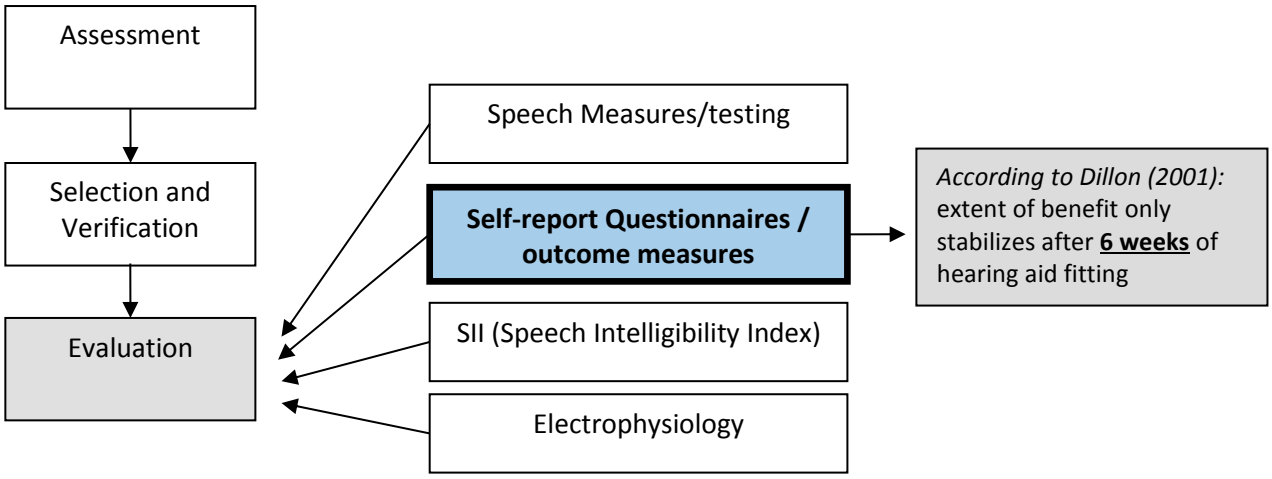
ADMINISTERING & INTERPRETING SELF-REPORT QUESTIONNAIRES / OUTCOME MEASURES
Practical Session: Nov 2017

1. WHERE DO OUTCOME MEASURES FIT IN?



2. HOW DO WE KNOW WE ARE EFFECTIVE?

"*If we cannot measure something, we do not know much about it*" (Lord Raleigh). Thus measuring outcomes of a hearing aid fitting can give us valuable insight into how successful we have been in improving the quality of life of our patients by providing amplification devices and hearing rehabilitation services.

3. ASSESSING USE, PROBLEMS AND SATISFACTION

Prior to initiating formal assessments of effectiveness it may be useful to gauge general outcomes of hearing aid fitting and rehabilitation

1. Does the patient wear the hearing aids?
2. On average for how many hours a day?
3. Any problems with the hearing aids (sound quality, whistling, mould comfort, difficulty with manipulation, telephone use, difference between ears, etc)?
4. How happy are they with the hearing aids

Once these issues are identified and if possible rectified, enough time should be allowed for the patient to accommodate and acclimatize to the hearing aid before administering self-reported questionnaires. The general timeline for adaptation to hearing aids after 6 weeks (usually 2-3months).

4. SELF-REPORT QUESTIONNAIRES (Adapted from Dillon, 2001)

Self-report measures are the **only viable way** to assess hearing aid usage and satisfaction. There are four types of self-report questionnaires (Refer to Table 1):

1. Standard questionnaires that *directly assess* benefit
2. Standard questionnaires that *compare handicap or disability* before and after rehabilitation
3. Individualised questionnaires that *directly assess* benefit
4. Individualised questionnaires that *compare handicap or disability* before and after rehabilitation

Standard: Questions are pre-set.
Individualised: Patients are able to direct the questionnaire based on the main difficulties they experience, or based on the patients main hearing needs.

