HRS Hearing Webinar

Key Hearing Measures and Field Insights from Senior Center Hearing Screenings

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Disclosure

- No relevant financial relationships with commercial interests.

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Objectives

To review key hearing measures in population-based studies

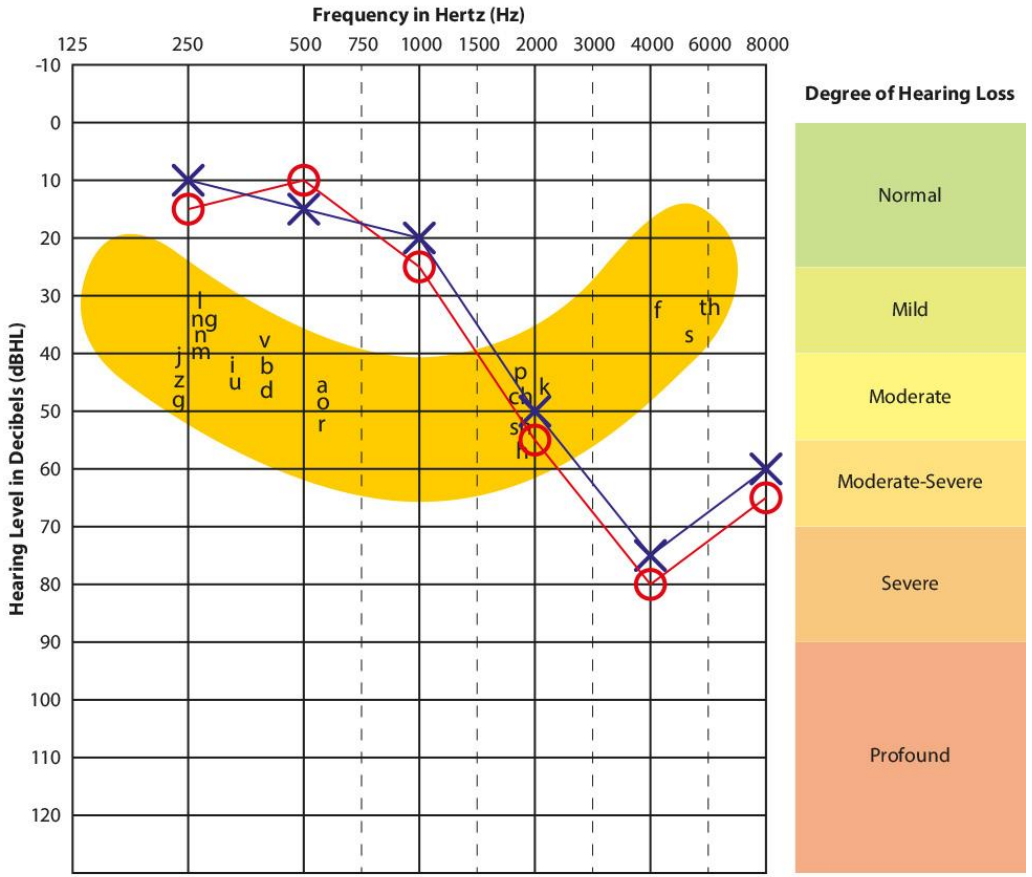
To discuss what we learned from hearing screenings in senior centers using the GSI AMTAS Flex

To discuss specific considerations about measuring hearing in the field

Hearing Measures

- **Key points for objective hearing measures:**

1. Objective hearing measures over self-reported hearing
2. Audiometry data across multiple frequencies
3. Repeated objective hearing measurement over time



1. Objective hearing measures over self-reported hearing

Table 2. Association Between HI and Functional Outcomes, NHANES 2005-2006 and 2009-2010, *N* = 1669.

Outcomes		Assessment of HI Using speech-frequency pure-tone audiometry[a]: HI as a continuous variable — OR per 25 dB of HI (95% CI)	HI as a binary variable — No HI	HI as a binary variable — OR [95% CI]	HI as an ordinal variable — No HI	HI as an ordinal variable — OR [95% CI]	HI as an ordinal variable — Moderate or greater HI — OR [95% CI]	Assessment of HI Using self-report: HI as a binary variable — Excellent or good hearing	HI as a binary variable — OR [95% CI]	HI as an ordinal variable — Excellent or good hearing	HI as an ordinal variable — OR [95% CI]	HI as an ordinal variable — Moderate or greater trouble hearing — OR [95% CI]
Objective outcomes	**Accelerometer measured physical activity[b]**											
	Next lower category of physical activity[c]	1.7 [1.1, 2.6]	Ref	2.2 [1.1, 4.3]	ref	2.3 [0.9, 5.4]	1.9 [1.0, 3.4]	ref	1.0 [0.7, 1.4]	ref	0.8 [0.5, 1.4]	1.2 [0.7, 2.1]
	Hospitalization in past 12 months[d]											
	Any (yes or no)	1.3 [1.1, 1.6]	ref	1.3 [1.0, 1.8]	ref	1.2 [0.8, 1.7]	1.6 [1.2, 2.2]	ref	1.2 [0.9, 1.6]	ref	1.3 [0.9, 1.8]	1.1 [0.9, 1.4]
	No. of hospitalizations (0, 1, >1)	1.4 [1.1, 1.7]	ref	1.4 [1.0, 1.9]	ref	1.2 [0.8, 1.7]	1.7 [1.2, 2.4]	ref	1.2 [1.0, 1.6]	ref	1.3 [0.9, 1.9]	1.2 [0.9, 1.4]
Subjective outcomes	**Self-reported healthy days in past 30 days[d]**											
	≥10 days with poor physical health	1.4 [1.1, 1.7]	ref	1.4 [1.0, 2.1]	ref	1.3 [0.8, 2.0]	1.6 [1.1, 2.5]	ref	1.4 [1.0, 2.0]	ref	1.3 [0.9, 2.1]	1.5 [1.1, 2.2]
	≥10 days with poor mental health	1.6 [1.2, 2.1]	ref	1.7 [1.0, 3.0]	ref	1.5 [0.8, 3.0]	2.1 [1.2, 3.6]	ref	1.8 [1.1, 3.1]	ref	1.6 [0.8, 3.0]	2.1 [1.2, 3.8]
	Self-reported functional difficulty[d]											
	ADL	1.4 [1.1, 1.9]	ref	1.5 [1.1, 2.1]	ref	1.4 [1.0, 1.9]	1.7 [1.1, 2.5]	ref	1.6 [1.1, 2.4]	ref	1.1 [0.7, 1.7]	2.4 [1.6, 3.8]
	IADL	1.6 [1.2, 2.2]	ref	1.7 [1.1, 2.5]	ref	1.5 [1.0, 2.4]	1.9 [1.2, 3.1]	ref	2.0 [1.4, 2.9]	ref	1.7 [1.2, 2.5]	2.4 [1.5, 3.7]
	Leisure and social activities	1.5 [1.1, 2.0]	ref	1.5 [0.9, 2.2]	ref	1.4 [0.9, 2.2]	1.5 [0.9, 2.4]	ref	1.8 [1.4, 2.3]	ref	1.5 [1.0, 2.1]	2.1 [1.6, 3.0]
	Lower extremity mobility	1.4 [1.1, 1.7]	ref	1.7 [1.3, 2.2]	ref	1.7 [1.3, 2.3]	1.6 [1.1, 2.2]	ref	1.9 [1.4, 2.6]	ref	1.7 [1.2, 2.4]	2.3 [1.6, 3.2]
	General physical activity	1.3 [1.1, 1.6]	ref	1.3 [1.0, 1.6]	ref	1.2 [1.0, 1.5]	1.4 [1.0, 2.0]	ref	1.9 [1.4, 2.4]	ref	1.5 [1.1, 2.1]	2.4 [1.8, 3.4]
	Walking limitation	1.6 [1.3, 2.0]	ref	1.7 [1.3, 2.2]	ref	1.6 [1.2, 2.1]	1.9 [1.4, 2.7]	ref	1.8 [1.4, 2.4]	ref	1.5 [1.0, 2.2]	2.4 [1.8, 3.1]
	Memory and confusion limitation	1.4 [1.1, 1.8]	ref	1.3 [0.9, 1.8]	ref	1.2 [0.8, 1.7]	1.5 [1.0, 2.1]	ref	1.6 [1.1, 2.5]	ref	1.3 [0.9, 2.1]	2.0 [1.2, 3.2]

Note. Shaded in light gray: $p < .05$, and shaded in dark gray: $p < .01$. HI = hearing impairment; OR = odds ratio; ADL = activities of daily living; IADL = instrumental activities of daily living.
[a]Audiometry-measured hearing is defined as a speech-frequency pure-tone average of hearing thresholds at 0.5, 1, 2, and 4 kHz in the better hearing ear (normal PTA <25 dB, mild hearing impairment 25-39 dB, moderate or greater ≥40 dB).
[b]Adjusted for age, sex, race, education, income, hypertension, cardiovascular disease, stroke, and smoking status.
[c]Categories of physical activity (inactive: 0 min/week of moderate-intensity physical activity or MPA, insufficiently active: <150 min/week of MPA, sufficiently active: ≥150 min/week of MPA).
[d]Adjusted for age, sex, race, education, income, hypertension, cardiovascular disease, stroke, diabetes, and smoking status.

