Development and Evaluation of a Hearing Screening Program in a Primary Care Health Setting
&
Development of a Comprehensive Protocol to Assess a Client's Audiological Needs in a Primary Care Setting

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Outline: Hearing screening

- A public health perspective should be applied to the problem of hearing loss (HL) in older adults (OA).
- One element of a public health approach is to conduct a broad-based screening program
- Principles of a screening program
- Brief overview of hearing screening studies
- Recommendation of the US agency re: universal hearing screening programs for adults and older adults
- Goals and issues addressed in present study
- Experimental design
- Obstacles encountered

Outline: Assessment of audiological needs

Origin of the present project

Domains of audiological assessment of needs

- medical/diagnostics
- functional/rehabilitation

ICF (2001) as the conceptual framework for developing AANP

Present assessment tools

Quebec Audiological Assessment Protocol (QAAP)

Applying a public health perspective to the problem of hearing loss in older adults

Elements of a Public Health approach

Many components including:

- Increasing public awareness (Information and education)
- Promotion of healthy behavior
- Prevention (reduce incidence, reduce prevalence)
- Population based intervention
- Policy driven (led by, or participation of, government)
- Early detection
- Effective treatment available
- Treatment cost effective
- Reduce cost to society
- Improve quality of life

Hearing loss is a public health issue

(Tremblay, 2017)

- Because hearing loss is highly prevalent
- There are numerous associated health risks that have an effect on individuals, their family, and their community
- When hearing loss is viewed from a public health perspective, the mission expands to include improving health and quality of life, not only through prevention and treatment of hearing loss but also through the promotion of healthy behaviors

WHY apply a Public Health perspective to Hearing loss in older adults

- Consequences are numerous and include important health determinants (communication, listening effort, listening fatigue, social isolation, cognition problems, depression, dementia, falls, etc..
- Important cost to society (Physical and mental health issues, more hospitalization, younger age in eldercare facilities)
- Effective treatment programs exist

WHY apply a Public Health perspective to hearing loss in older adults

- Population not knowledgeable about this health condition
- The symptoms, manifestations and consequences of hearing loss are not well know or they are learnt only at a late age (when hearing loss is significant).
- OA wait 7 – 10 years before consulting.
- The solutions to the problems are not well known (most think HA are the only solution to HL)

Early detection:
Universal or large scale hearing screening programs

Conditions to be satisfied in order to implement a screening program

Dobrow (2018):

12 consolidated screening principles based on a systematic review and modified Delphi consensus process

Generally, the conditions are

consistent with Wilson and Jungner's (1968) principles of screening

(Wilson, J. M. G., Jungner, G., & World Health Organization. (1968). Principles and practice of screening for disease)

Wilson and Jungner's (1968) principles of screening

- The condition sought should be an important health problem
- The natural history of the condition, including development from latent to declared disease, should be adequately understood
- There should be a recognizable latent or early symptomatic stage.

Wilson and Jungner's (1968) principles of screening

- There should be a suitable test or examination
- The test should be acceptable to the population
- There should be an agreed policy on whom to treat as patients
- There should be an accepted treatment for patients with recognized disease

Wilson and Jungner's (1968) principles of screening

- Facilities for diagnosis and treatment should be available
- The cost of case-finding (including diagnosis and treatment of patients diagnosed) should be economically balanced in relation to possible expenditure on medical care as a whole
- Case-finding should be a continuing process and not a "once and for all" project

Validity of hearing screening tests

Screening tool	Sensibility	Specificity
Single question*	**71%**	**71%**
Questionnaires (e.g., HHIE-s)*	**80%**	**67%**
Hearing tests		
Earcheck*	**82%**	**84%**
Audioscope	94%	80%
Speech tests		
Dutch Speech in noise (tel)	91%	93%
Tel Screen II (NAL)	90%	90%

Other screening procedures: watch tick test, fingers rub, whispered voice test, Audioscope, Uhear, SRT in noise, Triplett digit test, …..

Success of Hearing screening programs

STUDY	% who followed up	% of those contacted who obtained hearing aids
Meyer et al., 2011 (Aus)	36%	7%
Watson et al., (2015) (USA)	27%	8%
Yueh et al., (2010) VA-USA		5.9% (3.3% control grp)
Smits et al. (2006)	Approx. 33%	< 4%
Milstein & Weinstein (2002)	Offered info session about HAs	No significant improvement in follow-up

Summary of hearing screening programs : adherence to recommended treatment

<u>Important issues to consider:</u>

Factors that will have an effect on specificity and sensitivity

- Screening procedure used
- Age-range of participants (the older they are the more likely they will have hearing loss)
- Criteria for ‘failing’ the screening (degree of HL)
- Criteria for what is considered ‘adherence to the post screening recommendation (e.g., hearing test vs. use of hearing aids)
- Readiness for treatment

