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As a result of this presentation, participants will be able to:

1) Effectively administer and score four different outcome measures in a clinical setting
2) Interpret the results of the outcome measures discussed
3) Identify appropriate situations in which to use each of the outcome measures discussed
Why do we need outcome measures?

* Verification
  * Is the intervention doing what we think it is doing?
    * Probe mic measurements
    * Electroacoustic testing
    * Audibility
    * Physical fit
  * Verification is a good way to measure outcomes, but we also want...

Why do we need outcome measures?

* Validation
  * What was the impact of the intervention (in this case, the hearing aids) on the patient?
  * Did our intervention benefit the patient?
  * What works in the clinic (or the lab) may not be working in the real world!
  * Self-report outcome measures

Bentler et al. (2015)
4 Outcome Measures

* Client-Oriented Scale of Improvement (COSI)
* Abbreviated Profile of Hearing Aid Benefit (APHAB)
* Satisfaction with Amplification in Daily Life (SADL)
* International Outcome Inventory for Hearing Aids (IOI-HA)

Client-Oriented Scale of Improvement (COSI)

* Designed to focus on listening situations that are specific to the individual patient
* Pre-fitting or post-fitting measure
Client-Oriented Scale of Improvement (COSI)

* Clinical Example
  * Mrs. Smith – age 65

  * Mild sloping to moderately-severe sensorineural hearing loss

  * Clinician administers the COSI at a hearing aid consultation
<table>
<thead>
<tr>
<th>Specific Needs</th>
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<th>Score</th>
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<tbody>
<tr>
<td>Hearing vs. husband in the car</td>
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<td>X</td>
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<tr>
<td>Following conversations at book club</td>
<td>2</td>
<td>X</td>
</tr>
<tr>
<td>Following dialogue of the movies with my girlfriend</td>
<td>3</td>
<td>X</td>
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<table>
<thead>
<tr>
<th>Category</th>
<th>Score</th>
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</tr>
<tr>
<td>2</td>
<td>X</td>
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<table>
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<tr>
<td>4</td>
<td>X</td>
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</table>

**Notes:**
- Mrs. Smith is being assessed for auditory perceptual abilities.
- The results indicate a significant auditory cueing deficit, particularly in environments with multiple conversations.
* Designed to measure benefit in 4 areas
  * Ease of communication (EC)
  * Listening in reverberant environments (RV)
  * Listening in background noise (BN)
  * Unpleasantness of environmental sounds/aversiveness (AV)

* 24 questions (4 subscales of 6 questions each)
Abbreviated Profile of Hearing Aid Benefit (APHAB)

- 4 Purposes of the APHAB (Cox, 1997)
  - Pre-fitting measure to predict patient success
  - Compare benefit with different hearing aids
  - Compare patient’s benefit scores to the scores of a norm group
  - Compare benefit with hearing aids to the unaided condition

**Background Noise**

**Ease of Communication**

**Reverberation**

**Aversiveness**

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**Abbreviated Profile of Hearing Aid Benefit (APHAB)**

**Instructions:** Please circle the answers that come closest to your everyday experience. Notice that each choice includes a percentage. You can use this to help you decide on your answer. For example, if a statement is about 75% of the time, circle “C.” If you have not experienced the situation we describe, try to think of a similar situation that you have been in and respond for that situation. If you have no idea, leave that item blank.

**Ease of Communication:**

1. When I am in a crowded grocery store, talking with the cashier, I can follow the conversation.
2. I miss a lot of information when I’m listening to a lecture.
3. Unexpected sounds, like a smoke detector or alarm, are uncomfortable.
4. I have difficulty hearing a conversation when I’m with two of my family at home.
5. I have trouble understanding the dialogue in a movie or at the theater.
6. When I am listening to the news on the car radio, and family members are talking, I have trouble hearing the news.
7. When I’m at the dinner table with several people, and I’m trying to have a conversation with one person, understanding speech is difficult.
8. Traffic noises are too loud.
9. When I’m talking with someone across a large empty room, I understand the words.
10. When I’m in a small office, interviewing or answering questions, I have difficulty following the conversation.
11. When I’m in a theater watching a movie or play, and the people around me are whispering and rustling paper wrappers, I can still make out the dialogue.
Abbreviated Profile of Hearing Aid Benefit (APHAB)

* Clinical Example
  * Mr. Jones – age 74

* Unaided APHAB scores
  * EC: 34%
  * RV: 58%
  * BN: 67%
  * AV: 20%
Abbreviated Profile of Hearing Aid Benefit (APHAB)

* Clinical Example

* Aided APHAB scores after 3 months
  * EC: 14%
  * RV: 19%
  * BN: 35%
  * AV: 53%
Obtaining benefit – above the 50th percentile!