Objective hearing measures

Self-reported hearing measures

Objective outcomes

Subjective outcomes

First published online November 9, 2015 | Request permissions

A Comparison of Self-Report and Audiometric Measures of Hearing and Their Associations With Functional Outcomes in Older Adults

Janet S. Choi, MPH, Joshua Betz, MS, Jennifer Deal, PhD, Kevin J. Contrera, MPH, Dane J. Genther, MD, David S. Chen, MD, Fiona E. Gispen, MS, and Frank R. Lin, MD, PhD
View all authors and affiliations

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Hearing Measures

- **Key points for objective hearing measures:**

1. Objective hearing measures over self-reported hearing
2. Audiometry data across multiple frequencies
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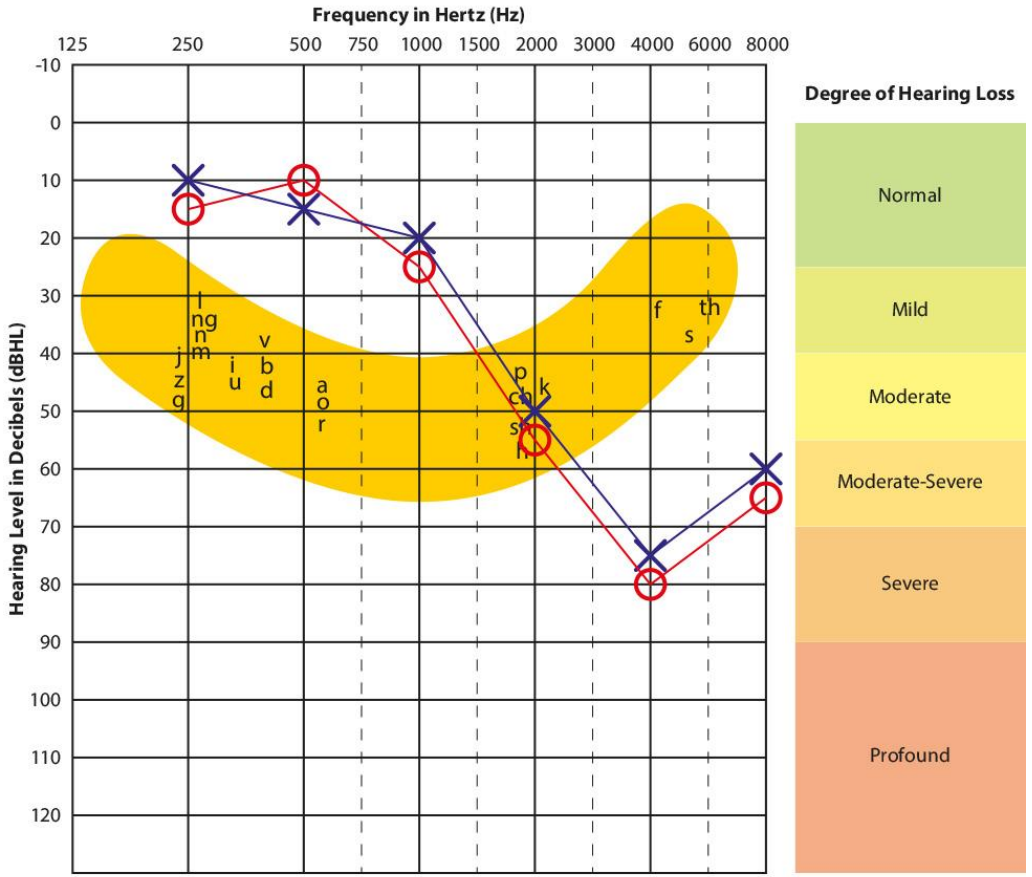

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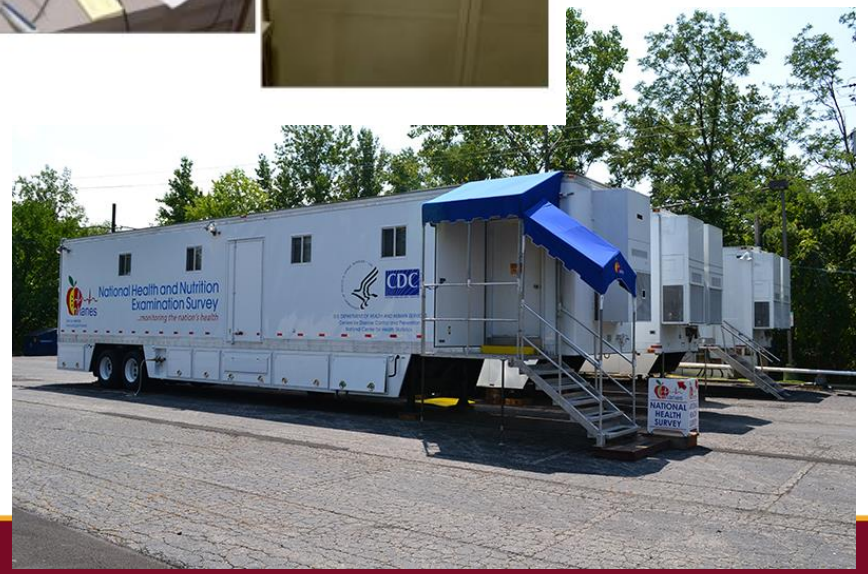
Plays 3 signals at 1000 Hz (55, 35, 20dBHL)
Plays 3 signals at 3000 Hz (75, 55, 35dBHL)

Exhibit 2-26. Audiometry room with set-up complete



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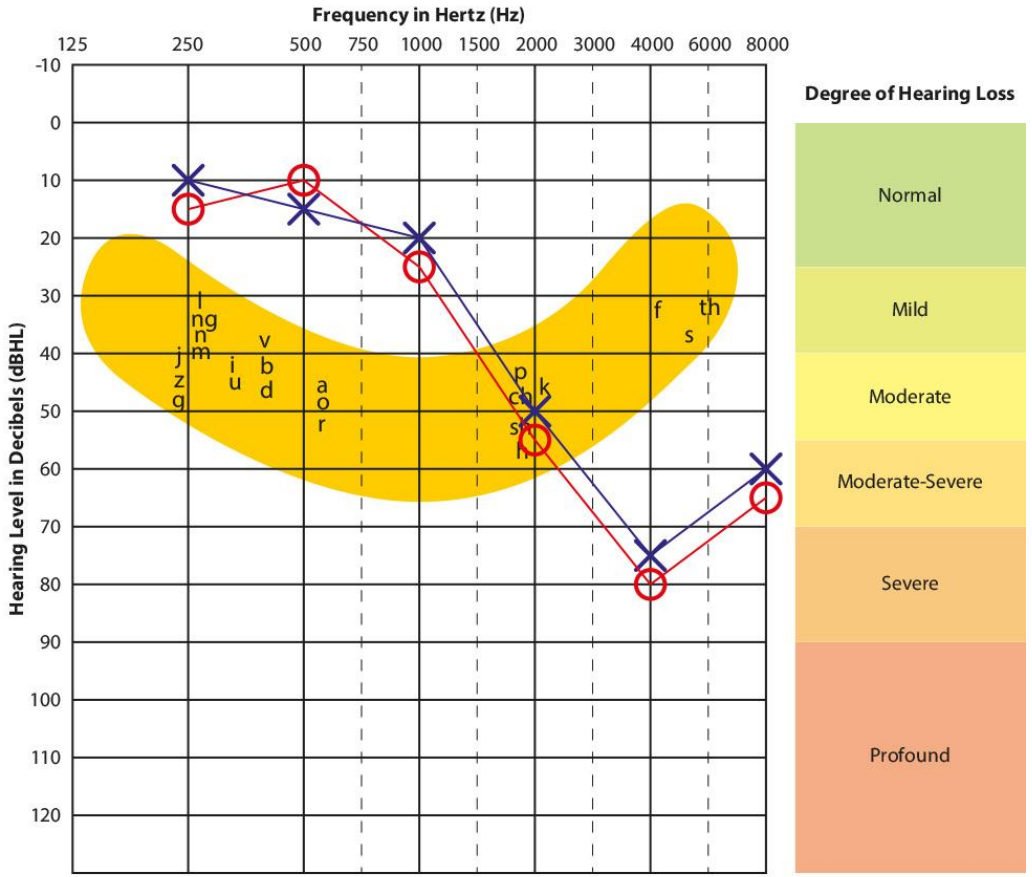

Longitudinal Relationship Between Hearing Aid Use and Cognitive Function in Older Americans

Asri Maharani, PhD, Piers Dawes, PhD,† James Nazroo, PhD,‡ Gindo Tampubolon, PhD,‡ Neil Pendleton, PhD,* and on behalf of the SENSE-Cog WP1 group*

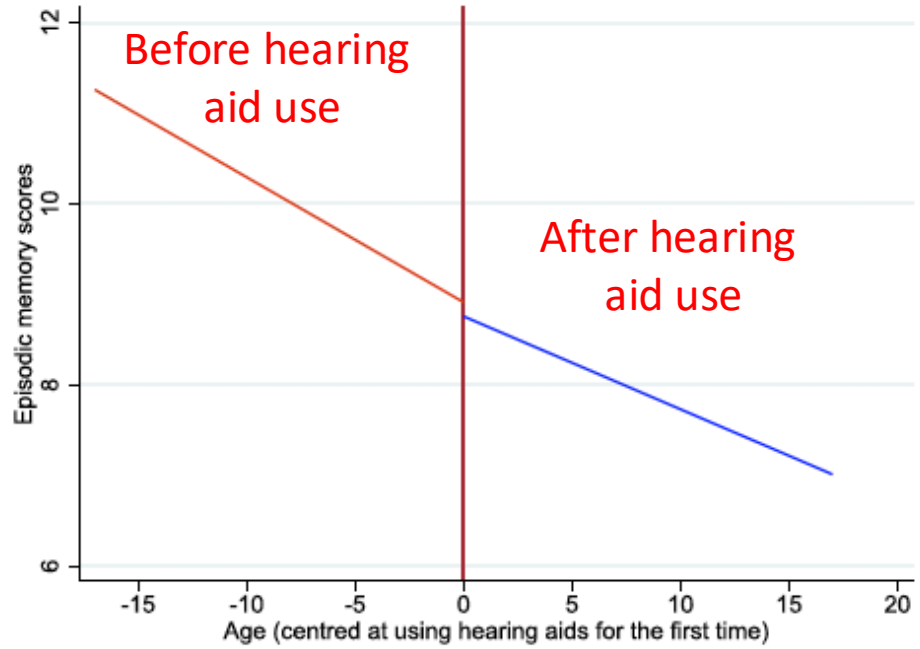

Figure 2. Predicted values of episodic memory before and after beginning to use hearing aids (time centered at using hearing aids).