Direct Assessment
When: only once, after patient has been fitted and rehabilitation services provided
Measures: Patient estimates the degree of benefit in designated situations
Responses: Responses vary evenly from a negative rating to a positive rating
Disadvantage: Does not reveal the full picture

Comparison Questionnaires
When: Twice, 1st time for unaided and 2nd time for aided. Both can be administered after fitting
Measures: Patients are asked how well they can hear or how much handicap they experience in designated situations.
Responses: Responses vary evenly from extreme difficulty to no difficulty in hearing
Disadvantages: Less accurate measure of benefit due to times of administration of unaided:
if before the HA fitting then weeks/months needed for patient to gain enough experience with hearing aid before aided questions can be asked. This can be disadvantageous if patient mood differs on each day. **If after** HA fitting then patients who are full time users may have difficulty remembering how much difficulty they had prior to HA fitting.

Table 1: Difference between Direct Assessment and Comparison Questionnaires

	DIRECT ASSESSMENT	COMPARISON (SUBTRACTION) OF UNAIDED AND AIDED RESPONSES
MEASURES	Patient estimates the degree of benefit in designated situations	Patients are asked how well they can hear or how much handicap they experience in designated situations.
RESPONSES	Responses vary evenly from a negative rating to a positive rating	Responses vary evenly from extreme difficulty to no difficulty in hearing
WHEN	**only once,** after patient has been fitted and rehabilitation services provided	**Twice, 1st time for unaided and 2nd time for aided.** (can administer both on the same day after fitting (patients cannot remember what they said at the assessment appointment)
DISADVANTAGES	Does not reveal the full picture	A less accurate measure of benefit Times of administration of unaided**:** **-if before** the HA fitting then weeks/months needed for patient to gain enough experience with hearing aid before aided questions can be asked. This can be disadvantageous if patient mood differs on each day. -**If after** HA fitting then patients who are full time users may have difficulty remembering how much difficulty they had prior to HA fitting.
In principle then, a combination of the two types will be the best compromise – patients will mark the aided scale in such a way that their ratings, relative to those on the unaided scale, reflect their direct assessment of benefit.		

5. A FEW SELF-REPORTED QUESTIONNAIRES / OUTCOME MEASURES

	NAME	AUTHOR	DATE
GHABP	Glasgow Hearing Aid Benefit Profile	Gatehouse	1999
GHADP	Glasgow Hearing Aid Difference Profile	Gatehouse	1999
COSI	Client Orientated Scale of Improvement	National Acoustic Laboratories	
SSQ	Speech Spatial and Qualities of Hearing Scale	Gatehouse & Noble	2004
APHAB	Abbreviated Profile of Hearing Aid Benefit	Cox and Alexander	1995
IOI-HA	International Outcome Inventory of Hearing aids	Cox, Alexander & Beyer	2003
HHIE	Hearing Handicap Inventory for Elderly	Ventry & Weinsten	1982
HHIA	Hearing Handicap Inventory for Adults	Newman, Weinsten, Jacobson & Hug	1990
HHIE-S	Screening versions of the HHIE screening	/	/

5.1 COMPARISON QUESTIONNAIRES

5.1.1 GLASGOW HEARING AID BENEFIT PROFILE (GHABP) – for new hearing aid users or those who have never worn any amplification before

Self-report measures are the only way to assess hearing aid usage and satisfaction (Dillon, 2001). The GHABP is a comprehensive self-report questionnaire that assesses the three dimensions of hearing aid benefit, hearing aid use, and hearing aid satisfaction (Dillon, 2001). The GHABP uses six predefined subscales which address initial disability and handicap (pre-intervention), and hearing aid use, hearing aid benefit, residual disability, and satisfaction (post-intervention) in four predefined (standardized) and four optional user-nominated (individualised) listening situations.

These subscales have been validated by using a paradigm in which sensitivity to alterations in audibility was the main factor determining the selection of predefined listening situations (Gatehouse, 1999b). Based on these normative findings, it is deemed an appropriate instrument for audiologists who want to use self-reported data to measure improvement in audibility. The GHABP is intended for individuals who require rehabilitative counselling prior to being issued with amplification devices, and they are also able to review any problems prior to being issued with amplification devices (Johnson & Danhauer, 2002). Scores for the six different subscales of the GHABP are recorded numerically from zero to 100 with the higher score representing a better outcome except for residual disability where the lower the score, the better the outcome.

