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# Measuring Meaningful Outcomes for Adult Hearing Health Interventions

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# Study Sponsors

- Centers for Disease Control and Prevention
- Defense Health Agency
- Department of Veterans Affairs
- National Institutes of Health
  - National Institute on Aging
  - National Institute on Deafness and Other Communication Disorders

# Committee Members

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# Statement of Task

An ad hoc committee of the National Academies of Sciences, Engineering, and Medicine will examine the state of the science in outcomes research for interventions in adult hearing health care (excluding surgically placed prosthetic devices), with an emphasis on measures that are meaningful to the individual and the clinician. The committee will determine a core set of existing standard outcome measures, define the core outcome domains (including hearing, communication, and other domains) that should be measured, and develop strategies and a set of recommendations to guide the development of standardized and meaningful measures that are fit for use in different settings.

# Study Process

- 7 full committee meetings
- Many working group calls
- 3 virtual public webinars
- Online open platform
  - Individuals with hearing difficulties
  - Clinicians in hearing health care
- External peer review by 12 experts in a variety of disciplines

# Study Context

- Hearing loss is the **most common sensory disorder**.
- More than 80 percent of adults with hearing loss are **over age 50**.
- **Hearing loss** is a diagnosis based on measurement of hearing ability.
- **Hearing difficulties** reflect the individual's perception of their hearing trouble.
- Current evaluations of the effectiveness of interventions may not accurately capture **individuals' perceptions of the effect their hearing difficulties** on the quality of their life.
- There is **inconsistent use of measurement** in the research limiting the ability to pool data and compare interventions.

# Study Focus

- Meaningful outcomes (rather than diagnosis or candidacy)
- Acquired, adult-onset hearing loss (and primarily on older age groups)
- Broad range of interventions and a wide range of settings
- Intervention at the level of the individual
- Exclusion of outcomes that could be highly influenced by systems and practice patterns

# Committee Approach

- Current and emerging interventions for a range of settings and purposes
- Evidence-based recommendations
- Broadly applicable recommendations