- Does hearing loss cause accelerated cognitive decline?
- Does hearing aid use prevent/mitigate cognitive decline among older adults with hearing loss?
- Additional questions:
  - Does **hearing loss severity** at the time of hearing aid adoption influence cognition?
  - Does the **duration of hearing loss** prior to hearing aid adoption influence cognition?

Maharani, Asri, et al. "Longitudinal relationship between hearing aid use and cognitive function in older Americans." *Journal of the American Geriatrics Society* 66.6 (2018): 1130-1136.

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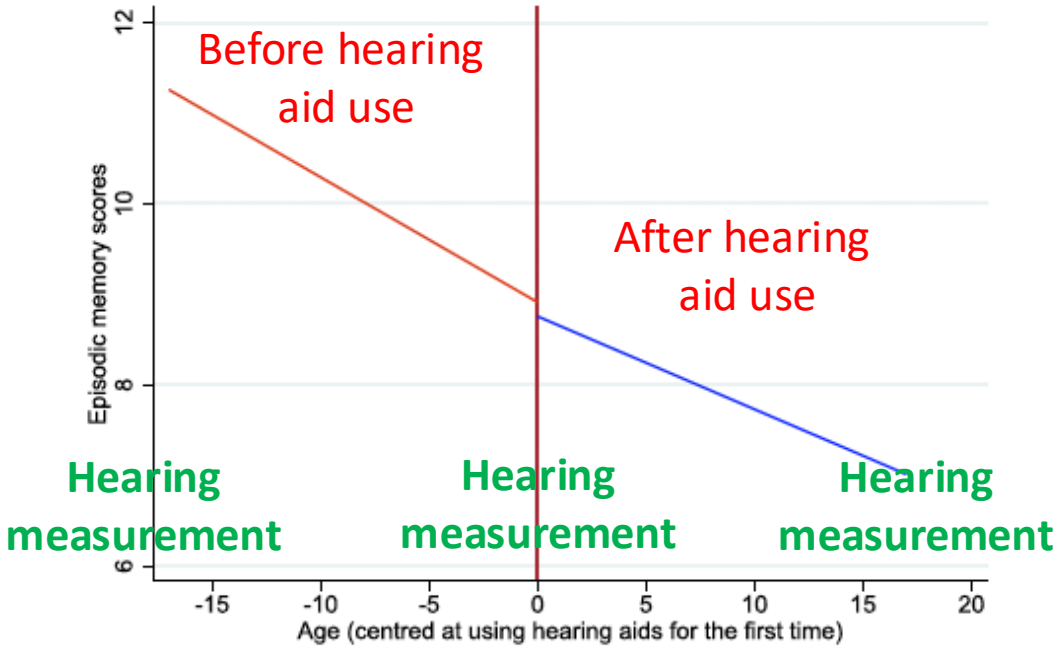

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Hearing Measures

- **Key points for hearing-related questionnaires:**

1. Self-reported hearing when using vs. not using hearing aids
2. Hearing aid use
3. Other hearing-related questions

Hearing Measures

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Self-reported hearing (Physical Health-C)

- Is your hearing excellent, very good, good, fair, or poor [(using a hearing aid as usual)]?
  - Excellent, Very good, Good
  - Fair, Poor

General Condition of Hearing (AUQ054)

Which statement best describes {your/SP's} hearing (without a hearing aid, personal sound amplifier, or other listening devices)? Would you say {your/his/her} hearing is excellent, good, that {you have/s/he has} a little trouble, moderate trouble, a lot of trouble, or {are you/is s/he} deaf?

Hearing Measures

- **Key points for hearing-related questionnaires:**

1. Self-reported hearing when using vs. not using hearing aids
2. Hearing aid use
3. Other hearing-related questions

Hearing Measures

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- Hearing aid use (Physical Health-C)
  - Do you ever wear a hearing aid?
    - Yes, No

- Currently wearing hearing aid (Physical Measures-I)
  - Yes, No

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NHANES 2015-16
- Ever worn hearing aid/cochlear implant? (AUQ146)
- In the past 12 months, how often worn a hearing aid? (AUQ152)

NHANES 2016-17
- Ever won hearing aid/amplifier/implant (AUQ630)
- Now use hearing aid/amplifier/implant (AUQ147)
- Past 2 weeks, how often worn hearing aid (AUQ153)

Hearing Aid Use and Mortality

Association between hearing aid use and mortality in adults with hearing loss in the USA: a mortality follow-up study of a cross-sectional cohort

Janet S Choi, Meredith E Adams, Eileen M Crimmins, Frank R Lin, Jennifer A Ailshire

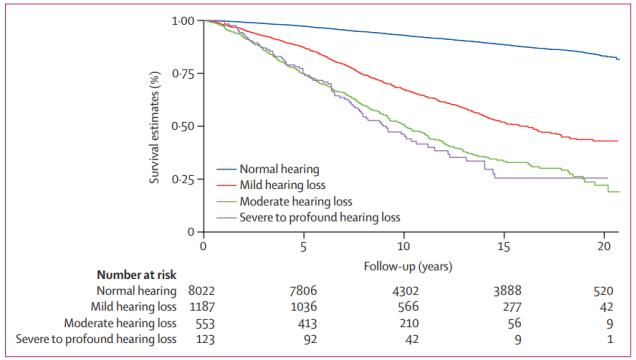

Figure: **Kaplan-Meier survival estimates by severity of hearing loss**
Estimates categorised according to speech-frequency pure-tone average in better hearing ear (normal: <25 dB HL; mild: 25 to <40 dB HL; moderate: 40 to <60 dB HL; and severe to profound: ≥60 dB HL).

	Unadjusted		Multivariable models					
	HR (95% CI)	p value	Model 1* HR (95% CI)	p value	Model 2† HR (95% CI)	p value	Model 3‡ HR (95% CI)	p value
Hearing aid use								
Never users	1 (ref)	..	1 (ref)	..	1 (ref)	..	1 (ref)	..
Non-regular users	1·41 (1·06–1·87)	0·018	0·88 (0·66–1·17)	0·39	0·89 (0·67–1·19)	0·44	0·93 (0·70–1·24)	0·66
Regular users	1·34 (1·06–1·69)	0·013	0·66 (0·52–0·84)	0·0010	0·70 (0·55–0·89)	0·0040	0·76 (0·60–0·95)	0·021

Choi, Janet S., et al. "Association between hearing aid use and mortality in adults with hearing loss in the USA: a mortality follow-up study of a cross-sectional cohort." *The Lancet Healthy Longevity* 5.1 (2024): e66-e75.

Hearing Measures

- **Key points for hearing-related questionnaires:**

1. Self-reported hearing when using vs. not using hearing aids
2. Hearing aid use
3. Other hearing-related questions (age/severity of hearing loss when started using hearing aids regularly, duration of regular hearing aid use, etiologies of hearing loss)

Grason-Stadler GSI AMTAS (MN, USA)

Feature	AMTAS Flex	AMTAS Pro
Air Conduction Diagnostic	Yes	Yes
Air Conduction Screening	Yes	Yes
Masking	Yes	Yes
Bone Conduction Diagnostic		Yes
Speech SRT		Yes
Speech WRS		Yes
Add on to AudioStar Pro and Pello	Stand Alone	Yes
VA Quasar Integration		Yes
dB HL Range	10 to 80	-20 to 100
Quality Indicators	6	9

Grason-Stadler GSI AMTAS (MN, USA)

- **With Tablet**

Product Number	Product	Quantity	Price per unit	Total
8521610 *GSI-8521610*	GSI AMTAS Flex DD65V2 2069 AMTAS Flex - Air Threshold (250-8k Hz) and Screening with DD65V2 headphone and Tablet PC	1.00	3,708.00	3,708.00
8122326 *SERVICE*	Shipping and Handling	1.00	89.00	89.00
8130080 *SERVICE*	Training	1.00	150.00	150.00

