

MedRx HLS Plus

An Instructional Guide to operating the Hearing Loss Simulator and Master Hearing Aid

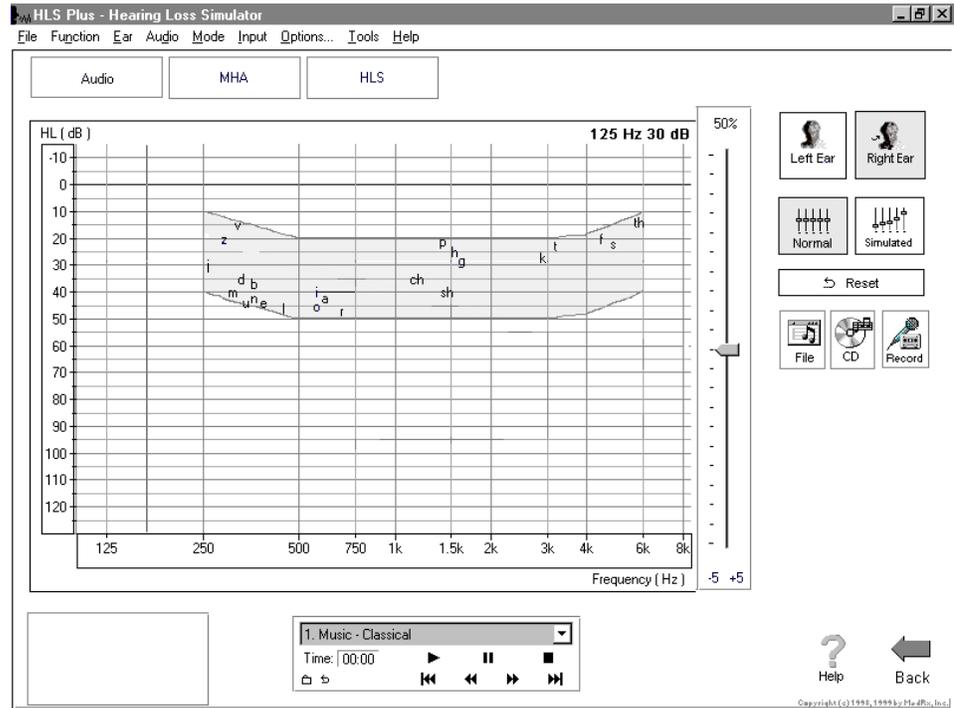
Hearing Loss Simulator

The **Hearing Loss Simulator** dynamically demonstrates the effect of the client's hearing loss for the spouse or any family member. The program simulates the hearing loss by attenuating the selected input signal. The spouse or family member listens to the free field speakers. The third party member can also hear how their own voice is distorted by the hearing loss when the Record input option is used.

You will be amazed how powerful this tool is in counseling significant others in the effects of a hearing loss.

There are three uses for the Hearing Loss Simulator and the following exercises present a step-by-step guide to using the program. To begin, load the software according to the installation instructions provided with the disc. Make sure the speakers and microphone are plugged into the computer sound card before starting the program.

The program opens with the HLS tab selected and the following screen displayed.



The audiogram allows you to enter the patient's air conduction scores for each ear.

The control panel on the right of the screen allows you to select the test ear, signal source and alternate between the normal and simulate modes.

The control panel below the audiogram allows you to select an audio track from a CD or the File in the program.

There are three tabs on the taskbar. The first is AUDIO. This screen shows the patient's audiogram. It displays the data for the test ear selected on the control panel.

Manual entry of audio data: Air conduction scores can be entered from the opening HLS screen or the AUDIO screen. To enter an audiogram, click *Right Ear* and *AC* on the control panel and simply point the mouse to the value on the audiogram, example 30dB at 1000Hz, and click the mouse button. The appropriate AC symbol for right ear air conduction threshold is plotted to the audiogram. Click *Left Ear* and enter air conduction values for the left ear.

EXERCISES

Exercise One: Simulate the difference between normal hearing (Normal) and the patient's hearing loss (Simulated)

Exercise Two: Simulate the potential improvement in the patient's hearing performance when hearing instruments are worn.

Exercise Three: Use the Hearing Loss Simulator to simulate the natural deterioration in thresholds over time.

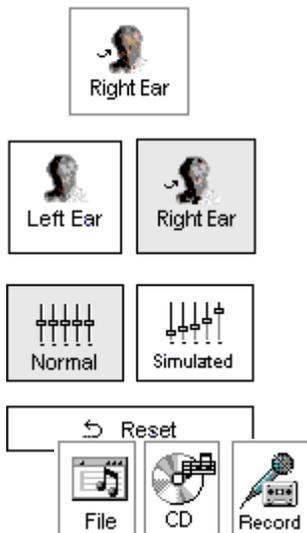
Before proceeding with these exercises, make sure the speakers used by your system for the Hearing Loss Simulator are connected to the system and turned on.