Hearing screening and stages of change

Laplante-Levesque et al., 2015

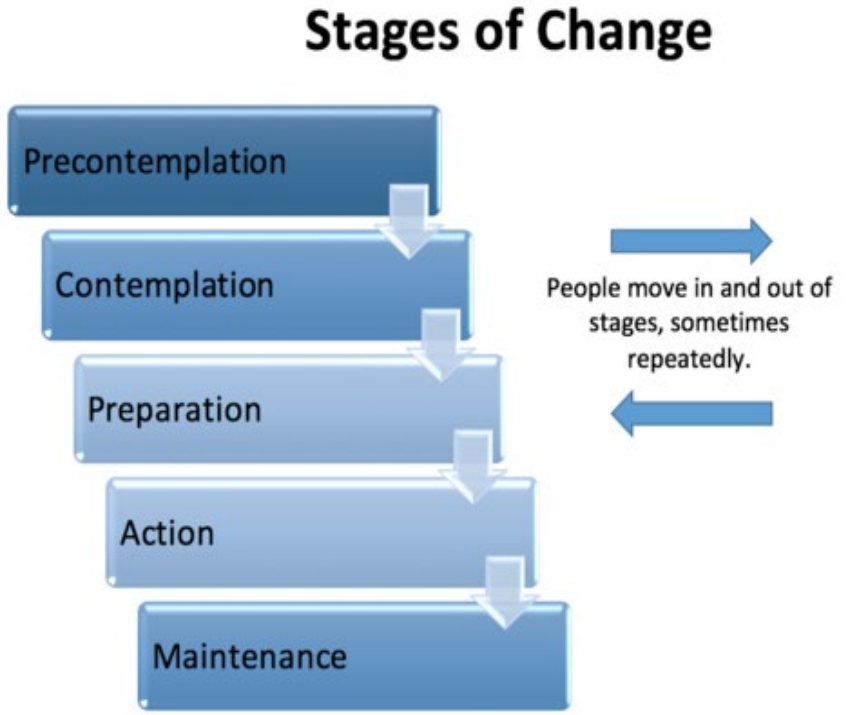
224 participants who failed hearing screening

38% in contemplation stage

50% Preparation stage

9% in pre-contemplation stage

3% action stage



The fact that very few people were in the action stage (approximately 3% of the sample) signals that screening alone is unlikely to be enough to improve help-seeking and rehabilitation rates.

Systematic review of hearing screening in older adults

Annals of Internal Medicine | CLINICAL GUIDELINE

Screening Adults Aged 50 Years or Older for Hearing Loss: A Review of the Evidence for the U.S. Preventive Services Task Force

Roger Chou, MD; Tracy Dana, MLS; Christina Bougatsos, BS; Craig Fleming, MD; and Tracy Beil, MS

Ann Intern Med. 2011;154:347-355.
For author affiliations, see end of text.

Conclusion: Additional research is needed to understand the effects of screening for hearing loss compared with no screening on health outcomes and to confirm benefits of treatment under conditions likely to be encountered in most primary care settings.

Our Study: the long-term goal

To develop a hearing a screening test that could be administered by non-hearing professionals (secretary, nurse, family physician) in a primary care setting (a doctor's office)

- Quick to administer and score
- Simple pass/fail criteria
- Good sensitivity and specificity

Research project

Evaluation of a hearing screening program for older adults who have an appointment with their family doctor in a primary care setting: Preliminary steps

Project funded by the Caroline-Durand, Endowed research chair in hearing and aging at the University of Montreal. J-PG is holds this endowed research chair

Objectives

- Investigate the useful and applicability of 3 different screening procedures in a primary care health setting
- Investigate the effect of who informs the participant of the screening result on the rate of adherence to treatment
- Investigate the effect of including an information session, in to the recommendation of consulting an audiologist for a hearing test
- Identify the factors that constitute obstacles/facilitators for adherence to recommended follow-up (based on a qualitative study conducted with a subgroup of participants for whom a follow-up was recommended)

Participant inclusion / exclusion criteria

Inclusion:

- Individuals 60 years of age or older
- Competent in French of English (to answer spoken and written questions)
- Present at the primary health care facility because they have an appointment with their family physician

Exclusion:

- if they use (or own) hearing aids
- if they have had a hearing test during the previous 12 months
- If visualization shows that the ear canal is completely occluded

Screening tests

Hearing screening test always administered by a member of research team

All participants do all three screening tests

1. Single question (always administered first):

   In your opinion, do you have a hearing loss?

2. 15 questions along the line of the HHIE-S (ex: When you speak to one person, do you ask him to repeat? Do you have any problems understanding when many people speak together? Do you find that people mumble or do not speak loud enough (T.V., friends, doctors)? Answers: Yes, Sometimes, No).