Total: USD 3,947.00

- **Without Tablet**

Product Number	Product	Quantity	Price per unit	Total
8534869	GSI AMTAS Flex DD65V2 2069 GSI AMTAS Flex DD65V2 2069 - without Tablet - iBasso DC04 Sound Card	1.00	2,145.00	2,145.00
8122326 *SERVICE*	Shipping and Handling	1.00	89.00	89.00
8130080 *SERVICE*	Training	1.00	150.00	150.00

Total: USD 2,384.00

- Annual Calibration
  - Travel fee $65
  - Per device charge $160

Shoebox (Canada)

Initial Term

Item	List Price	Qty	Discount	Amount
CC SW ESS PURETEST 1YR 10247472	$ 3,780.00	1	30.00%	$ 2,646.00
CC SBX WIFI IPAD SUB 1Y 10247750	$ 450.00	1	30.00%	$ 315.00
DELIVERY 2 DAY 10240631	$ 29.00	1	0.0%	$ 29.00
EQ. SBX 10.2" WIFI IPAD GR 21044070	$ 0.00	1	0.0%	$ 0.00
ACC. SBX PT DD450 CALIBRATED 21044090	$ 0.00	1	0.0%	$ 0.00
ACC. SHOEBOX CARRYING CASE 21044087	$ 0.00	1	0.0%	$ 0.00
ACC. SBX IPAD STAND 10247431	$ 0.00	1	0.0%	$ 0.00
CARD PRINT SBX PT 10247433	$ 0.00	1	0.0%	$ 0.00

Initial Term Total USD
Plus Applicable Taxes: $ 2,990.00

Renewal Term

Renewal Items	Renewal List Price	Renewal Qty	Renewal Discount (%)	Renewal Amount
CC SW ESS PURETEST 1YR RENEW 10247473	$ 3,780.00	1	63%	$ 1,398.60
CC SBX WIFI IPAD RENEWAL 1Y 10247756	$ 450.00	1	63%	$ 166.50

Renewal Term Total USD
Plus Applicable Taxes: $ 1,565.10

HearX

hearScreen®

PURE TONE SCREENING AUDIOMETER

Award-winning pure tone audiometry hearing screening solution on a smartphone. A cost-effective, clinically-validated smartphone screening audiometer.

A user-friendly design, automated test protocols and quality control features allows minimally trained persons to conduct quick and accurate hearing screening.

hearScreen® is launched from mHealth Studio, which is our integrated cloud-based electronic health record solution to manage your patient, facility and test data seamlessly. mHealth Studio is free of charge purchased with the hearScreen® solution.

SCREENING HARDWARE SET

Samsung Galaxy J4 Core, Sennheiser HD 280 Pro headphones & carry case

Frequency range: 500 - 8,000 Hz
Intensity range: 20 to 90 dB HL

Available in English, Spanish & French

	Lite	Enterprise	Enterprise Plus
Annual test credits	360	Unlimited	Unlimited
Headphone swap out *No downtime in testing*	✗	✗	✓
Access to mHealth Studio Cloud Software *Secure cloud-based data management platform.*	✓	✓	✓
Warranty *1-year warranty on all hardware components.*	✓	✓	✓
One-on-one training, plus access to the online training platform	✓	✓	✓
Software updates and remote technical support	✓	✓	✓
Year 1 *Includes once-off outright purchase of hardware, calibration, shipping and software license fees for year 1 only.*	$1,050	$1,330	$1,330
Annually, from Year 2 onwards *Annual fee includes recalibration, return shipping and software license fees.*	$330	$610	$750

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CERTIFIED PURE TONE CLINICAL AUDIOMETER

A world-first pure tone audiometry solution on a tablet.

The world's only certified (IEC 60645-1) pure tone audiometer on a tablet. This cost-effective audiometer uses calibrated headphones with an extended high frequency (8-16 kHz) option. A user-friendly design allows automated or facilitated testing with real-time quality control and cloud data management.

hearTest is launched from mHealth Studio, which is our integrated cloud-based electronic health record solution to manage your patient, facility and test data seamlessly. mHealth Studio is free of charge purchased with the hearTest solution.

DIAGNOSTIC HARDWARE SET A

20dB Sennheiser HD280 Pro
Samsung Tab A7, Sennheiser HD 280 Pro headphones & carry case

Frequency range: 125 - 8,000 Hz
Intensity range: 20 to 90 dB HL

Available in English, Spanish & French

	Lite	Enterprise	Enterprise Plus
Annual test credits	360	Unlimited	Unlimited
Headphone swap out *No downtime in testing*	✗	✗	✓
Access to mHealth Studio Cloud Software *Secure cloud-based data management platform.*	✓	✓	✓
Warranty *1-year warranty on all hardware components.*	✓	✓	✓
One-on-one training, plus access to the online training platform	✓	✓	✓
Software updates and remote technical support	✓	✓	✓
Year 1 *Includes once-off outright purchase of hardware, calibration, shipping and software license fees for year 1 only.*	$2,000	$2,300	$2,300
Annually, from Year 2 onwards *Annual fee includes recalibration, return shipping and software license fees.*	$390	$690	$830

hearTest

CERTIFIED PURE TONE CLINICAL AUDIOMETER

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The world's only certified (IEC 60645-1) pure tone audiometer on a tablet. This cost-effective audiometer uses calibrated headphones with an extended high frequency (8-16 kHz) option. A user-friendly design allows automated or facilitated testing with real-time quality control and cloud data management.

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DIAGNOSTIC HARDWARE SET C

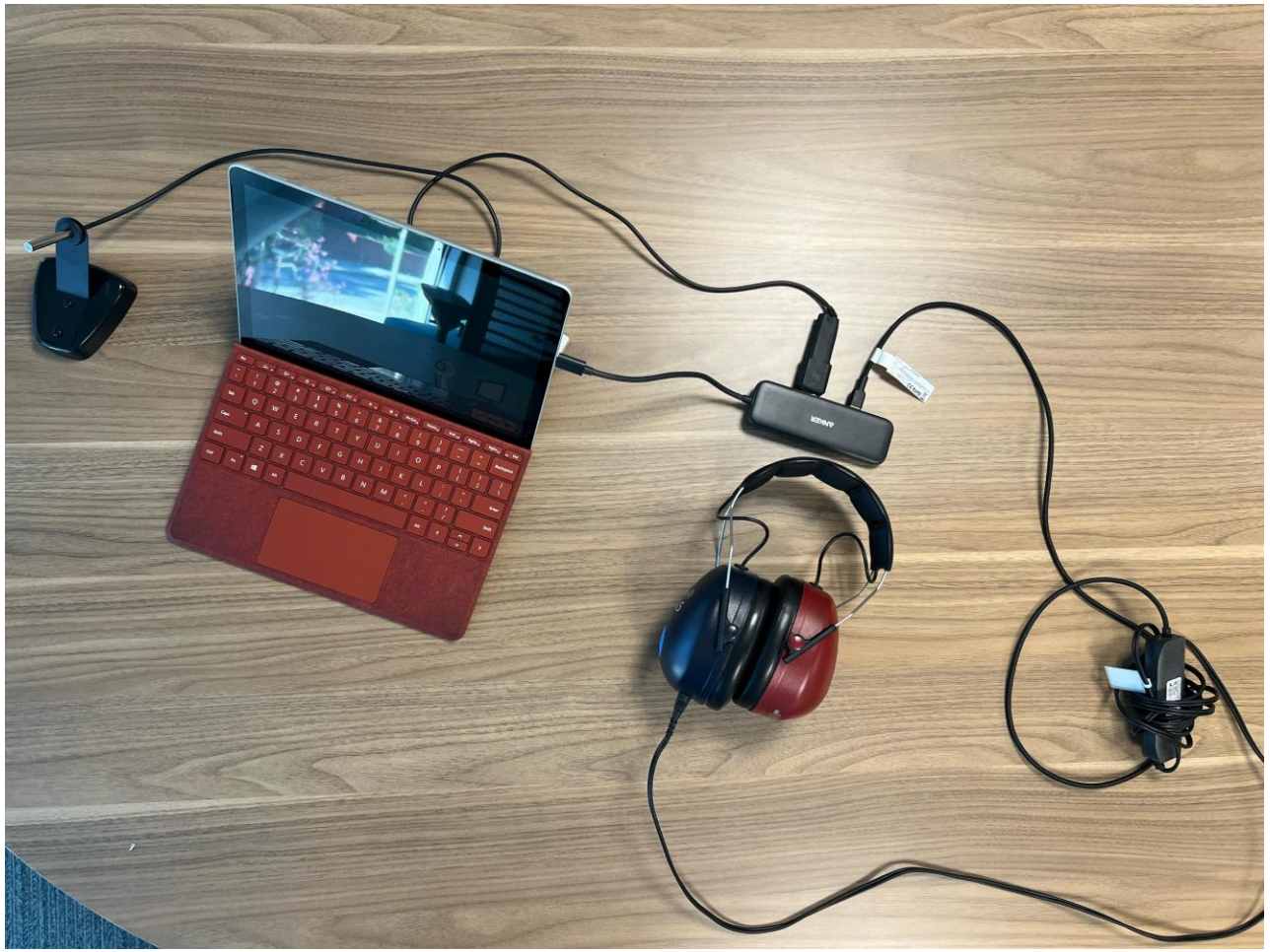
-10dB RadioEar DD450
Samsung Tab A7, RadioEar DD450 headphones, v3 DAC & carry case