EXERCISE ONE: Simulate the difference between normal hearing (Normal) and the patient's hearing loss (Simulated)

For the purposes of this exercise, enter the following audiogram values for the *Right Ear*:

20 at 250, 30 at 500, 40 at 1000, 50 at 2000, and 60 at 3000, 4000, 6000 and 8000Hz.

Click *Right Ear*, *Normal*, and *File*.



The "File" input option accesses the audio track stored in the program. The MedRx Sounds Sensations CD is on File.

Select *Track 2* on the CD control panel.

Explain the audiogram to the third party. Pay special attention to the speech area.

Explain the simulation activity. First, the third party will listen to music in the Normal mode. When you click Simulated, the third party will hear the music adjusted for the patient's hearing loss.

Position the third party so that they are near the speakers and can view the monitor easily.



Click *Play* on the CD control panel.

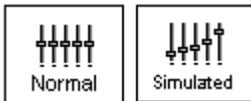


Adjust the volume control if the third party has difficulty hearing the music. Click -5 or +5 icons to increase or decrease the volume respectively or adjust the volume control on your speakers as required. In most cases, you will not need to adjust the volume.



Allow the third party to listen to the music for 20 - 30seconds, reinforcing that this is how the third party normally hears this music.

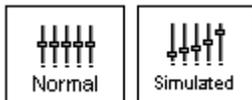
Click *Simulated*. Tell the third party that they are now listening to the patient's hearing loss.



Alternate between *Normal* and *Simulated* so that the third party can appreciate the difference.

12. Speech In Quiet - Female

Repeat the simulation with Track 12, which is a female voice in quiet.



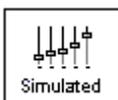
Alternate between *Normal* and *Simulated*.

This provides a good demonstration of why the patient says the third party "mumbles". The hearing loss makes it sound like the female voice is mumbled.

The next track demonstrates how the patient's hearing loss can affect their safety.

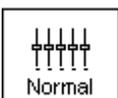
14. Railroad Crossing, Bells and Train

Select *Track 15*.



Click *Simulated*. Press *Play* on the CD control panel and ask the third party to identify the sound. It will take some time until the third party recognized the approaching train whistle.

When they have identified the sound, press *stop*.



Replay track 15 in the normal mode. Click *Normal* and then *Play*.



This is an effective demonstration of how the patient may not be hearing important environmental sounds for safety.

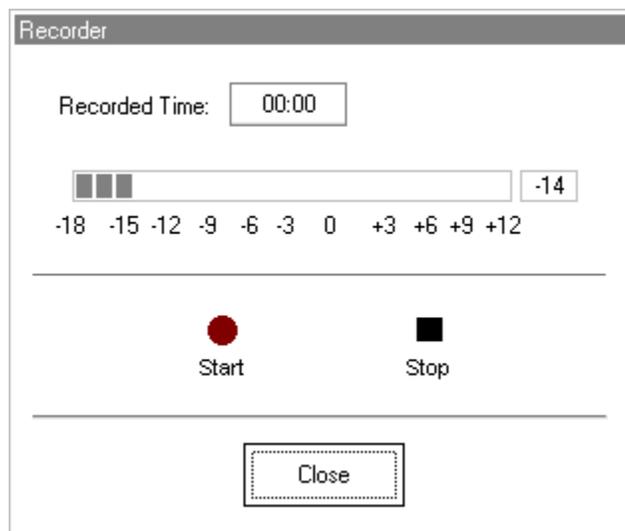
HOW TO USE THE RECORD INPUT OPTION:

You must have a microphone plugged into your computer sound card to use the RECORD mode.

Select *Record* on the HLS control panel. A new control panel appears on the display below the audiogram.



Click on the red circle icon.



The microphone is activated, although there is no output to the speakers as yet. Have the third party member practice speaking the intended speech sample into the microphone. Use the slider control to adjust the level. Aim to peak the voice effort at zero on the active VU meter.

When practice is successful in maintaining a consistent input level, click the *Start* icon (red circle) and begin recording.

note: Some commercially available microphone do not produce enough gain to obtain a zero VU reading. In this case aim for the highest reading that you can obtain. Also, you can also adjust the microphone level by changing how close the person speaks into the microphone. Some sound cards have additional gain boost that can be made in the Volume Control adjustment for your individual card.

When finished, click the *Stop* (black square) icon.

The Record Time will be displayed to show the length of the recording in seconds.