3. HearCheck: hearing test designed by Siemens

HearCheck screener (developed by Siemens)

Generates the following sequence of tones

3000 Hz:	75 dB HL
	55 dB HL
	35dB HL
1000 Hz:	55 dB HL
	35 dB Hl
	20 dB HL

Test presentation is automatic and it takes less than 1 minute/ear to administer

Experimental conditions

Participants to be referred are assigned (sequentially) to one of 4 conditions:

1. Results given by member of **MEDICAL** team, recommendation is to **CONSULT AN AUDIOLOGIST** (n=200)

2. Results given by member of **RESEARCH** team, recommendation is to **CONSULT AN AUDIOLOGIST** (n=200)

3. Results given by member of **MEDICAL** team, recommendation is to **ATTEND 2 HOUR INFORMATION SESSION** (n=200)

4. Results given by member of **RESEARCH** team, recommendation is to **ATTEND 2 HOUR INFORMATION SESSION** (n=200)

Data analyses

2 factor CHI^2 analysis

* Fictitious data

	Medical staff	Research staff
Information session plus reference to audiology	150/200*	130/200
Reference to audiology only	120/200	60/200

Content of 2-hour information session

Outline*

- Ice Breaker activity
- Description of presbycusis (pathology, hearing loss, causes, manifestations, consequences)
- Possible solutions (hearing aids, HATS, communication strategies)
- Hearing health professionals (ENTs, audiologists, *audioprothésistes*)
- Where to find audiologists: (Public and Private sector)
- Questions and answer periods

*Participants are strongly invited to comme with SO

Follow-up (8-months after testing)

for every person who ‘failed’ the hearing screening

Telephone interview:

- Did you do anything to follow-up after you obtained the results of the hearing screening test that you did 8 months ago?
- If so, what did you do?
- If not, is there a reason for not following-up?
- Your impression of the hearing screening program (+ and -)
- Other comments
- Any questions

Qualitative research: semi-structured interview

(n˜48; ˜38 who failed and 10 who passed the screening test)

Content

- Their view of the statement: generally, our hearing becomes poorer as we get older
- Their perception of their present hearing abilities
- Describe their experience with undergoing a hearing screening test in primary health care setting (their doctor's office)
- Their perception of the influence of the person who informed them of the result of their screening test

Qualitative research: semi-structured interview

(n˜48; ˜38 who failed and 10 who passed the screening test)

Goal:

- What follow-up was undertaken since screening test
- Perception of audiological asessment (when applicable)
- Their awareness of hearing difficulties since doing the screening test
- Reasons for following up (or not) on the recommandation they received
- The benefit (or not) of attending a 2 hour information session (if applicable)
- Any other comments

Summary of procedure

1	IDENTIFICATION DES PARTICIPANTS (1 min)	
	Réceptionniste	- Patients 60 ans et plus - Orientation vers l'assistant de recherche
2	RECRUTEMENT DES PARTICIPANTS (10 min)	
	Équipe de recherche	- Validation des critères de sélection - Présentation du projet, signature du consentement
3	DÉPISTAGE AUDITIF (15 min)	
	Équipe de recherche	- Administration du questionnaire sociodémographique - Question unique: «Selon vous, avez-vous une perte auditive?» - Questionnaire sur les difficultés auditives (15 questions) - Épreuve de détection de sons

Summary of procedure

4

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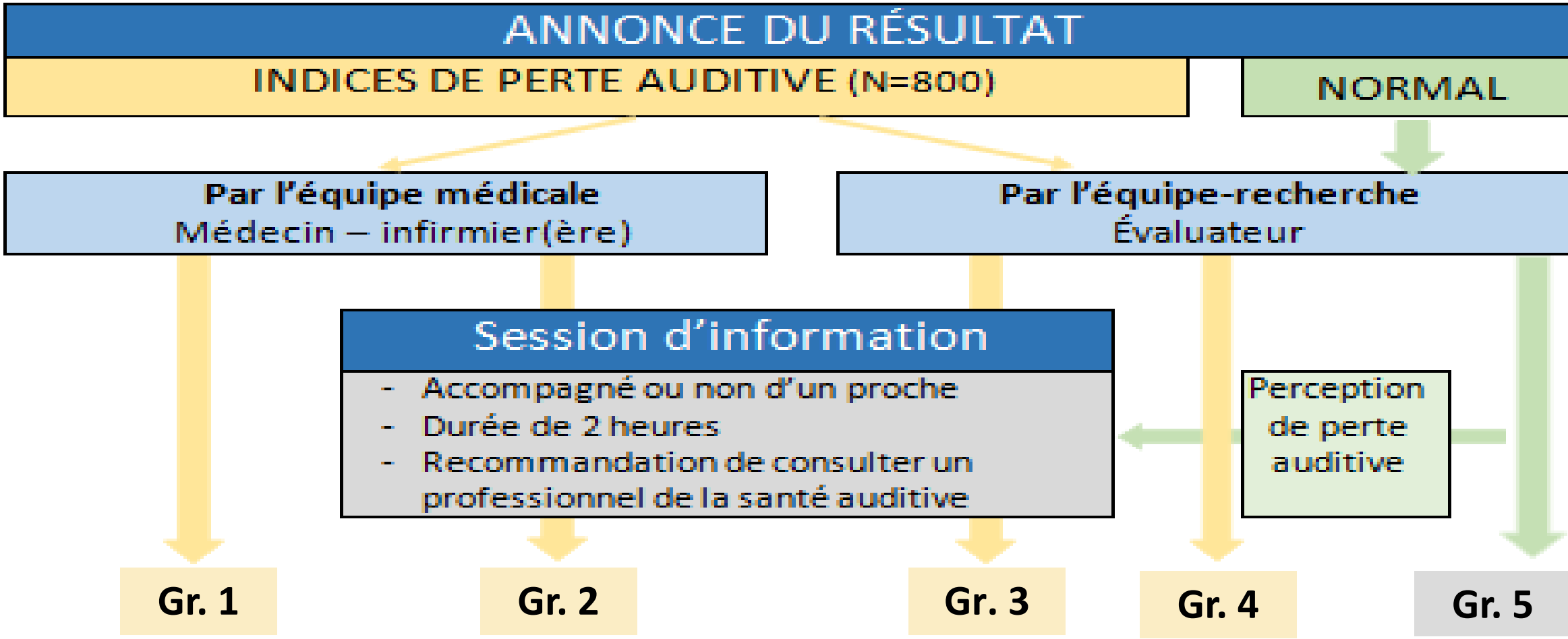

