Hearing Screenings
Summer Institute for School Nurses - 2019

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Disclosures

Financial
I am receiving honorarium for this presentation
I am an employee of Longwood University

Nonfinancial
I have no relationship to any product discussed
I enjoy serving my community and persons who have hearing loss
Our purpose today...

To provide overview school-based hearing screening best practices, barriers, and solutions with lecture and hand-on practice.

Gretchen’s and Terrance’s stories

Photos from Pexel & Creative Commons
Age 10: “R doesn’t always respond when called, I can understand him but other people can’t, I have to raise my voice for him to hear me, he likes the TV very loud.”

Age 11: “K gets in trouble in school for back-talking, he is getting D’s and F’s, he is seeing a counselor because he gets very angry and frustrated.”

“No, I don’t think he has a hearing loss; he’s just shy.”

What will we be doing this afternoon?

- Presentation
- Skills practice with audiometers
Learning Objectives

Participants will be able to:

- Define the components of a school hearing screening: How, who, when, why, and outcomes
- Demonstrate understanding of how to perform a hearing screening using an audiometer
- Identify potential barriers and solutions to hearing screenings
- Follow-up procedures and resources
What is a hearing screening?

- All sounds, including speech sounds, have a frequency or pitch:
- low-middle-high
- “ah”, “ee”, “oo”, “m”, “sh”, “s”, etc.
- Frequency is measured in Hertz (Hz)
- “speech” frequencies: 500, 1000, 2000, 4000 Hz

Hearing Test Frequencies

During a hearing screening we ask:
“Can the person hear frequencies that are important for speech understanding?”

What is a hearing screening?

- All sounds have intensity (decibels) or loudness
  - 0 dB HL ~pin drop
  - 20 dB HL ~whisper
  - 40 dB HL ~normal conversation level
  - 60 dB HL ~shouting

During a hearing screening, we ask:
“Can the person hear soft sounds?”
How to perform a hearing screening

Equipment: AUDIOMETER

- Headphones and audiometer are one unit

https://www.youtube.com/watch?v=ep8KUwbI19I

How to perform a hearing screening
(based on ASHA Guidelines for Audiologic Screening)

- “I am going to put these earphones on you
- I want you to raise your hand (age 5 years and up) as soon as you hear a beep
- The first beep you hear will be easy to hear and will show you what you are listening for
- After that, the beeps will be very soft so you will have to listen carefully
- Please listen carefully and raise your hand as soon as you hear the beep”
- Ensure nothing is impeding the passage of sound (remove hair from between earphone and ear)
- Place the red earphone on the student’s right ear and blue earphone on the student’s left ear
How to perform a hearing screening

- Present “familiarization” tone @ 40 dB HL at 1000 Hz
- When they raise hand, move to screening level of 20 dB HL at 1000 Hz
- Obtain at least 2 responses for each frequency, for each ear (2 out of 3)
- Right ear: 1000 Hz, 2000 Hz, 4000 Hz
- Left ear: 4000 Hz, 2000 Hz, 1000 Hz
- Vary the pauses between presentations to prevent establishing a rhythm and increase your test reliability.
- The person being screened should be seated so that he/she cannot see you manipulating the controls.

Questions for you:
1. What is the minimum number of tone presentations necessary to complete a hearing screening? How many presentations?

2. What would you do if you present a tone at 20 dB HL and obtain no response?

3. What would you do if you present the first tone at 20 dB HL and there is no response, followed by no response to a second presentation of the same tone to the same ear?

4. What would you do if there is a noise in the room when you just presented a tone and the student did not respond?

4.a. What if you present the tone again and there was no response the second time? Would you move on to another frequency or present the toner at third time?
How to perform a hearing screening

The minimum set of tone presentations:

- R, 1000, @ 40,
- R, 1000, @ 20 X1
- R, 1000, @ 20 X2
- R, 2000, @ 20 X1
- R, 2000, @ 20 X2
- R, 4000, @ 20 X1
- R, 4000, @ 20 X2
- L, 4000, @ 20 X1
- L, 4000, @ 20 X2
- L, 2000, @ 20 X1
- L, 2000, @ 20 X2
- L, 1000, @ 20 X1
- L, 1000, @ 20 X2

For adolescents, addition of 6000 Hz and 8000 Hz is being recommended for increased likelihood of identifying early high-frequency hearing loss/noise-induced hearing loss.

Audiometer check before starting screenings

Part 1  [https://www.youtube.com/watch?v=q-SBNY87ho](https://www.youtube.com/watch?v=q-SBNY87ho)

- Before you screen (in quietest area of building):
  - Ensure proper operation of all knobs, buttons, headband, cords, and earphones
  - Place earphones on yourself
  - Set intensity dial at 40 dB HL
  - Listen to 1000 Hz in the right ear = loudness to 1000 Hz in the left ear
  - Repeat right-left check at 2000 and 4000 Hz
  - Tones should be clear
  - Cords should not be allowed to get curled
Audiometer check before starting screenings

Part 2

- Repeat the listening check: Listen @ 20 dB HL for each frequency being screened (the assumption is that you have normal hearing)
- Check that you can hear the tones at the 20 dB HL screening intensity level
- If you cannot hear @ 20, find a quieter location