If you are satisfied with the recording click the *Close* icon. If you are not satisfied, simply repeat the process of recording a new sample of speech, then click the *Close* icon.

To play the recorded speech, click the Play icon on the control panel.

Allow the third party member to experience the recording under the *Normal* and *Simulate* conditions.

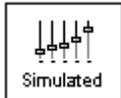


Use the *track return* icon on the control panel to replay the recorded sample continuously.

EXERCISE TWO: Simulate the potential improvement in the patient's hearing performance when hearing instruments are worn.

This also provides an opportunity to set the third party's expectations for the benefits and limitations of hearing aids.

Setup



Click *Simulated*.

12. Speech In Quiet - Female

Select *Track 12* on the File control panel. (Make sure *File* is selected as the input signal)

Explain that you are now going to simulate the potential improvement a hearing aid can make to the patient's hearing.



Click *Play*.

The third party is listening to the female speaker on Track 12, adjusted for the hearing loss. Improve the patient's thresholds by applying a half gain rule to the audiogram values. Simply point and click on the audiogram to the improved threshold level.

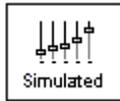
For example: For the hearing loss entered in this lesson, you will now point and click to 10 at 250, 15 at 500 20 at 1000, 25 at 2000 and 30 at 3000,4000,6000 and 8000Hz.

You do not need to be precise in this step as you are performing a “simulation” of the potential benefit.

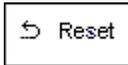
As you improve the threshold at each frequency, the female's voice becomes clearer.



At this point, click the *Normal* icon. Explain to the third party that while you can dramatically improve the hearing performance with hearing instruments, it is still not normal hearing.



With the track still playing, click *Simulated* again. Remind the third party that with the hearing aid, the patient hears better than without the hearing aid. To demonstrate this, click the *Reset* icon on the control panel. This resets the audiogram to the patient's original hearing loss values.



You can repeat this simulation with a variety of tracks on File.

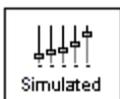
This simulation provides the third party with the experience and understanding that hearing instruments have great potential to benefit the patient. It also helps the third party not to expect the patient to have normal hearing, even with hearing instruments.

EXERCISE THREE: Use the Hearing Loss Simulator to simulate the natural deterioration in thresholds over time

This helps consolidate your recommendation for the patient to be fitted with the flexibility of programmable technology, which allows the hearing instrument to "grow" with the hearing loss for the life of the instrument.

It is useful to simulate the effect of a drop in the patient's hearing. Most presbycusis hearing losses are characterized by gradually declining hearing thresholds. It is not unusual to see a drop of 5 to 10dB in thresholds over a 3 year period. This simulation is used in conjunction with your recommendation to fit programmable hearing instruments that can be adjusted for changes in hearing levels for the life of the hearing aid. This adds validity to the added cost of high end program hearing instruments.

Setup



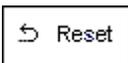
Click *Simulated*.

Select your preferred track on File.



Click *Play*.

Manually change the audiogram thresholds by 5 -10dB for all frequencies across the frequency range. Simply point and click the mouse to a threshold 5dB below the current threshold on the audiogram. While this does not "appear" to be a significant change on the audiogram, it is usually enough of a drop in hearing performance for the third party to hear.



To return to the original audiogram, click the *Reset* icon.

Part Two: Master Hearing Aid

It is highly recommended you use a hearing aid manufacturer's demonstration hearing aids as Master Hearing Aids whenever you have them available. Providing the patient with the experience of listening to a "real" hearing instrument is a superior demonstration to a master hearing aid. However, the Master Hearing Aid provided in this program is a quick way to simulate the potential benefit of hearing instruments to a patient who has never worn hearing aids before. It is recommended you use the MHA for mild and moderate losses only.

Please be sure you have the headphones plugged into the soundcard before proceeding with the Master Hearing Aid. To avoid having to unplug the speakers and headphones as you change from HLS to MHA, use the dual purpose speakers with headphone output plug. Call MedRx for further information on where to get these speakers.

Setup for Master Hearing Aid

Click *MHA* on the taskbar.



When an audiogram is already present in the AUDIO or HLS screen, the data will be used to plot gain curves to the MHA screen. When no audiogram data is available, you are required to go to the AUDIO screen and input the appropriate data.

Select *Right Ear*.



Select *Normal*.

For the purpose of this exercise, enter the following audiogram for the *Right Ear*:

20 at 250, 30 at 500, 40 at 1000, 45 at 2000, 50 at 3000, 55 at 4000, 6000 and 8000Hz.

Enter the same values for the Left Ear.

The default gain rule applied to the thresholds is the NAL(R) rule. This rule applies well to most hearing losses for comfort level hearing.