Summary of procedure

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POST-TEST 8 MOIS (10 min)	
Équipe de recherche	- Entrevue téléphonique - Présence/absence de consultation d'un spécialiste - Questionnaire sur les incapacités auditives et le handicap

et/ou

7

POST-TEST 8 MOIS (45 min)	
Équipe de recherche	Entrevue qualitative semi-dirigée en personne (n=48) (cheminement, obstacles, facilitateurs, autres commentaires)

Obstacles encountered in planning the study

- ENTs and *Audioprothésistes* in the same primary health care faciltiy as their family physician (reaction of a*udioprothésistes*; reaction of family physicians)

- Hectic schedule of physicians: want to be involved as little as possible
- Need quiet room for interview and hearing screening test

- Patient not wanting to leave waiting room in case they are called to see the doctor.
- Access to audiology services at no direct cost to participant is difficult

Next step:

New start at another primary health care faciltiy (with no *audioprothésistes*)

Planning a similar study in a specialized outpatient clinic for patients with cardiac problems (mostly men with heart problems)

Possibility of doing study in a non metropolitain region of Québec (about 75 Kms from Montreal)

Questions !

Comments !!

Suggestions !!

Assessment of (audiological) needs

Outline: assessment of audiological needs

Origin of the present project

The goals of audiological assessment

- medical/diagnostics
- functional/rehabilitation

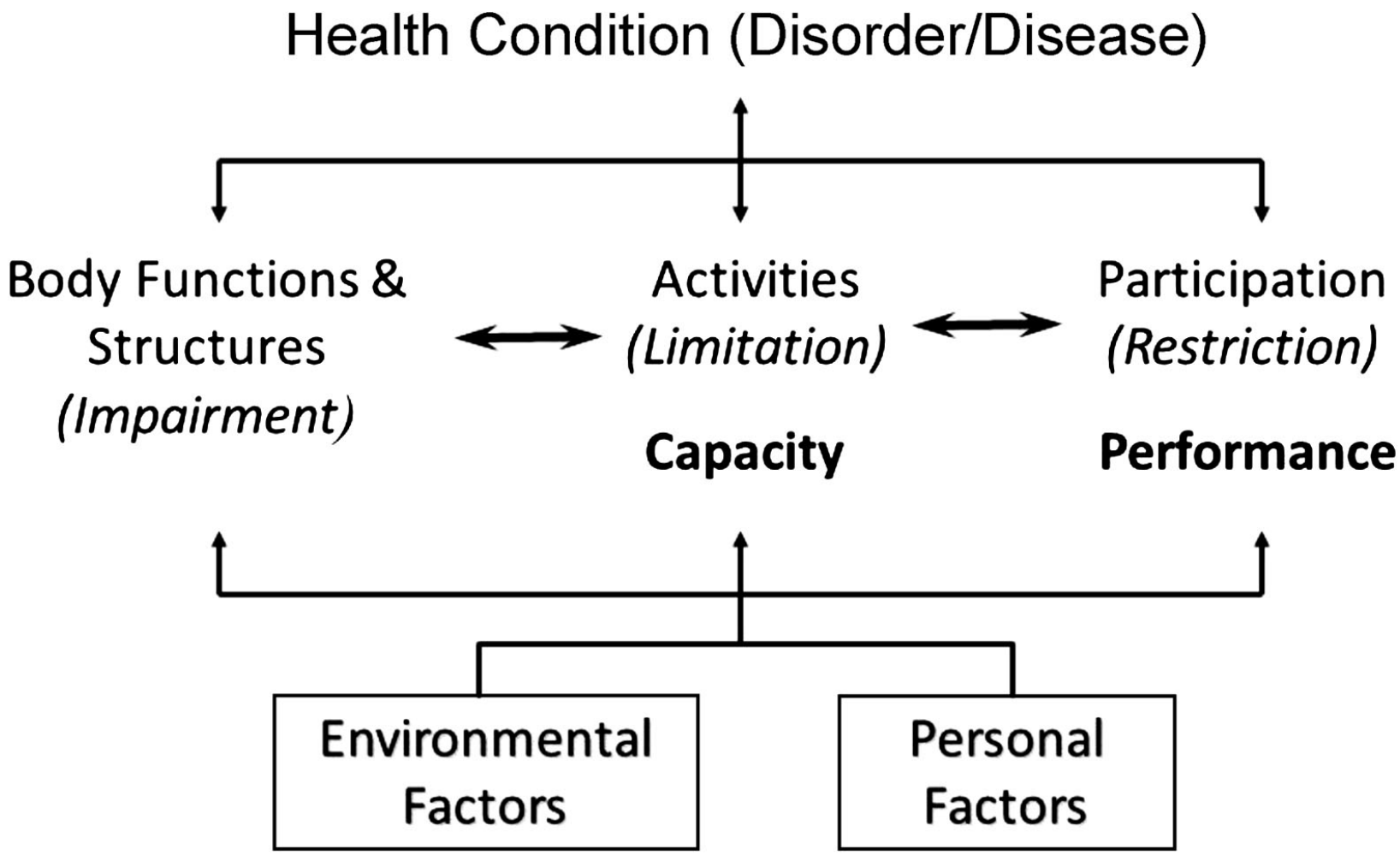
ICF (2001) as the conceptual framework for developing AANP