The GHABP is a comprehensive self-report questionnaire that assesses the three dimensions of hearing aid benefit, hearing aid use and hearing aid satisfaction.

6 Subscales measured:

- pre hearing aid fitting scores:
    - Initial disability (pre-intervention – before hearing aid fitting)
    - Initial handicap (pre-intervention – before hearing aid fitting)
- post hearing aid fitting scores:
    - Hearing aid use aid-use (post-intervention – after hearing aid fitting)
    - Hearing-aid benefit (post-intervention – after hearing aid fitting)
    - Residual disability (post-intervention – after hearing aid fitting)
    - Satisfaction (post-intervention – after hearing aid fitting)

4 predefined (standardized) listening situations:

- TV while volume is suited to others
- One – to –one
- Group
- Busy street or shop

4 optional user-nominated (individualised):

- Any further 4 that the patient would like to add

5.1.2 GLASGOW HEARING AID DIFFERENCE PROFILE (GHADP) – to compare old and new hearing aids

Same 6 subscales, and predefined listening situations as GHABP

Questions are divided into two groups

1. Before changing the HA
   -Use with the old aid
   -Residual disability with old aid
2. After introducing the change (new device)
   -Use with new aid
   -Residual disability with new aid

-Benefit difference between old and new aids
-Satisfaction difference between old and new aids

Benefits of GHABP/GHADP

- Quantitative data that can be used for comparison
- Combination of both standard and individual questions
- Quick and easy to administer and score
- Easy to interpret
- Can relate to the PTA
- Comparison of their disability vs handicap

Disadvantages of GHABP/GHADP

- Difficult for patients to choose a specific response
- Some patients may take too long to think of the answers
- Must be administered by audiologist
- Audiologists when not following the instructions can prompt or guide the answer

5.1.3 CLIENT ORIENTATED SCALE OF IMPROVEMENT (COSI)

Clinicians can use this questionnaire to document patient's goals/needs and measure improvements in hearing ability. The advantage of this is that it promotes a greater focus on the patient's individual needs when designing their rehabilitation program. It teaches the importance of identifying and solving specific hearing problems that made the patient seek help in the first place.

COSI is administered in two phases:
Phase 1 - identifying very specific listening situations
- Place in order of significance
- Categorise the situations (16 categories)

Phase 2 - Assessment of improvement and final listening ability
- Rate the degree of change with the hearing aids on

Benefits of COSI

- Very individualised so can focus on specific needs of the patient
- Easy to administer and score
- Easy to interpret

Disadvantages of COSI

- Not for use on patients who are unsure of what they want from hearing aids
- Quantitative data - does not provide comparable data

5.2 DIRECT ASSESSMENT QUESTIONNAIRES

5.2.1 INTERNATIONAL OUTCOME INVENTORY FOR HEARING AIDS SPEECH SPATIAL AND QUALITIES OF HEARING SCALE (SSQ)

The IOI-HA was developed by Cox et al. (2000) as a means to pool and compare data from various studies from different countries. The goal of the IOI-HA is to assess post hearing aid benefit, satisfaction, and quality of life changes associated with hearing aid use. The IOI-HA is a seven-item inventory with a five point rating scale, which was designed to be applied to different investigations carried out in various cultural and social environments (Cox et al., 2000).

This measure is not intended by the inventors to be a substitute for outcome measurement, but rather it should serve as a supplement of the battery of self-reported measures of any study in hearing aid rehabilitation. It will provide directly comparable data across otherwise incompatible projects.
5 point rating scale with 7 questions/subscales that relate to the following:

The seven subscales are:

- Hearing aid use – The number of hours that a subject uses the hearing aids per day
- Hearing aid benefit – Subject's improvement in hearing-related activities
- Residual activity limitation – Degree of difficulty a subject experiences hearing in various situations, after hearing aid fitting
- Satisfaction – Subjects' satisfaction with hearing aids
- Residual participation restriction – The extent to which a subject is unable to participate in activities as a result of the hearing loss, after hearing aid fitting
- Impact on others – How a subject perceives how others reacted to them using a hearing aid
- Quality of life – Improvement in the subject's quality of life as a result of hearing aid use

5.2.2 ABBREVIATED PROFILE OF HEARING AID BENEFIT (APHAB)

The APHAB is a 24-item self-assessment inventory in which patients report the amount of trouble they are having with communication or noises in various everyday situations. Benefit is calculated by comparing the patient's reported difficulty in the unaided condition with their amount of difficulty when using amplification.