Frequency range: 125 - 16,000 Hz
Intensity range: -10 to 95 dB HL

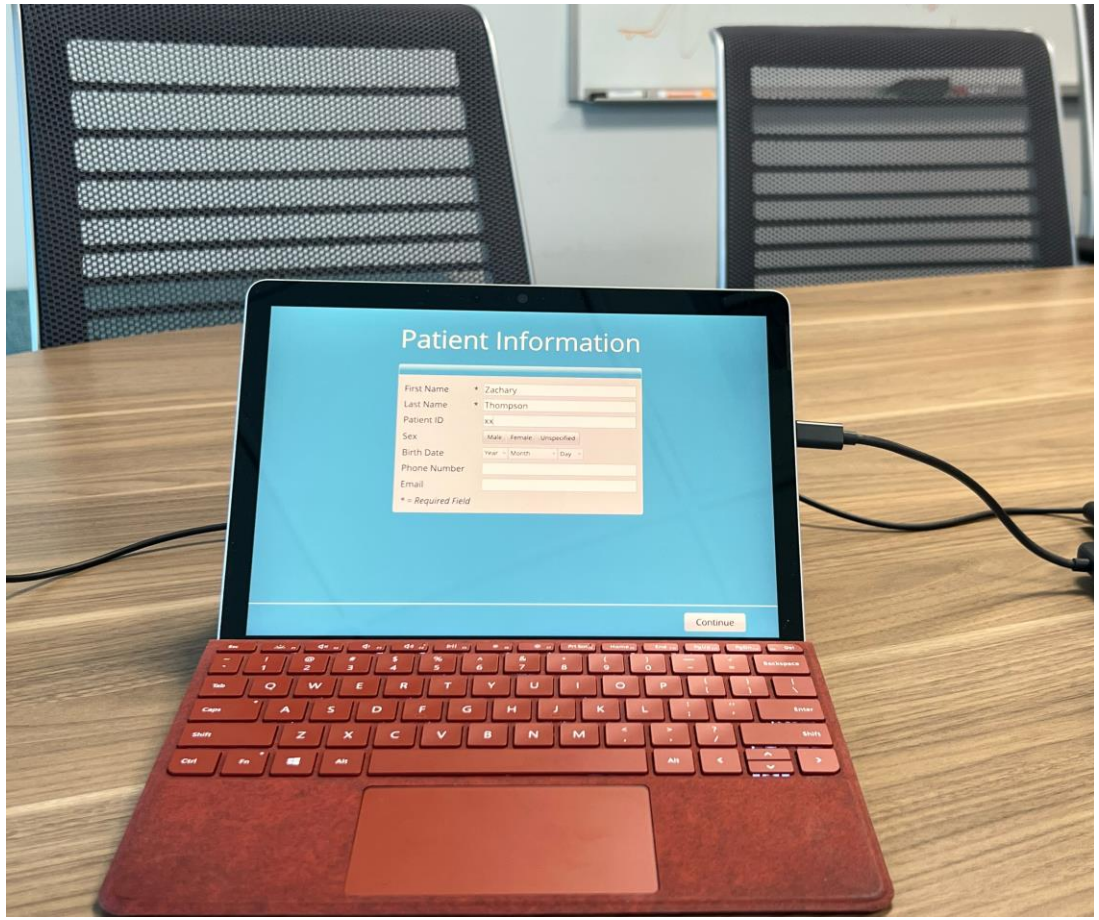
Available in English, Spanish & French

	Lite	Enterprise	Enterprise Plus
Annual test credits	360	Unlimited	Unlimited
Headphone swap out *No downtime in testing*	✗	✗	✓
Access to mHealth Studio Cloud Software *Secure cloud-based data management platform.*	✓	✓	✓
Warranty *1-year warranty on all hardware components.*	✓	✓	✓
One-on-one training, plus access to the online training platform	✓	✓	✓
Software updates and remote technical support	✓	✓	✓
Year 1 *Includes once-off outright purchase of hardware, calibration, shipping and software license fees for year 1 only.*	$3,000	$3,300	$3,300
Annually, from Year 2 onwards *Annual fee includes recalibration, return shipping and software license fees.*	$390	$690	$1,540

GSI AMTAS Flex



GSI AMTAS Flex



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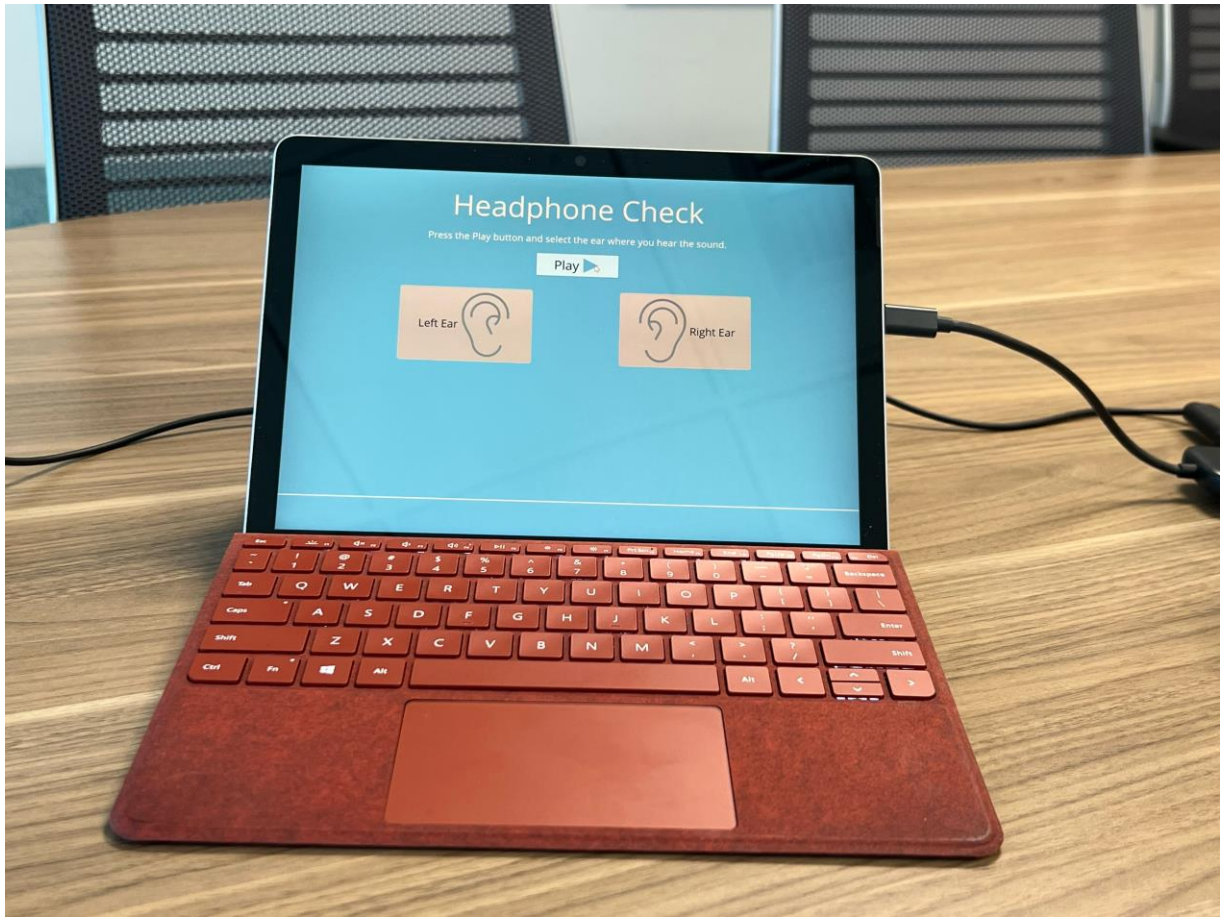