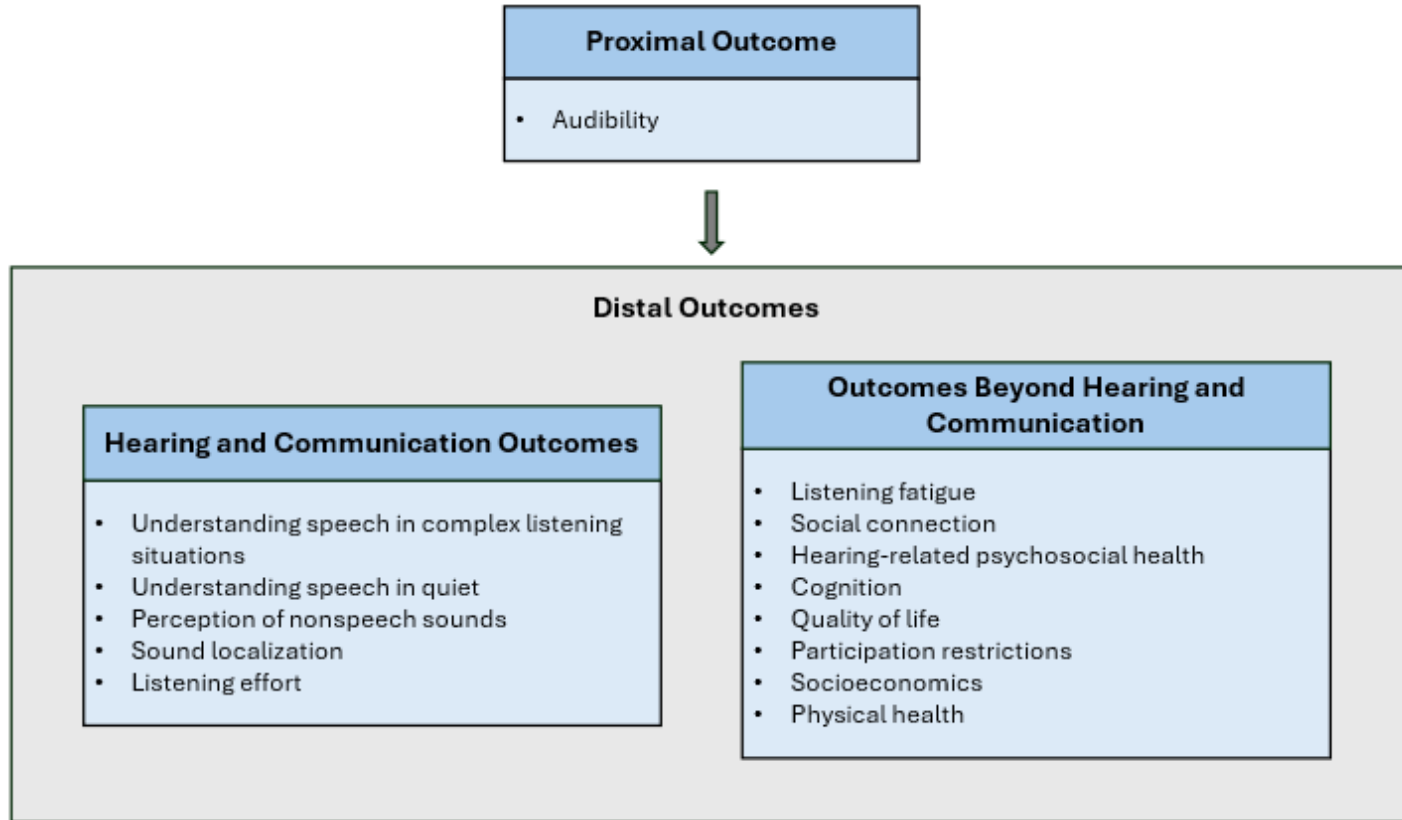
# Key Terminology

- **Outcome** Effect of intervention on health
- **Outcome measure** A tool/instrument that assesses the impact of an intervention on an outcome.
- **Meaningfulness** Perceived importance by adults with hearing difficulties and clinicians
- **Importance to measure** Reflects whether an intervention has the ability to directly affect the outcome or whether measurement of the outcome provides information that would be helpful for clinical decision making.

# Committee Process - Outcomes

- Identify and describe candidate outcomes
- Criteria for inclusion of outcomes in the core set
  - Meaningfulness to individuals with hearing loss and clinicians
  - Association between hearing difficulties and the outcome
  - Importance to measure

# Outcomes



# Audibility

- Fundamental to success of intervention
- Requires verification using appropriate methods (varies by type of intervention)
- Essential but not sufficient for measuring hearing health outcomes

# Committee Process - Measures

- Inventory of measures
- Evaluate quantity and quality of the evidence
  - Scientific acceptability
  - Feasibility
  - Sensitivity to change

# Areas of Recommendations

1. Core outcome set
2. Standardized outcome measures
3. Future research on outcomes
4. Future measure development and refinement
5. Uptake of core outcome set and measures

# Core Outcome Set

**Recommendation 5-1:** Individuals and organizations engaged in hearing health interventions should adopt the following outcomes as a core outcome set in both research and clinical settings:

- Understanding speech in complex listening situations
- Hearing-related psychosocial health

# Standardized Outcome Measures

**Recommendation 6-1:** When assessing outcomes in hearing health, clinicians, researchers, and individuals should use the following outcome measures for each of the outcomes in the core outcome set:

- a. Understanding speech in complex listening situations
  - i. Abbreviated Profile of Hearing Aid Benefit test (global score)
  - ii. Words in Noise test
- b. Hearing-related psychosocial health
  - i. Revised Hearing Handicap Inventory

# Outcomes Research

**Recommendation 4-1:** Sponsors of hearing health research should fund additional research to engage adults with hearing difficulties, their communication partners, and clinicians to determine the most meaningful outcomes based on direct evidence from adults with hearing difficulties.

