usually have smaller "mini-USB" or "micro-USB" ports.

A USB extension cable will also likely be desired in this setup (e.g. a 6 ft USB extension cable) to serve as the cord to allow the learner to use the Ink Sensor Smart Cable like a Stethoscope diaphragm.

If the Body Sounds App is running you will need to provide Permission in a popup window to use the attached Ink Sensor Smart Cable.

Once the Ink Sensor Smart Cable is attached and communicating properly - the text in the blue toolbar at the top of the Body Sounds App will be green rather than white. This green text is the "Smart Cable Indicator" that confirms the Ink Sensor Smart Cable is working.

This text should stay green for the duration of the learning exercise. The text may briefly turn blue when a Bluetooth transmission is received – or even briefly turn white – but it should quickly return to green to indicate proper communication with the Ink Sensor Smart Cable.

If the text remains white or blue for more than a second, the Ink Sensor Smart Cable is not communicating properly and should be reset using one of the following steps (AND any vitals should then be re-transmitted to the Body Sounds App):

a. Try detaching and then reattaching the USB cable as in the initial installation.
b. Try closing and restarting the Body Sounds App and reattaching the USB cable.
c. In very rare cases, try powering off the Android tablet and then restarting it.

HESS Ink Sensor Smart Cable

If a surface Marker color is also going to be used, the "Enable Smart Location" option must be set to "Yes".

By rubbing a small amount (about the size of a dime or quarter using a QTip) of Luminescent Ink at the spot on a Manikin or Standardized Patient where a real Stethoscope diaphragm could be placed to hear body sounds, the Ink Sensor Smart Cable will be able to "see" the Luminescent Ink and cause the Body Sounds App to play the sounds. The Luminescent Ink is usually invisible to the eye requiring the learner to know the correct placement of the Ink Sensor Smart Cable to hear the sound.

Luminescent Inks

One source of Luminescent Ink that the Ink Sensor Smart Cable can use is available from **www.directglow.com**. Be sure to use **ONLY** use the type that is **safe for use on skin** and **NOT the type designed for printers or industrial use**.

A UV Flashlight can be extremely helpful in seeing things when using Luminescent Inks on surfaces.

See **www.BetterNurseEducation.com** for more information about use of the Ink Sensor Smart Cable.

HESS Ink Sensor Smart Cable

The Body Sounds App needs to "learn" the color(s) of the Luminescent Ink after it has been applied to the "skin" (Manikin or Standardized Patient) surface.

Setting The Ink Sensor Smart Cable Marker Color

To make the Body Sounds App "learn" a Marker color, use "Set Markers" in the Body Sounds App options via the Android "3 dots menu" in the upper right corner of the Body Sounds App screen. The "learned" Marker color will be saved in the Body Sounds App – but will ONLY function properly on the **specific Manikin's/ Standardized Patient's** "skin" surface and ONLY using the **same Ink Sensor Smart Cable** – so if the Ink Sensor Smart Cable is used with another Manikin or Standardized Patient, the Marker color will need to be "re-learned" for that Manikin's/ Standardized Patient's "skin" surface.

The Ink Sensor Smart Cable must **already be properly connected** to use the "Set Markers" function.

1. Choose "Set Markers" from the options menu via the Android "3 dots menu" in the upper right corner of the Body Sounds App screen.
2. Once in the Set Markers option, **Detach and Re-Connect** the Ink Sensor Smart Cable from the USB port of the tablet - and **provide Permission in a popup window** to use the Smart Cable. This is required to comply with Android permissions for use of an attached device.
3. Touch "**FIND MARKER**" – then hold the Ink Sensor Smart Cable **completely** over the Marker spot to be learned. Wait to hear the 3 beeps indicating that the Marker spot color has been learned.
4. Touch "**SAVE AS MARKER x**" to save the Marker color learned as Marker 1, 2 or 3.
5. Repeat Steps 3 and 4 for each Marker color to be learned.
6. **Detach** the Ink Sensor Smart Cable from the USB port, then use the Android "back" arrow to return to the Body Sounds App screen.
7. On the Body Sounds App screen, **Re-Connect** the Ink Sensor Smart Cable to the USB port - and **provide Permission in a popup window** to use the Smart Cable. This is required to comply with Android permissions for use of an attached device. (Watch for the "green" text…)
8. Transmit Body Sounds Vitals to the Body Sounds App.
9. Test the Ink Sensor Smart Cable on areas of the surface that do not contain a Marker color spot - and then on each Marker color spot - to make sure each color has been learned correctly.

Notes:

1. Turning "View Marker Sensor Data" on in the Settings can help with testing that the Marker color was learned properly. The Sensor Data will display:
    - the currently sensed color components (R: G: B: C:)
    - if the sensor is currently sensing "darkness" (S:true),
    - if the sensor is currently sensing the saved learned Marker color (M:true).
    - each saved learned Marker (M1, M2, M3) color components (R: G: B: C:)
2. If the R: G: and B: components are not at least 20 with a C: of at least 60, the sensor is likely not reading any replicable Marker color under UV light and results can be unpredictable.
3. A bright white LED will turn on briefly after the Ink Sensor Smart Cable is connected – and then turn off. This is normal. The white LED is not used during operation.