- Screenings should never be done at a level greater than 20 dB HL

Hearing Screening Outcomes

- **Pass**: responses to ALL test frequencies in BOTH ears with at least two responses for each frequency in each ear
- **Fail (Refer = did not pass)**: Not responding to even one frequency in one ear because to pass a hearing screening, the student must detect very soft sounds (speech frequencies!) in both ears
  - Should receive second screening same day - repositioning the earphones - (this is the ASHA Rx)
  - or at a later date soon after first screening
- You may re-screen only frequency(ies) that failed
- If a child is non-compliant or cannot be conditioned to a motor response, it constitutes a “Fail”
### Hearing Screening Outcomes

- Screening failure does not tell you how much hearing loss there is; it tells you only that further testing is needed
- If fail on second screening, then parent is notified
- If failure, child should be seen by an audiologist or medical provider
- School must have a follow-up system

- Even a mild hearing loss can cause a student to miss soft speech sounds, misunderstand what is said, and affect learning. (Imagine you trying to learn a language without hearing all the sounds!)

### Audiometer Maintenance

**“Code of Virginia: Administrative Code**

- **18VAC80-20-260. Calibration Statement Required:**
  - A. Audiometers used in testing the hearing impaired must be in calibration.
  - B. Calibration must be done once a year or more often, if needed.
  - C. A certified copy of an electronic audiometer calibration shall be maintained for three years and shall be made available to the department upon request.”
Why do we do hearing screenings?

- **The purpose of screening** is to detect, among apparently healthy persons, those individuals who demonstrate a greater probability for having a disease or condition, so they may be referred for further evaluation.

- Hearing is necessary for oral language acquisition and for learning.
Why do we do hearing screenings?

- When screening using tones, sound goes through the entire auditory system.

DisbabledWorld.com
Why do we do hearing screenings?

- Hearing Loss, even a MINIMAL loss, causes problems:
  - Hearing subtle conversational cues
  - Following fast-paced conversations
  - Hearing fine word-sound distinctions: shoe/shoes; walk/walked
  - Even with mild loss, “eat,” “feet,” “beeped,” “sleeps:” May all sound like “ee”
  - Ask this child, “Did you hear me?”
    - Answer would likely be, “Yes”
  - Audibility vs. Intelligibility = Hearing vs. understanding

Why do we do hearing screenings?

- Hearing loss:
  - Distorts, smears, or eliminates information
  - Has an effect on reading because reading
  - Has an effect on academic success
Who should be screened and when?

- New entrants, (K), 3rd, 7th, and 10th-graders
  - (K) part of physical exam
  - With prior written notification to parent of date and purpose
- Prior to placement in SPED. Must have full audiologic eval., if screen is failed.
- “Student may be exempt if parent objects on religious grounds and the student shows no obvious evidence of any defect or disease of the...ears.”
- Within 60 administrative days of the opening of school.
Who should be screened and when?

- Commonwealth of Virginia School Entrance Health Form

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What can cause a student not to pass the screening?

- Anatomical/Physiological
  - Outer ear
  - Middle ear
  - Inner ear
What can cause a student not to pass the screening?

- Environmental
- Equipment
- Operator error
- Student
Play Audiometry
- Developmental ages between about 3 and 5 years
- Hand raising boring for pure-tone testing
- Non-English speakers: English not needed. You can just show child the desired response to the tone
- Play a “listening game” - fun activity
- Show
- Assist
- Independently

Play Audiometry
- Maintain eye contact with younger child while not allowing them see you pushing the interrupter or turning frequency/intensity dials
- Show
- Assist
- Independently
- Take your time, don’t rush
- Don’t ask, “Did you hear it?” They will ALWAYS say, “Yes!”
- Change task prn, if child bored
Play Audiometry

Conditioning:
- Starting point for response = Establish a “starting behavior”
- Define wanted response: anything, clap, peg in board, etc.
- Present tone
- Tester initially guides child
- Social reinforcer
- Starting point again
- Tester decreases guidance
- Student responds independently
- Give real choices: “Do you want blue or red?”

Resources

- I can be a resource 😊
- Speech-language pathologists in your LEA
- Teachers/administrators/parents
- Other audiologists in your area
- Annual audiometer calibration: e3diagnostics.com/find-local-office
Resources

Consider:

- Providing education to students, parents, faculty and staff on hearing loss prevention:
  
  - [Link](asha.org/buds/)
  
  60/60 Rule
  - [Link](asha.org/aud/pei/): Handouts related to hearing in English and Spanish
  - [Link](asha.org/public/hearing/Noise-and-Hearing-Loss-Prevention/)

Summary

- Why do hearing screenings?
  - S/L development & learning

- Sound goes through entire auditory system
  - Outer, middle, inner ear

- What can cause a student not to pass?
  - Many factors

- What is a hearing screening?
  - 1000, 2000, 4000 Hz @ 20 dB HL

[YouTube Video](https://www.youtube.com/watch?v=5P0cWp1u_aM)
Summary

- How to perform hearing screenings?
  - Familiarize at 1000 Hz @ 40dB HL
  - RIGHT: @ 20 dB HL:
    - 1000 Hz (at least x2), 2000 Hz (x2), 4000 Hz (x2)
  - LEFT: @ 20:
    - 4000 Hz (at least x2). 2000 Hz (x2), 1000 Hz (x2)

Our goal today was:
- To provide overview school-based hearing screening best practices, barriers, and solutions with a presentation and hands-on practice.