) tuned

updated 05/02/25

Tuned's Hearing Screening Process

Tuned has revamped the hearing screening process for its members and audiologists.

Overview

Screening Component	Status	Notes
Intake Questionnaire	Updated	More relevant questions added; less free text questions; multiple trigger questions for additional questionnaires
Tone Screener	**NEW!**	Tuned's tone screener will replace SonicCloud
Digits in Noise	Updated	HearX's DIN is now color-coded to aid interpretation

Intake Questionnaire

- Notable topics:
    - Audiologic and otologic history
    - Presence of comorbid conditions
    - Top priorities and level of motivation
    - Listening behavior and sound exposure
    - Help-seeking behavior for audiologic needs
- There are also 3 trigger questions that will lead to additional questionnaires:

Question	Answer	Action
Ringing or buzzing?	Yes	Tinnitus Handicap Inventory
Dizziness, vertigo or imbalance?	Yes	Dizziness Symptom Profile
Are you noticing issues with your hearing?	Yes	Hearing Handicap Inventory for Adults, Screening

    - *Note: All additional measurements include the scoring and interpretation in the member's chart.*

Tuned Tone Screener

Development

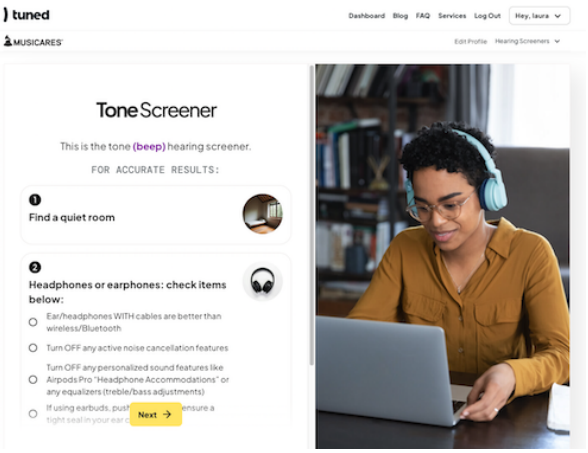
- The screener design was based on extensive research including articles on hearing screening best practices, consultations with experts, and the WHO Hearing Screening guidelines. Thank you, Laura Sinnott, Au.D. and Frank Wartinger, Au.D.!
- We replaced the previous screener because audiologists and members often misunderstood the results and interpreted it like a clinical audiogram.
- The screener measures 500 Hz, 1000 Hz, 2000 Hz, 4000 Hz, and 6000 Hz using a pulsed warble tone at three levels in descending order: 65-, 55-, and 25-dB HL.

- *30 dB HL is used at 500 Hz instead of 25 dB HL*
- *Did not respond = did not detect 65 dB HL level.*

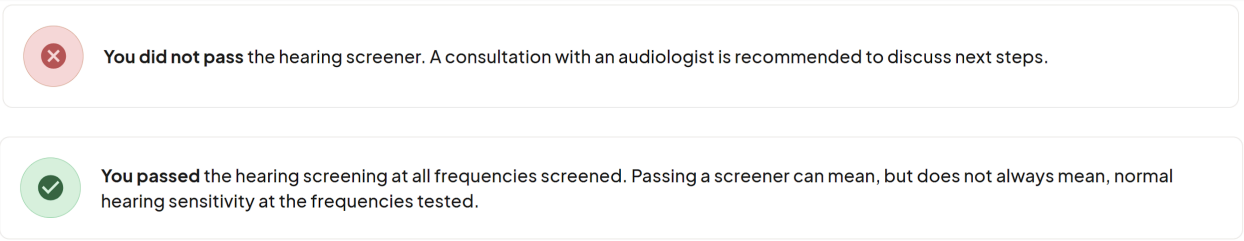
Validation Study

- N = 32, comparing the Tuned Tone Screener using an iPad with the Sennheiser HDA 280 Pro headphones to in-booth testing. We chose the 280s because RETSPLs exist which is required for proper calibration.
- Results:
  - Overall sensitivity = 100% and specificity = 96%.
  - Most (but not all) participants had hearing thresholds within normal limits.

User Experience



- The member must identify the headphones used and level of background noise before starting.
- After, the member will see one of two messages:



Audiologist View and Interpretation

- The audiologist will see ear- and frequency-specific results, transducer and device used, number of false positives, and the member view (see below.)

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Left Ear

FREQUENCY (HZ)	AMPLITUDE DETECTED
500	30 dB HL
1000	25 dB HL
2000	25 dB HL
4000	25 dB HL
6000	25 dB HL

Right Ear

FREQUENCY (HZ)	AMPLITUDE DETECTED
500	55 dB HL
1000	55 dB HL
2000	25 dB HL
4000	25 dB HL
6000	25 dB HL

- Background noise level: **No Noise**
- Headphones type: **In-Ear, Wireless**
- Headphones brand: **Apple**
- Device brand: **Airpods**
- Using a headphone dongle: **No**
- # of false positives: **0**

Audiologists, remember that the accuracy of results may be heavily influenced by transducer and device (phone, laptop etc.) used as well as ambient noise levels. This screener was calibrated with an iPad using Sennheiser HDA 280 Pro headphones.

Member view

You did not pass the hearing screener. A consultation with an audiologist is recommended to discuss next steps.