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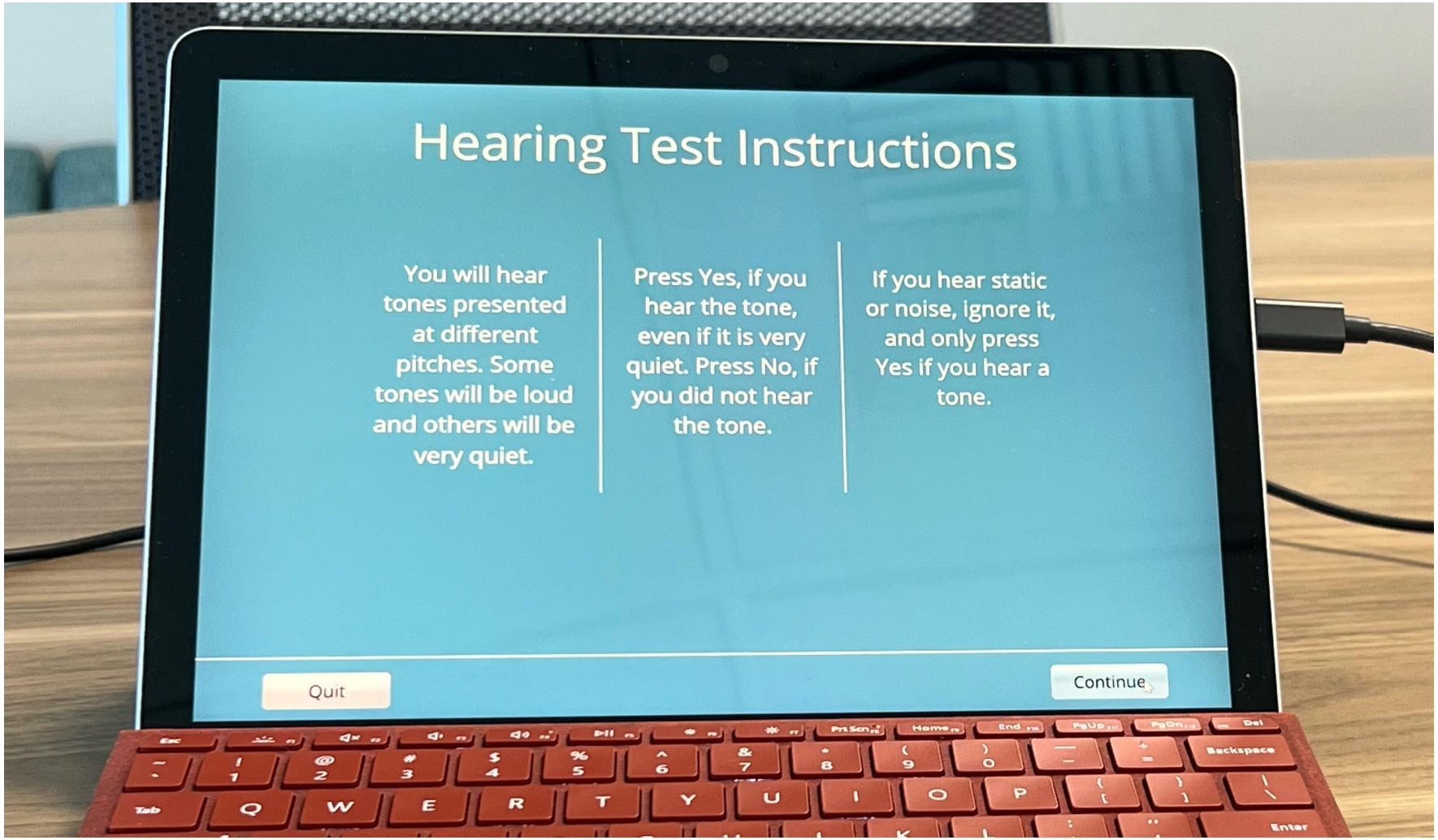

GSI AMTAS Flex

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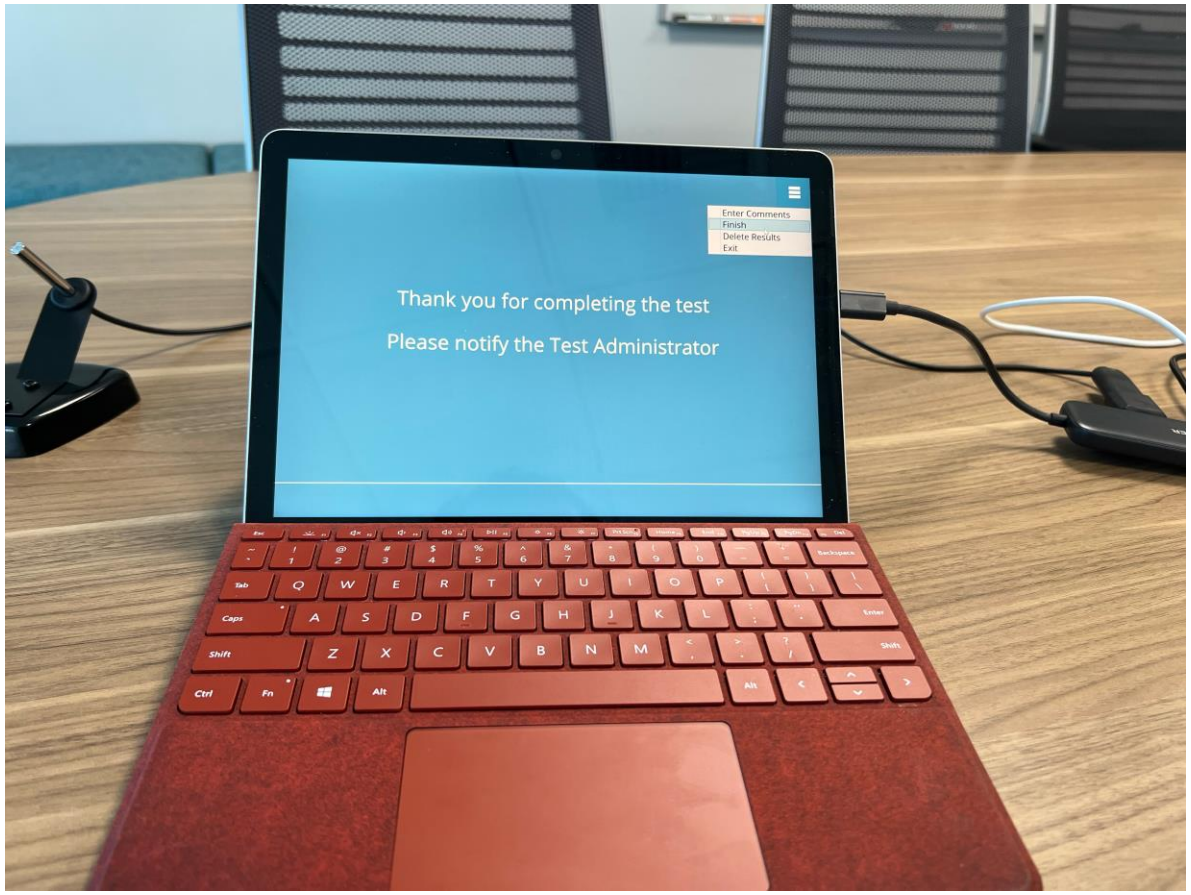
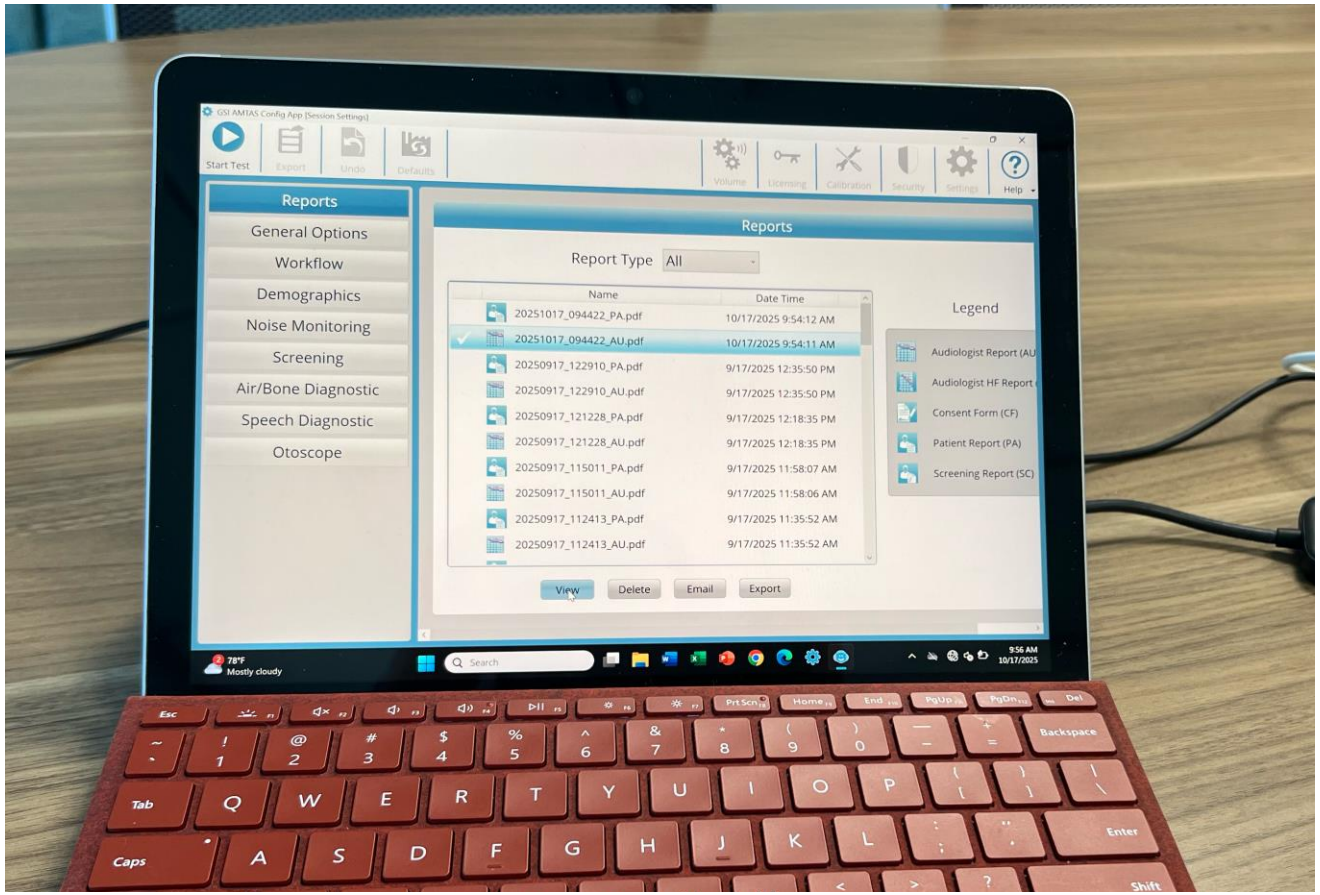
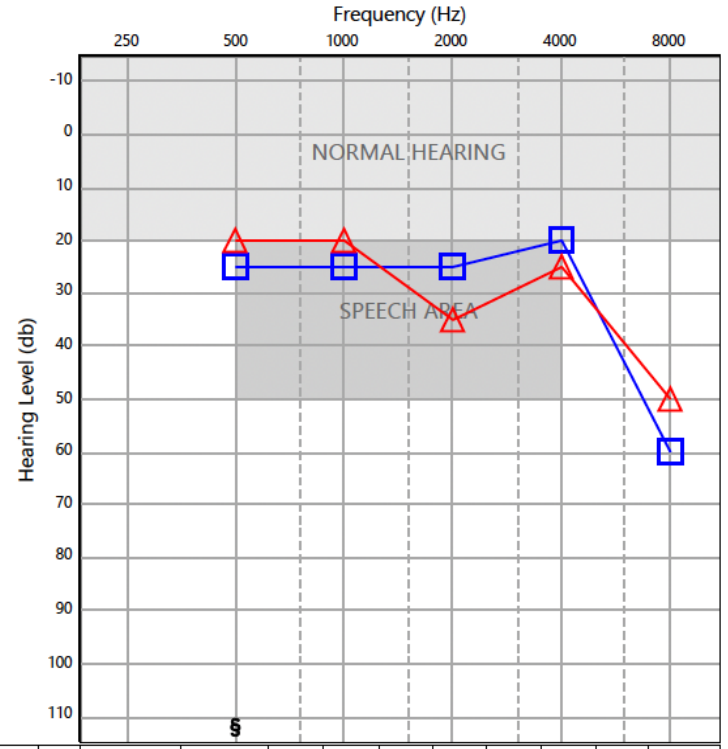