Present assessment tools

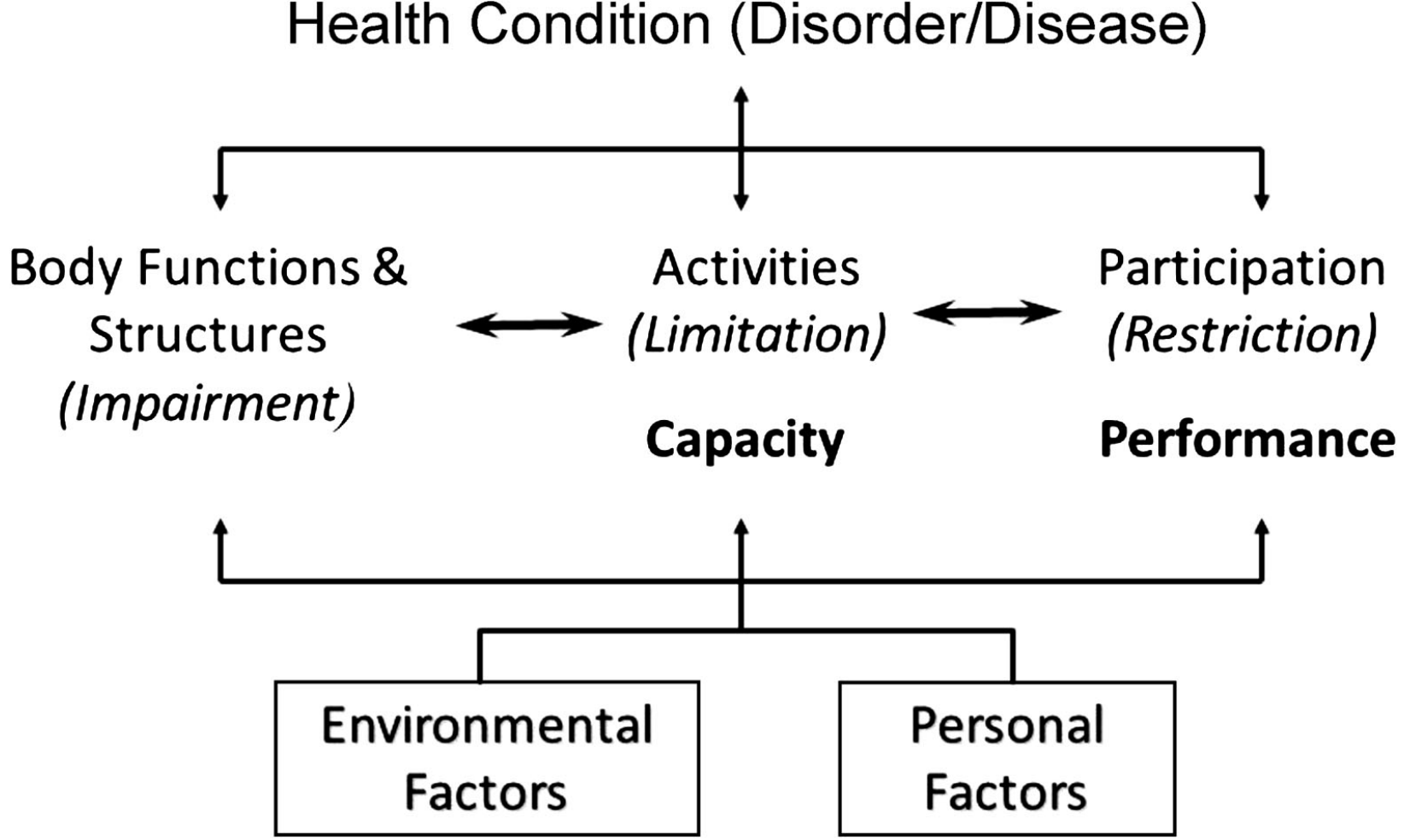
Quebec Audiological Assessment Protocole (QAAP)

Origin of the project

- Quebec government hearing aid program (RAMQ = ADP in ON)
- Revision of the Ministry of Health's (RAMQ) hearing aid program – 2015
- Presently the criteria focus almost exclusively on degree of HL (≥ 35 dB HL in the better ear)
- Audiologists commented that more weight should be given to the person's functional needs rather than their hearing detection thresholds
- MoH contract to develop a protocol to assess functional needs



The ICF offers:
a very functional approach to diseases and disorders. An ideal conceptual framework for rehabilitation



AANP should take into account all the domains of the ICF: Impairment, activity limitations, participation restrictions, environmental factors (physical and social) and personal factors NOT JUST DEGREE OF HL

Questionnaires most frequently used in AR (from Granberg 2014).