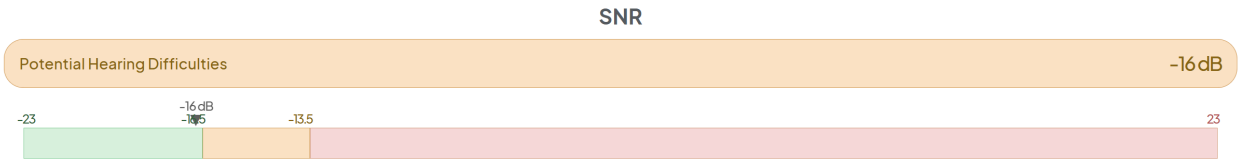
	Left Ear	Right Ear
High Pitches	Potentially Little to **No Difficulty**	Potentially Little to **No Difficulty**
Mid Pitches	Potentially Little to **No Difficulty**	Potentially **Some Difficulty**
Low-mid Pitches	Potentially Little to **No Difficulty**	Potentially **Some Difficulty**

Interpretation

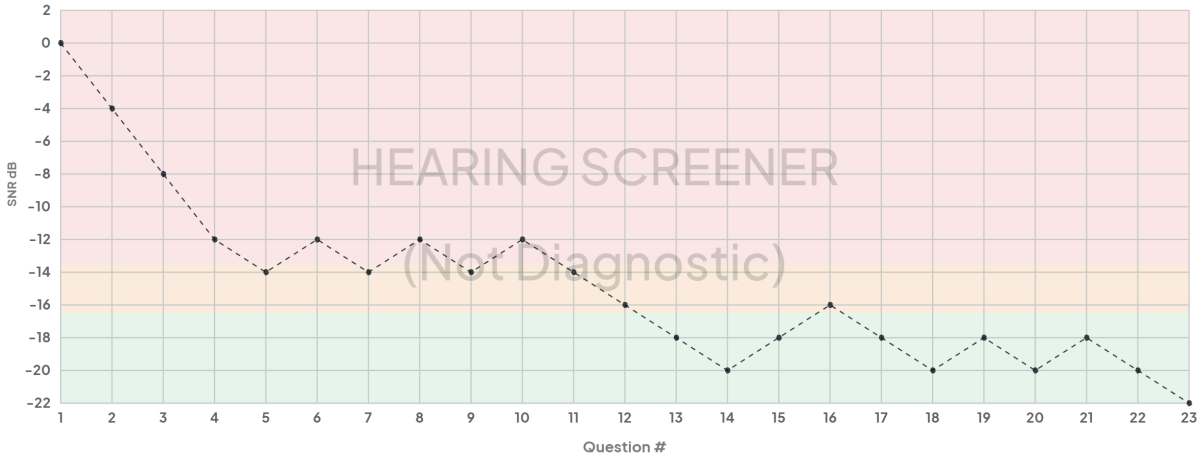
- PASS: All frequencies were successfully detected at the lowest presentation level.
- NOT PASS: At least one frequency was not successfully detected at the softest presentation level.
- Pros: Grossly measures hearing, looks for asymmetries, determines appropriate next steps, offers an opportunity for education, and rounds out the screening process with another data point
- Cons: Cannot determine changes in hearing, recognize hidden hearing losses, diagnose type and severity of hearing loss.

Digits in Noise

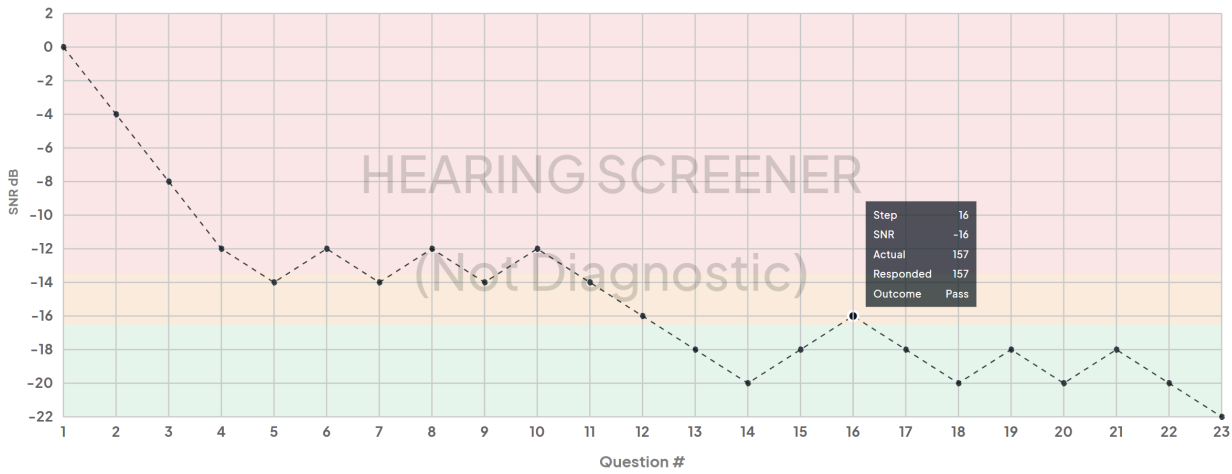
- We are continuing with the DIN from HearX
- Results will be shown as SNR with color-coded interpretation bar included.



- The view will also show the results of all 23 rounds:



- If you hover over a point, you will see more information:



- According to HearX's validation studies, the SNR should corroborate a 4-frequency pure tone average.

Putting it all together:

- As with the previous screener, it is important to look holistically at the member and all components of the screening process.
- Use this information to guide the consultation conversation, recommendations, and appropriate technology. This can also include a referral to an expert (vestibular or tinnitus.)