**Recommendation 5-2:** Sponsors of hearing health research should fund research to build the evidence base on the clinical effect of hearing health interventions on key outcomes that are meaningful to adults with hearing difficulties and clinicians.

# Examples of Needed Research by Outcome

Outcome	Research Needed on Outcome
⊕ Perception of nonspeech sounds (e.g., music)	Determine which subpopulations consider this most meaningful.
Listening effort and listening fatigue	Research the separate constructs warranted. Currently, definitions and theoretical approaches are not consistent.
Social connection	Determine the intervention's effect on clinical outcomes.
Hearing-related psychosocial health	Determine the differences of effects on social versus emotional health (currently not distinctly measured).
Cognition	Determine the intervention's effect on clinical outcomes and mechanism for effect.
Quality of life	Determine a clear and consistent definition with common metrics across conditions.
Socioeconomic impacts	Determine the intervention's effect on the outcome.
Participation restrictions	Develop a consistent definition. Define the outcome independent of individual underlying constructs and overlapping outcomes.
Physical health	Determine the intervention's effect on clinical outcomes.

# Measure Development and Refinement

**Recommendation 6-2:** Sponsors of hearing health research should fund further psychometric evaluation of the measures recommended for the core outcome set. Specific areas of research include the following:

- a. Development of links and crosswalks
  - i. Words in Noise (WIN) test versus Quick Speech in Noise (QuickSIN) test
  - ii. Among different variations of the Hearing Handicap Inventory (HHI)
- b. Establishment of the sensitivity to change relative to intervention (including minimal detectable change and minimal clinically important difference) for the WIN, the global score from the Abbreviated Profile of Hearing Aid Benefit (APHAB-global), the Revised HHI (RHHI), and the screening (RHHI-S)
- c. Development of WIN (and QuickSIN) in other languages
- d. Assessment of associations among the set of core outcomes to further establish the independence and uniqueness of each measure
- e. Application of item response theory to further develop and refine the recommended outcome measures

# Measure Development and Refinement

**Recommendation 6-3:** Sponsors of hearing health research should fund research to develop and refine hearing health outcome measures beyond the currently recommended measures, including:

- a. Broader psychometric development of the Quick Speech in Noise (QuickSIN) test;
- b. Exploration of the use of the digits-in-noise test as an outcome measure; and
- c. Exploration of the usefulness of high-quality language agnostic tests for sound processing in complex listening situations.

# Uptake

**Recommendation 7-1:** Health academic organizations and programs, professional organizations, researchers, and consumer groups should disseminate information about the importance of the core outcome set to clinicians of first contact (e.g., primary care clinicians), hearing health clinicians (e.g., students, audiologists, otolaryngologists), and adults with hearing difficulties.

**Recommendation 7-2:** To create incentives for the use of the core outcome set and corresponding measures the following should occur:

- a. Sponsors of research on hearing health interventions should require the use of the core outcome set and corresponding measures (at a minimum), unless scientifically justified for exclusion.
- b. Electronic health record (EHR) vendors should incorporate the Abbreviated Profile of Hearing Aid Benefit and Revised Hearing Handicap Inventory into EHRs.
- c. Insurers who require outcome measures should require the use of the recommended measures.

# Uptake *(continued)*

**Recommendation 7-3:** To facilitate big data meta-analyses, the National Institutes of Health should develop a national database to allow clinicians and researchers to benchmark the use of the core outcome set and corresponding measures as well as their results.

**Recommendation 7-4:** After an adequate level of new research has been gathered, the National Institutes of Health, the Department of Defense, and the Veterans Administration should collaborate to revisit the core outcome set.

**Recommendation 7-5:** Sponsors of hearing health research should fund research on comprehensive implementation science approaches to identify additional key facilitators for and barriers to the uptake and use of the core outcome set and corresponding measures.

# Thank You

More information can be found at:

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