Table 4. Overview of the most frequently identified PT-S in this review. The references are available as a Supplementary Appendix 2 in the online version of the journal. Please find this material using the direct link to the article at: http://informahealthcare.com/doi/abs/10.3109/14992027.2013.851799.

	*Instrument type**	*Pool I (n = 246) Frequency*	*Pool II (n = 122) Frequency*
The Hearing Handicap Inventory for the Elderly (HHIE). (Ventry & Weinstein, 1982)	CS	5 (2.0%)	2 (1.6%)
The Abbreviated Profile of Hearing Aid Benefit (APHAB). (Cox & Alexander, 1995)	CS	3 (1.2%)	1 (<1.0%)
Hearing Disability and Handicap Scale (HDHS). (Hétu et al, 1994)	CS	2 (<1.0%)	2 (1.6%)
Hearing Handicap Inventory for the adults (HHIA). (Newman et al, 1990)	CS	2 (<1.0%)	1 (<1.0%)
Satisfaction with amplification in daily life (SADL). (Cox & Alexander, 1999)	CS	2 (<1.0%)	1 (<1.0%)
Short Form – 36 (SF-36). (Ware et al, 1993)	G	2 (<1.0%)	1 (<1.0%)
The Communication Profile for the Hearing Impaired (CPHI). (Demorest & Erdman, 1987)	CS	2 (<1.0%)	–
Communication Scale for Older Adults (CSOA). (Kaplan et al, 1997)	CS	1 (<1.0%)	1 (<1.0%)
Glasgow Benefit Inventory (GBI). (Robinson et al, 1996)	G	1 (<1.0%)	1 (<1.0%)
The Hearing Aid Performance Inventory (HAPI). (Walden et al, 1984)	CS	1 (<1.0%)	1 (<1.0%)
The Hearing Handicap and Disability Inventory (HHDI). (van den Brink et al, 1996)	CS	1 (<1.0%)	1 (<1.0%)
Health Utilities Index Mark III (HUI3). (Feeny et al, 1995)	G	2 (<1.0%)	–
The International Outcome Inventory for Hearing Aids (IOI-HA). (Cox et al, 2000)	CS	2 (<1.0%)	–
Performance Inventory for Profound and Severe Loss (PIPSL). (Owens & Raggio, 1988)	CS	2 (<1.0%)	–
Short Form -12 (SF-12). (Ware et al, 1996)	G	1 (<1.0%)	1 (<1.0%)
The Speech, Spatial and Qualities of Hearing Scale (SSQ). (Gatehouse & Noble, 2004)	CS	2 (<1.0%)	–

*CS: condition-specific instrument; G: generic instrument.

Glasgow Hearing Aid Benefit Profile (Gatehouse, 1999)

Does this situation happen in your life?
0 ___ No 1 ___ Yes

LISTENING TO THE TELEVISION WITH OTHER FAMILY OR FRIENDS WHEN THE VOLUME IS ADJUSTED TO SUIT OTHER PEOPLE

How much difficulty do you have in this situation?	How much does any difficulty in this situation worry, annoy or upset you?	In this situation, what proportion of the time do you wear your hearing aid?	In this situation, how much does your hearing aid help you?	In this situation, with your hearing aid, how much difficulty do you now have?	For this situation, how satisfied are you with your hearing aid?
0___N/A	0___N/A	0___N/A	0___N/A	0___N/A	0___N/A
1___No difficulty	1___Not at all	1___Never/Not at all	1___Hearing aid no use at all	1___No difficulty	1___Not satisfied at all
2___Only slight difficulty	2___Only a little	2___About ¼ of the time	2___Hearing aid is some help	2___Only slight difficulty	2___A little satisfied
3___Moderate difficulty	3___A moderate amount	3___About ½ of the time	3___Hearing aid is quite helpful	3___Moderate difficulty	3___Reasonably satisfied
4___Great difficulty	4___Quite a lot	4___About ¾ of the time	4___Hearing aid is a great help	4___Great difficulty	4___Very satisfied
5___Cannot manage at all	5___Very much indeed	5___All the time	5___Hearing is perfect with aid	5___Cannot manage at all	5___Delighted with aid

Does this situation happen in your life?
0 ___ No 1 ___ Yes

HAVING A CONVERSATION WITH ONE OTHER PERSON WHEN THERE IS NO BACKGROUND NOISE

How much difficulty do you have in this situation?	How much does any difficulty in this situation worry, annoy or upset you?	In this situation, what proportion of the time do you wear your hearing aid?	In this situation, how much does your hearing aid help you?	In this situation, with your hearing aid, how much difficulty do you now have?	For this situation, how satisfied are you with your hearing aid?
0___N/A	0___N/A	0___N/A	0___N/A	0___N/A	0___N/A
1___No difficulty	1___Not at all	1___Never/Not at all	1___Hearing aid no use at all	1___No difficulty	1___Not satisfied at all
2___Only slight difficulty	2___Only a little	2___About ¼ of the time	2___Hearing aid is some help	2___Only slight difficulty	2___A little satisfied
3___Moderate difficulty	3___A moderate amount	3___About ½ of the time	3___Hearing aid is quite helpful	3___Moderate difficulty	3___Reasonably satisfied
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5___Cannot manage at all	5___Very much indeed	5___All the time	5___Hearing is perfect with aid	5___Cannot manage at all	5___Delighted with aid