GSI AMTAS™ Hearing Report

Test Date: 7/17/2025



Right	AC		0		0		15		5		30
(dB EML)											
Left	AC		5		5		5		0		40
(dB EML)											

QUALIND™		
Quality	GOOD	
Indicators	Value	Rank
Accuracy	5 dB	0
Response Time	0.9 s	30
False Alarm	9 %	65
Test-Retest	2 dB	23
Check Fail	8 %	69

Legend	Right	Left
Masked Air	△	□
OSHA Alert	§	

Distraction Alert	NONE

QUALIND™		
Quality	FAIR	
Indicators	Value	Rank
Accuracy	6 dB	20
Response Time	2.5 s	95
False Alarm	26 %	90
Test-Retest	2 dB	23
Check Fail	8 %	69

QUALIND™		
Quality	POOR	
Indicators	Value	Rank
Accuracy	11 dB	90
Response Time	1.6 s	75
False Alarm	14 %	80
Test-Retest	2 dB	23
Check Fail	33 %	94

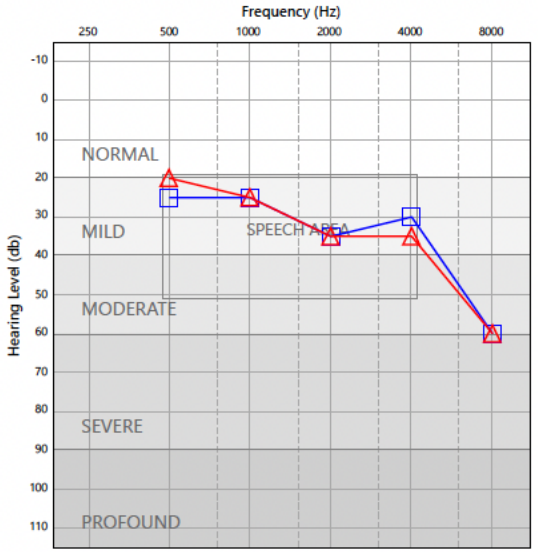
AMCLASS™ Audiogram Classification			
Ear	Severity	Configuration	Site Of I
Right	Normal-Mild	Sloping Hearing Loss	Cannot de
Left	Mild	Flat Hearing Loss	Cannot de

PTA	
Ear	dB HL
Right	25
Left	25

Your Hearing Report

Test Date: 7/21/2025

Audiogram



Legend	Right	Left
Masked Air	△	□

The audiogram is a graph that shows what sounds you are able to hear and what sounds you cannot hear. Each mark on the audiogram is the softest sound you can hear - your threshold - for a particular frequency or pitch. Normal hearing people hear sounds that are 20 decibels (dB) or less at all the frequencies.

Hearing loss can be described by the degree of loss - how loud sounds have to be for you to hear them - and the pattern of the thresholds shown on the audiogram. The degree of loss can be mild, moderate, severe, or profound.

The speech area represents the sounds that make up everyday conversational speech. If your thresholds are all above the speech area, you hear all the sounds that are important for understanding speech. If your thresholds are all below the speech area, you hear none of the sounds in normal speech. If some of your thresholds are in or below the speech area, you are missing some of the sounds that are important for understanding everyday conversation.

Hearing loss is a symptom of a problem somewhere in the ear. It can be in the outer ear, the middle ear, or the inner ear. Some of these conditions can be treated with medication or surgery. Many people with hearing loss are helped by hearing aids. It is important to find out the cause of the hearing loss so that the appropriate treatment can be provided.

Right Ear and Left Ear

Your audiogram shows that the hearing in your RIGHT ear and your LEFT ear is a mild to moderate, sloping hearing loss.

A sloping hearing loss is one where the thresholds for the low frequencies (the left side of the audiogram) are better (higher) than the thresholds for high frequencies (on the right side of the audiogram). Your hearing for low frequencies is in the speech area so you probably don't hear some of the low pitches in speech (like vowel sounds). Your hearing at high frequencies drops below the speech area so you probably have difficulty hearing some of the high pitches in speech (like s, p, t, th). This usually causes some difficulty understanding speech in quiet conditions and more difficulty when there is background noise, a soft speaker, or a reverberant room. A hearing aid may be very helpful for you.

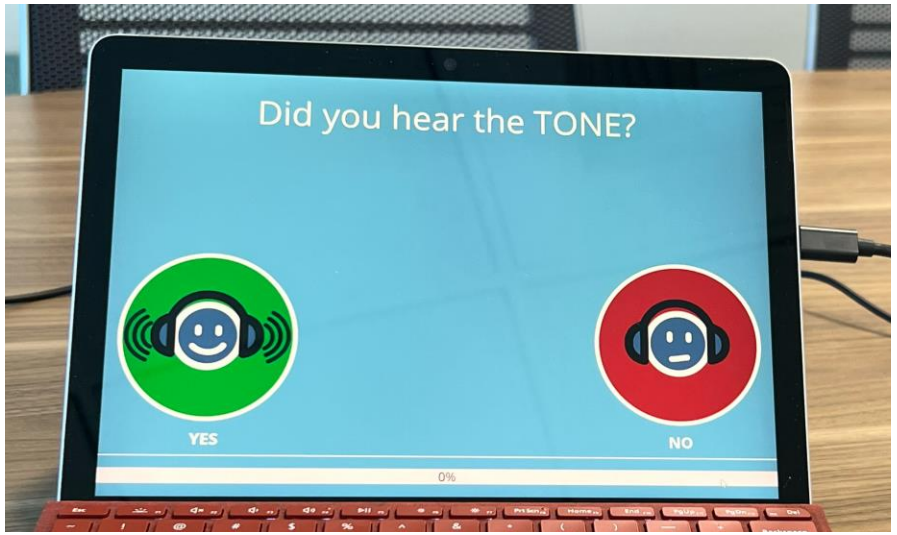
Field Use Considerations

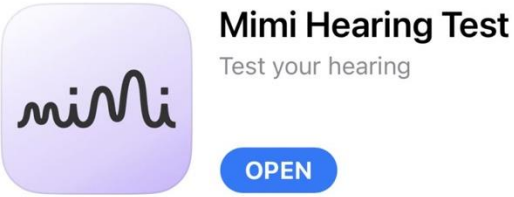
- **Senior center hearing screenings in Los Angeles**
  - Participant age: 60+ years
  - English/Spanish speaking
  - Screening time: ~5-10 minutes per participant
    - 0.5, 1, 2, 4, 6, 8kHz air-conduction pure-tones

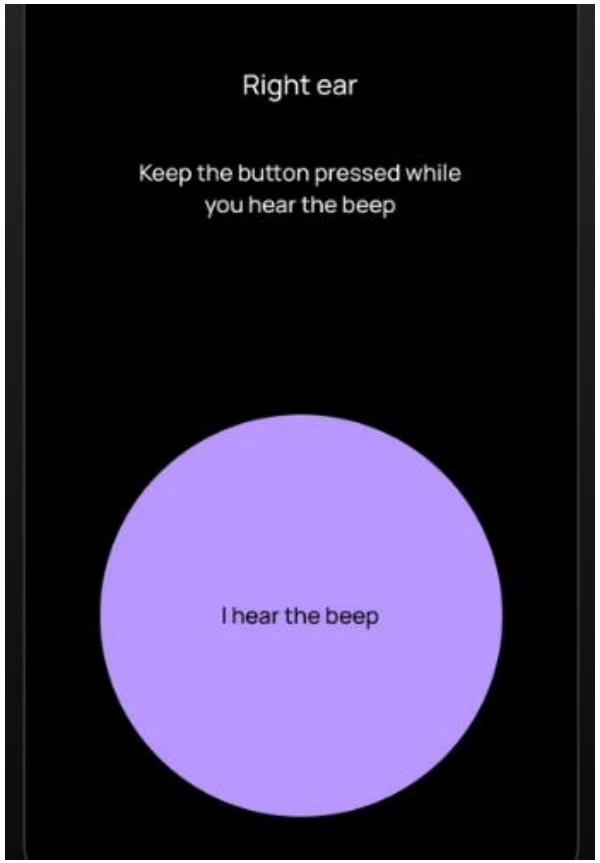
Field Use Considerations

Software

- Easy to use, no issues tapping “YES/NO”
- Occasional missed responses or taps without tones (false alarm)
- Generally intuitive interface