Negative benefit (more problems) – AV often adversely affected with hearing aids

TABLE 5. Ninety and 95% critical differences (in %) for APHAB subscales and for comparable PHAP and PHAB subscales from previous studies.

<table>
<thead>
<tr>
<th>Ssc(cond)</th>
<th>APHAB</th>
<th>PHAB</th>
<th>PHAP</th>
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<td></td>
<td></td>
<td>95%</td>
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<tr>
<td>EC(unaided)</td>
<td>22</td>
<td>26</td>
<td></td>
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<tr>
<td>RV(unaided)</td>
<td>24</td>
<td>28</td>
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<tr>
<td>BN(unaided)</td>
<td>23</td>
<td>27</td>
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<td></td>
<td></td>
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<tr>
<td>AV(unaided)</td>
<td>17</td>
<td>21</td>
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<td></td>
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<tr>
<td>EC(aided)</td>
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<td>23</td>
<td>26</td>
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<tr>
<td>RV(aided)</td>
<td>18</td>
<td>20</td>
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<tr>
<td>BN(aided)</td>
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<td>27</td>
<td>18</td>
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<tr>
<td>AV(aided)</td>
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<td>23</td>
<td>36</td>
<td>28</td>
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<tr>
<td>EC(benefit)</td>
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<td>27</td>
<td>31</td>
<td>32</td>
<td></td>
<td></td>
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<tr>
<td>RV(benefit)</td>
<td>28</td>
<td>25</td>
<td>33</td>
<td>29</td>
<td></td>
<td></td>
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<tr>
<td>BN(benefit)</td>
<td>27</td>
<td>21</td>
<td>34</td>
<td>25</td>
<td></td>
<td></td>
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<tr>
<td>AV(benefit)</td>
<td>31</td>
<td>27</td>
<td>37</td>
<td>32</td>
<td></td>
<td></td>
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</tbody>
</table>

Sac(cond) = subscale and response condition.

continued
Satisfaction with Amplification in Daily Life (SADL)

* “Indirect” measure of hearing aid satisfaction
* 15 questions divided into 4 subscales
  * Positive Effect (6)
  * Service and Cost (3)
  * Negative Features (3)
  * Personal Image (3)
Self-Pay vs. VA service-connected

SADL Scale Norms

Black circle = mean score
Gray bar = 20th to 80th percentile scores
Clear augmentation to “Service & Cost” for patients who receive a free hearing aid from the VA.

SADL Critical Differences

<table>
<thead>
<tr>
<th>Score</th>
<th>90% CD</th>
<th>95% CD</th>
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</thead>
<tbody>
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<tr>
<td>Positive Effect</td>
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<tr>
<td>Service &amp; Cost</td>
<td>1.3</td>
<td>1.6</td>
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<tr>
<td>Negative Features</td>
<td>2.0</td>
<td>2.3</td>
</tr>
<tr>
<td>Personal Image</td>
<td>1.6</td>
<td>2.0</td>
</tr>
</tbody>
</table>

(Cox & Alexander, 1999)
Clinical Example

Mr. Johnson – age 73

Very soft spoken; reports that he is doing well with his hearing aids and cannot think of improvements

Clinician decides to administer the SADL to ensure report of satisfaction
International Outcome Inventory for Hearing Aids (IOI-HA)

- Short questionnaire used to quickly quantify effectiveness
- Original intent: to compare outcomes across countries and cultures (Cox et al., 2000)
- Available in 22 languages

International Outcome Inventory for Hearing Aids (IOI-HA)

- Made up of 7 items, each targeting a different domain of hearing aid use
  - Daily Use
  - Benefit
  - Satisfaction
  - Impact on Significant Others
  - Residual Activity Limitation
  - Residual Participation Restriction
  - Quality of Life
4. Considering everything, do you think your present hearing aid(s) is worth the trouble?

- not at all worth it
- slightly worth it
- moderately worth it
- quite a lot worth it
- very much worth it

Worst Outcome
Best Outcome
Subjective Problems = mild to moderate

Use Ben RAL Sat RPR loth QoL

Item Score

Subjective Problems = moderate to severe+

Use Ben RAL Sat RPR loth QoL

Item Score

International Outcome Inventory for Hearing Aids (IOI-HA)

* Clinical Example

* Mrs. Anderson – age 57

* First time hearing aid user; mild sloping to moderate sensorineural hearing loss

* Fills out the IOI-HA in the waiting room of the clinic
It is still difficult to understand my daughter on the phone.
Availability

* Hearing Aid Research Lab (HARL) - harlmemphis.org
  * APHAB
  * SADL
  * IOI-HA
  * National Acoustic Laboratories (NAL) – nal.gov.au
  * COSI

References

Questions?

Thank You!