Does this situation happen in your life?
0 ___ No 1 ___ Yes

CARRYING ON A CONVERSATION IN A BUSY STREET OR SHOP

How much difficulty do you have in this situation?	How much does any difficulty in this situation worry, annoy or upset you?	In this situation, what proportion of the time do you wear your hearing aid?	In this situation, how much does your hearing aid help you?	In this situation, with your hearing aid, how much difficulty do you now have?	For this situation, how satisfied are you with your hearing aid?
0___N/A	0___N/A	0___N/A	0___N/A	0___N/A	0___N/A
1___No difficulty	1___Not at all	1___Never/Not at all	1___Hearing aid no use at all	1___No difficulty	1___Not satisfied at all
2___Only slight difficulty	2___Only a little	2___About ¼ of the time	2___Hearing aid is some help	2___Only slight difficulty	2___A little satisfied
3___Moderate difficulty	3___A moderate amount	3___About ½ of the time	3___Hearing aid is quite helpful	3___Moderate difficulty	3___Reasonably satisfied
4___Great difficulty	4___Quite a lot	4___About ¾ of the time	4___Hearing aid is a great help	4___Great difficulty	4___Very satisfied

Dillon et al., 1999

National Acoustic Laboratories
A division of Australian Hearing

NAL
CLIENT ORIENTED SCALE OF IMPROVEMENT

Name : _____ **Category.** **New** _____
Audiologist : _____ **Return** _____
Date : **1. Needs Established** _____
2. Outcome Assessed _____

SPECIFIC NEEDS

Indicate Order of Significance

☐ _____

☐ _____

☐ _____

☐ _____

☐ _____

Degree of Change

Worse	No Difference	Slightly Better	Better	Much Better	CATEGORY

Final Ability (with hearing aid)