Exceptions: For very mild hearing losses, select the 1/3 Gain rule.

For very severe hearing losses, select the 1/2 Gain rule.

A gain curve is plotted for each ear. The highlighted (green) curve is determined by which test ear icon you have selected on the control panel.



Click either the *File* or *CD* icon. *File* accesses the stored audio tracks on the system hard drive. The MedRx Sounds Sensations CD is on *File*. If you use the *CD*, make sure the audio CD is in the CD ROM before selecting the *CD* input. This option provides you with greater variety and control of the sounds used in the simulation.



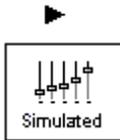
Click *Binaural*. This allows the prescribed gain to go to each ear simultaneously, to simulate a binaural fitting.

Instruct the patient. The patient will begin by hearing the sound unchanged. When you click the Simulated icon, the patient will hear the simulated hearing aid effect on the sound.

Place the earphones on the patient.

Position the patient so that they can view the monitor.

Select the desired track on File or if using the CD, select the preferred track and press *Play*.



Allow the patient to listen for a few seconds, then click *Simulated*.

Continue presenting the signal.

The patient should now be able to notice a significant change in the clarity of the signal.

Repeat this simulation using a variety of CD tracks.

Use familiar voices for the MHA by selecting the Record input option.

HOW TO USE THE RECORD INPUT OPTION:

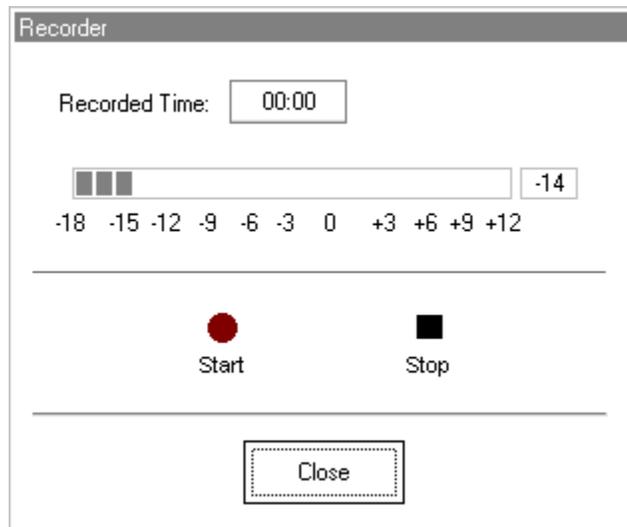
You must have a microphone plugged into your computer sound card to use the RECORD mode.



Select *Record* on the MHA control panel. A new control panel appears on the display below the audiogram.



Click on the red circle icon.



The microphone is activated, although there is no output to the speakers as yet. Have the third party member practice speaking the intended speech sample into the microphone. Aim to peak the voice effort at zero on the active VU meter.

When practice is successful in maintaining a consistent input level, click the *Start* icon (red circle) and begin recording.

When finished, click the *Stop* (black square) icon.

The Record Time will be displayed to show the length of the recording in seconds.

If you are satisfied with the recording click the *Close* icon. If you are not satisfied, simply repeat the process of recording a new sample of speech, then click the *Close* icon.

To play the recorded speech, click the Play icon on the control panel.

Allow the patient to experience the recording under the *Normal* and *Simulate* conditions.



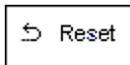
Use the *track return* icon on the control panel to replay the recorded sample continuously.

Based on the patient's subjective response as to "how it sounds", you can make adjustments to the simulation by 1) editing the gain curves and/or 2) comparing monaural to binaural amplification.

1) Editing the Gain curve to customize the master hearing aid

Adjust to comfortable volume: If the patient does not think the Simulated mode is comfortably loud in each ear, adjust the overall volume level using the +5 or -5 icons.

Sound is too "tinny"?: If the patient reports that the signal is too "tinny", you can reduce the high frequency gain or increase the low frequency gain by editing the gain plot on the display. To do this, select the ear icon to be adjusted and simply point to the preferred level of gain on the gain curve at any given frequency and click the mouse button. The gain curve plot changes to the new level. Make appropriate changes to the other ear gain curve. Monitor the patient's response as to how it sounds. At any time, to return to the original prescription gain levels, select the *Reset* icon.



COMPARING A MONAURAL TO A BINAURAL FITTING USING MASTER HEARING AID

The Master Hearing Aid task automatically assumes a binaural fitting and applies gain for each ear. If you want to demonstrate a monaural fitting, either as a comparison to the binaural fitting or because only one ear is aidable, click the *Monaural* icon and proceed with the simulate versus normal demonstration outlined above. The non-test ear will not receive any stimulus.