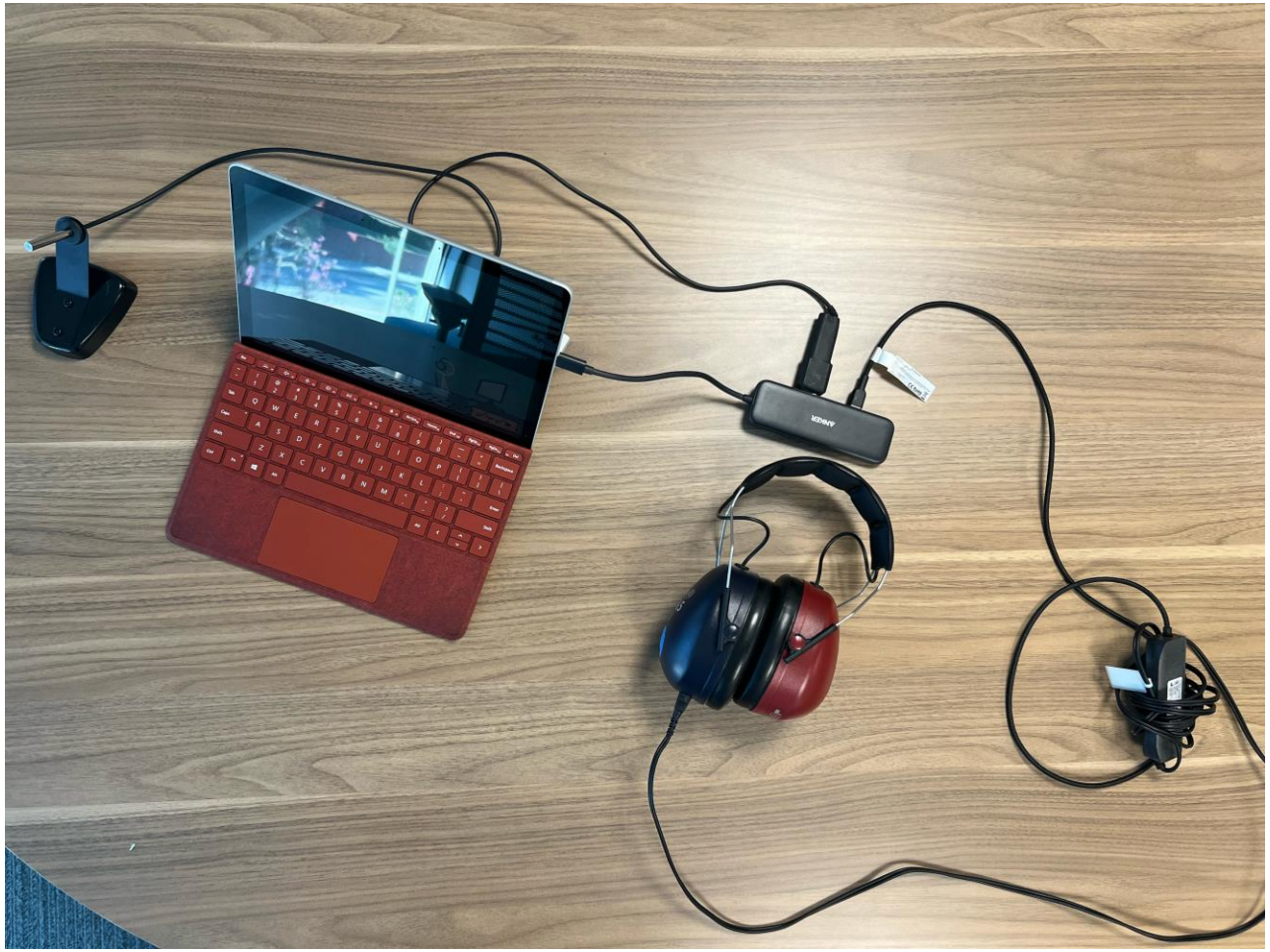




Field Use Considerations

Headphone

- Well-tolerated overall
- One participant reported discomfort,
  being ”too tight”



Audiogram report

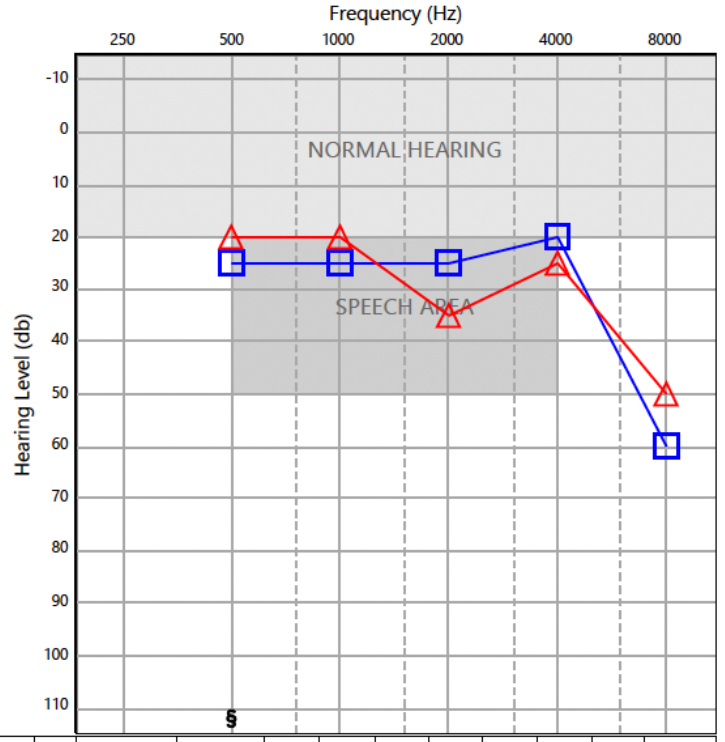
- Participant view
- Audiologist view
- Data export: XML file

Ambient noise report

- Average noise levels
- OSHA/ANSI limits
- Distraction alert

GSI AMTAS™ Hearing Report

Test Date: 7/17/2025



QUALIND™		
Quality	GOOD	
Indicators	Value	Rank
Accuracy	5 dB	0
Response Time	0.9 s	30
False Alarm	9 %	65
Test-Retest	2 dB	23
Check Fail	8 %	69

Legend	Right	Left
Masked Air	△	□
OSHA Alert	§	

Distraction Alert	NONE

Right	AC		0		0		15		5		30
(dB EML)											
Left	AC		5		5		5		0		40
(dB EML)											

AMCLASS™ Audiogram Classification				
Ear	Severity	Configuration	Site Of Lesion	Bilateral Symmetry
Right	Normal-Mild	Sloping Hearing Loss	Cannot determine	Symmetric
Left	Mild	Flat Hearing Loss	Cannot determine	Symmetric

PTA	
Ear	dB HL
Right	25
Left	25

Audiogram report

- Participant view
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Ambient noise report

- Average noise levels
- OSHA/ANSI limits
- Distraction alert

Environmental Noise Report

Any noise level that may have had an impact on the threshold is indicated on the audiogram with an '!' next to the audiometric symbol

Average Noise Levels

Average noise levels for each octave band during testing

	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
OSHA Limit (dB SPL)*	---	61	60	71	75	85
Measured	---	32	26	24	23	22

* Maximum Permissible Ambient Noise Levels (MPANL) used by AMTAS are adjusted for the additional attenuation provided by the circumaural earphones

OSHA Limits

Number of times the octave band noise exceeded the maximum limits during the test

	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Limit (dB SPL)	---	61	60	71	75	85
Alerts Count	---	1	0	0	0	0
Alert Percent	---	0 %	0 %	0 %	0 %	0 %

AMTAS Threshold Alerts

Thresholds that may have been affected by ambient noise

	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
AC Alerts						
BC Alerts						

Maximum Noise Level during testing

Number of times the noise level exceeded the overall maximum

Maximum Limit (dB SPL)	Exceeded Max Count	Exceeded Max Percent	Total Test Time (min:sec)	Total Test Count
73	17	2 %	11:16	737

Distraction Alert

Overall likelihood that distractions affected patient responses

NONE

Discussion

- Feasibility of incorporating hearing measures in HRS and sister cohorts
- **Short-term**: Questions on hearing loss and hearing aid use (duration, frequency of use, age/severity of hearing loss when started using regularly)
- **Long-term**: Incorporate repeated objective hearing measures in HRS and sister cohorts
  - Clarify mechanisms linking hearing loss (#1 potentially modifiable risk factor for dementia?), hearing aid use, and cognition

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Mimi Hearing Test - Android and iPhone