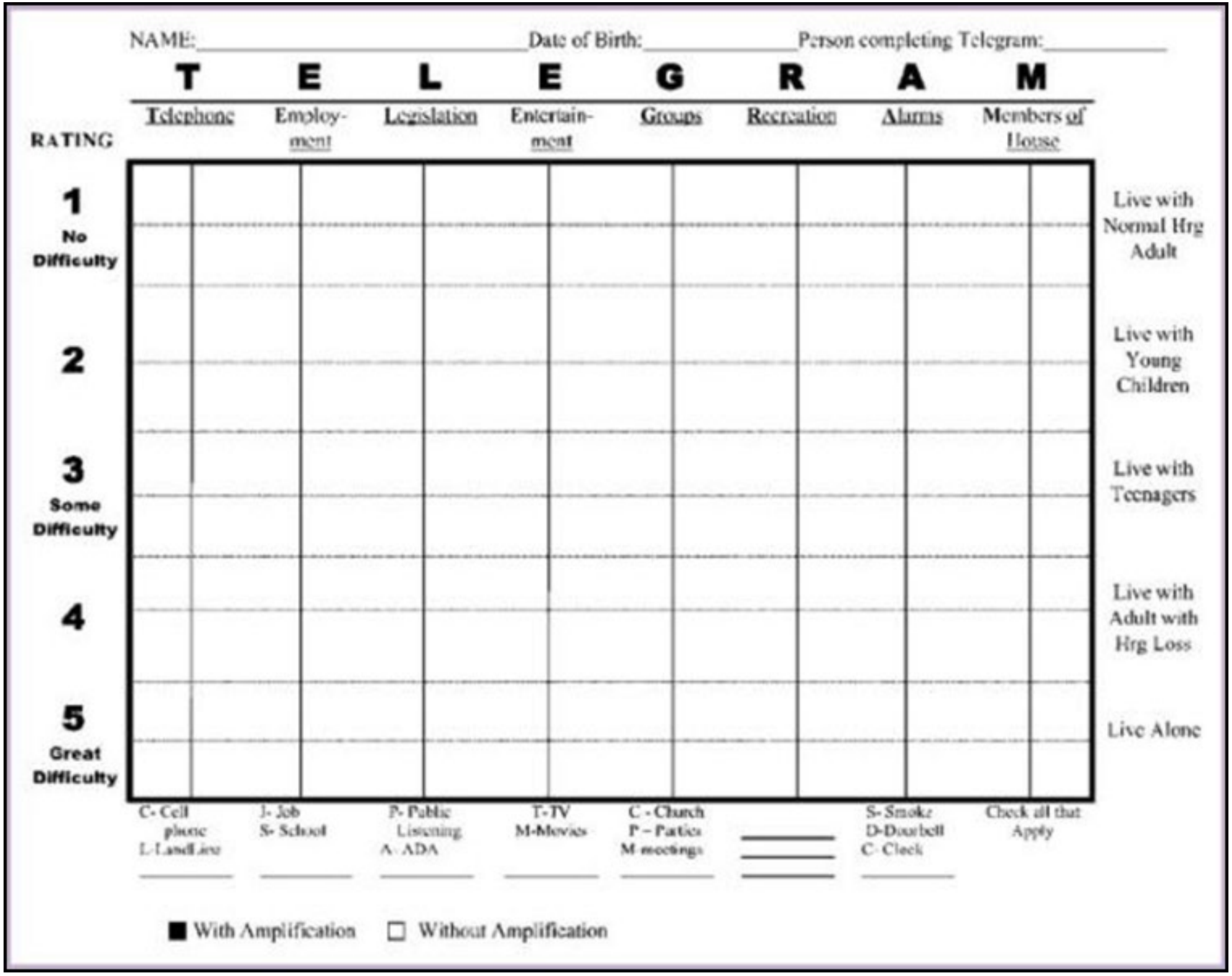
Person can hear

10%	25%	50%	75%	95%
Hardly Ever	Occasionally	Half the Time	Most of Time	Almost Always

Categories

1. Conversation with 1 or 2 in quiet
2. Conversation with 1 or 2 in noise
3. Conversation with group in quiet
4. Conversation with group in noise
5. Television/Radio @ normal volume
6. Familiar speaker on phone
7. Unfamiliar speaker on phone
8. Hearing phone ring from another room
9. Hear front door bell or knock
10. Hear traffic
11. Increased social contact
12. Feel embarrassed or stupid
13. Feeling left out
14. Feeling upset or angry
15. Church or meeting
16. Other

Thibodeau, L (2004)



Elements of a comprehensive assessments of needs

- User's experience with hearing aids (if applicable)
- Activity limitations / participation restrictions
- Person's living condition
- Personal factors that might influence audiologic follow-up
- Interest and motivation to overcome difficulties
- Other factors (including audiometric results)
- Audiological conclusion
- Negotiated intervention/treatment plan
- Audiologist's signature

Elements of a comprehensive assessments of needs

User's experience with hearing aids (if applicable)

- how long
- type of HAs
- current use
- current benefit
- current satisfaction
- other information as needed

QAAP: Activity limitation / participation restriction

- Problematic activity (approx. 3 to 5)
- Describe the difficulty and its context
- Magnitude
- Frequency
- Importance to solve problem for the user
- Strategies used in this situation and their effectiveness

*If the client is consulting for HA renewal or for adding a 2nd HA , describe the difficult situations experienced with present amplification configuration

QAAP: Activity limitation / participation restriction

Environment/activities to explore

- At home (specify):
- At work (specify):
- At school (specify):
- During leisure activities (specify):
- In personal relationships (specify):
- Community and civic life (specify):
- Domestic and daily activities (specify):
- Commute/travel (specify):
- Other (specify):

Person’s living condition

Example:

- Lives alone
- Lives with family
- Child in shared custody
- Single family house
  - Number of floors:
  - Number of rooms:
- Apartment/Condominium
  - Number of rooms:
  - Details:

· Residence for autonomous people

· Residence for semi-autonomous people

· Residential - long-term care

· Nursing home

· Other:

Personal factors that might influence audiologic follow-up

Facilitators or Obstacles

- Dexterity
- Visual impairment
- Ability to use technology (HAs, HATs, Computer, smartphone, tablet, etc..)
- Cognition
- Other disabilities
- Other major health condition
- Ability to commute to receive services (ex: reduced mobility, must be accompanied during outings outside the home, lives far from services)

Personal factors that might influence audiologic follow-up

Facilitators or Obstacles

- Feeling of self-efficacy (feeling capable of completing a rehabilitation and of thinking that it will be beneficial)
- Literacy
- Psychosocial factors: (ex: depression, stigma, self-stigma, denial, motivation, involvement)
- Financial resources
- Other: _____

Interest and motivation

The user's **interest** in taking steps to address his/her hearing difficulties is:

The user's **motivation** to undertake a rehabilitation treatment/program is:

- ❑ An obstacle
- ❑ A facilitator
- ❑ Difficult to evaluate
- ❑ Does not apply
- ❑ Comment:

Other factors

Hearing related information:

- Take into account otologic status
- Results of audiological tests
- Specific hearing related information required for provincial hearing aid program

Other factors

Support offered by the entourage

The support offered by the social environment and the people present in the physical environment is:

- An obstacle
- A facilitator
- Difficult to evaluate
- Does not apply
- Comment:_____

Other factors that may influence the choice of objectives and means of intervention

Intervention/treatment plan

Prioritization of the three most important difficult situations from the point of view of the client, those on which he wishes to act

A. _____

B. _____

C. _____

Set a specific goal for each priority retained

Final steps:

- Follow-up: Who does what? Establish timeline
- Additional notes
- Signature: Audiologist signs report; gives copy to client and sends copy to RAMQ if applicable

Presently the AANP can be administered in two forms

Use protocol to make sure all aspects are covered and reported but administer the protocol in the order and fashion that is most suitable to you

The protocol is available in a Questionnaire /formulae form with answers that are reported using a closed set and open set format

Questions?

Thank you for Your Interest and attention

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