The APHAB produces scores for 4 subscales:

- Ease of Communication (EC) – strain of communicating under relatively favourable conditions
- Reverberation (RV) – communication in reverberant rooms such as classrooms
- Background Noise (BN) – communication in settings with high BGN levels
- Aversiveness (AV) – the unpleasantness of environmental sounds. It teaches that hearing aids will be more effective in some situations than in others.

Benefits of APHAB

- Provides very valid hearing aid information in day to day activities
- Good qualitative data for comparisons for research

Disadvantages of APHAB

- Time consuming / not practical to conduct in clinic
- Has to be administered by audiologist

5.2.3 SPEECH SPATIAL AND QUALITIES OF HEARING SCALE (SSQ)

This questionnaire is designed to measure patient's auditory disability across a wide variety of domains, reflecting the reality of hearing in the everyday world. Particular attention is given to:

- Hearing speech in a variety of competing context
- The directional, distance and movement components of spatial hearing
- Segregation of sounds and attending to simultaneous speech streams
- Ease of listening
- The naturalness, clarity and identifiability of different speakers
- Different musical pieces and instruments
- Different everyday sounds

The SSQ can reveal small differences in function, such as minor departures from normal binaural ability, and can be used as an instrument for evaluating the effect different intervention methods could have on auditory function.
There are 3 versions to the SSQ:

1. SSQ - minor version

2. SSQ-B (Benefit) - for first-time users of hearing aids: it measures the benefit from having a hearing aid.
3. SSQ-C (Comparison) - or comparing two different hearing aids (i.e., the hearing aid used presently versus the hearing aid used previously).

5.3 COMBINATION OF DIRECT AND COMPARISON QUESTIONNAIRES

5.3.1 HEARING HANDICAP INVENTORY FOR ADULTS AND ELDERLY (HHIA / HHIE)

The HHIE hosts a combination of scales that include assessment of social and situational (patients perceived effects of hearing impairment in a variety of social situations) and psychosocial or emotional (patients attitudes, and emotional responses toward hearing impairment) consequences of hearing impairment. The HHIE was modified for use with younger hearing-impaired adults who are less than 65 years of age.

Hearing Handicap Inventory for the Elderly (HHIE-S – Ventry & Weinstein, 1982)
The purpose of the HHIE self-assessment tool is to assess the effects of hearing loss on the emotional and social adjustment of elderly individuals (Ventry & Weinstein, 1982). The goal of the HHIE is to measure the perceived effects of hearing loss. The HHIE hosts a combination of scales that include assessment of social and situational (patients' perceived effects of hearing loss in a variety of social situations) and psychosocial or emotional (patients' attitudes, and emotional responses toward hearing loss) consequences of hearing loss (Ventry & Weinstein, 1982). The HHIE was modified for use with adults with hearing loss who are younger than 65 years of age (Newman et al., 1991).

Ventry and Weinstein (1982) reported that results from their study indicated that the HHIE is highly reliable, is purported to have content validity and reported to have excellent internal consistency. Test-retest reliability is reported as being high, which suggests that the HHIE is a good measure of change resulting from rehabilitation (Weinstein, Spitzer, & Ventry, 1986). Johnson and Danhauer (2002) describe this as an easy measure for the elderly to complete with scores that are easy to interpret. This questionnaire was used on subjects and prospective subjects who were 65 years and older.

Hearing Handicap Inventory for the Adults (HHIA-S – Newman, Weinstein, Jacobson & Hug, 1990)
The purpose of the HHIA is to quantify the perceived handicap for adults younger than 65 years and to assess benefit by measuring the change in perceived handicap before and after fitting hearing aids (Johnson & Danhauer, 2002). The HHIA is similar to the HHIE and is composed of two subscales namely emotional and social/situational (Newman, Weinstein, Jacobson & Hug, 1991). The focus of some questions in the HHIA is on the occupational effects of hearing loss.

The HHIA has a high internal reliability (Newman et al., 1990) and high test-retest reliability with a low standard error of measurement (Newman et al., 1991). This measure is easy to complete and scores can be easily interpreted (Johnson & Danhauer, 2002). Based on the inclusion criteria of 18 years and older, this questionnaire was used on subjects and prospective subjects who were between 18 and 64 years old.

Benefits of HHIE/HHIA
- Quick and easy to administer and score
- Patient able to complete on their own
- Provides quantitative data

Disadvantages of HHIE/HHIA
- If sent home, may get family or carer responses
- Standardised questions may not be very relevant
- Makes assumptions on patients lifestyle depending on age
- Not for use on patients who are unsure of what they want from hearing aids

Quantitative data - does not provide comparable data

6. BENEFITS OF DOING SELF-REPORTED OUTCOME MEASURES

1. Used as a counselling tool to provide information to guide individual management decisions
2. Gives us important insight into how successful we have been in improving the quality of life of our patients by providing amplification devices and hearing rehabilitation services/ Validate a successful HA fitting
3. To document clinical / cost effectiveness of services
4. To compare data across different services
5. Provide info on benefits of new technologies
6. Provide info to service providers that service is achieving goals
7. Provide feedback to suppliers

7. DISADVANTAGES OF USING SELF-REPORT QUESTIONNAIRES

1. Some patients do not like completing them, especially if situations not relevant to them
2. Some clinicians do not like completing them, especially if they have to score it themselves
3. Standard questionnaires will not give an insight to the particular situations that the patient spends the most time in (not individualised)
4. Some patients especially elderly have difficulty understanding the questions
5. Some patients cannot entirely categorise their experience in the levels/scales provided in questionnaires
6. In the non-standard questionnaires (e.g. COSI) comparisons across patients or patient populations become difficult

8. LIST OF READING MATERIAL

Cox, R. M. (April 1997) “Administration and Application of the APHAB”, Hearing Journal, 50: Issue 4, pp32-48

Dillon, H. Chapter 13: Assessing the outcomes of hearing rehabilitation

Gatehouse, S (1999) "Glasgow Hearing Aid Benefit Profile: Derivation and validation of a client-centered outcome measure for hearing-aid services", Journal of the American Academy of Audiology, 10:80-103.

Gatehouse, S (1999). "A self-report outcome measure for the evaluation of hearing-aid fittings and services", Health Bulletin, 57:424-436

Gatehouse, S., and Noble, W. (2004). "The Speech, Spatial and Qualities of Hearing Scale (SSQ)," Int. J. Audiol. 43, 85-9.

Gatehouse, S., and Akeroyd, M.A. (2007). "Tailoring hearing-aid and rehabilitative interventions to listeners' disabilities and priorities, in Hearing Care of Adults: An international Conference," edited by C.V Palmer and R.C. Seewald, pp 97-111 (Phonak, Switzerland).

Noble, W., and Gatehouse, S. (2004). "Interaural asymmetry of hearing loss, Speech, Spatial and Qualities of Hearing Scale (SSQ) disabilities, and handicap," Int. J. Audiol. 43, 100-114.

Noble, W., and Gatehouse, S. (2006). "Effects of bilateral versus unilateral hearing aid fitting on abilities measured by the Speech, Spatial, and Qualities of Hearing Scale (SSQ)," Int. J. Audiol. 45, 172-181.

Robyn M. Cox & Genevieve C. Alexander (2002) The International Outcome Inventory for Hearing Aids (IOI-HA): psychometric properties of the English version: El Inventario International de Resultados para Auxiliares Auditivos (IOI-HA): propiedades psicometricas de la version en ingles, International Journal of Audiology, 41:1, 30-35, DOI: 10.3109/14992020209101309