

AUDIOLOGIC REHABILITATION NEEDS OF ADULTS WITH HEARING LOSS

by

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As members of the Audiology Doctoral Project Committee, we certify that we have read the project prepared by Chloe Robbins, titled *Audiologic Rehabilitation Needs of Adults with Hearing Loss* and recommend that it be accepted as fulfilling the Audiology Doctoral Project requirement for the Degree of Doctor of Audiology.

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## TABLE OF CONTENTS

LIST OF FIGURES .....	6
LIST OF TABLES .....	7
ABSTRACT.....	8
INTRODUCTION .....	9
PURPOSE OF THE CURRENT STUDY .....	13
METHODS .....	13
PARTICIPANTS .....	14
PROCEDURES .....	14
COM-B MODEL.....	16
RESULTS .....	18
PARTICIPANT CHARACTERISTICS .....	18
QUALITATIVE FINDINGS WITHIN COM-B MODEL.....	19
<i>Capability</i> .....	19
<i>Opportunity</i> .....	19
<i>Motivation</i> .....	22
POSITIVE PATIENT EXPERIENCES.....	23
NEGATIVE PATIENT EXPERIENCES.....	24
COMMUNICATION NEEDS .....	25
NEEDS OF THE COMMUNITY .....	26
IDENTIFICATION OF NEW INTERVENTION FUNCTIONS FOR LWHL.....	28
DISCUSSION .....	31
FUTURE DIRECTIONS.....	34
CONCLUSION .....	34
APPENDIX A.....	36
APPENDIX B.....	37
APPENDIX C.....	38
APPENDIX D.....	39
REFERENCES .....	41

LIST OF FIGURES

1. Living Well With Hearing Loss Attendance Data.....11

2. COM-B Framework.....17

## LIST OF TABLES

1. Demographic Information for Participants.....	18
2. COM-B and Intervention Functions Matrix.....	28
3. Recommendations Table.....	30

## ABSTRACT

The *Living Well with Hearing Loss* Audiologic Rehabilitation Program for Adults at the University of Arizona has been in existence since 2010. Over 600 adults with hearing loss and their frequent communication partners have participated in the group audiologic rehabilitation (AR) program at various stages of their journey as a person with hearing loss. This study aims to identify barriers to participation in group AR for University of Arizona Hearing Clinic patients through in-person interview. Patients who receive hearing healthcare services at the UA Hearing Clinic are classified into one of the following billing groups: Medicare, Vocational Rehabilitation (VR), Self-Pay, EPIC provider group, and Sertoma Arizona Hearing Aid Bank (HAB). A purposeful oversampling of HAB patients was performed due to an observed low attendance rate for group AR for this population. Audio-recorded interviews were conducted prospectively with a sample of 30 hearing aid patients between May-October 2016. Content analysis methods were used to gain insight into perspectives of those with hearing loss. Interview response data were coded using the Capability, Opportunity, Motivation and Behavior (COM-B) model (Michie, Atkins, & West, 2014). Results provide insight into current barriers to participation in group AR and specific modifications that may make the program more accessible for adults with hearing loss and their families in Southern Arizona.

*Keywords:* hearing loss, group audiologic rehabilitation

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## INTRODUCTION

For adults with hearing loss, participation in group audiologic rehabilitation (AR) programs has shown numerous benefits. These benefits include an improved quality of life (Abrams, Chisolm & McArdle, 2002; Hickson, Worrall & Scarinci, 2007), a decrease in hearing aid returns (Northern & Beyer, 1999), a change in hearing-related activity limitations and participation restrictions (Hawkins, 2005; Sweetow & Palmer, 2005), and an improvement of an individual's psychological, social and emotional adjustment to hearing loss (Hickson et al., 2007). Further, it has been shown that individuals who attend group AR with their significant others report a greater reduction in hearing handicap than those who attend alone (Preminger, 2003).

Boothroyd (2007) defines adult aural rehabilitation as “the reduction of hearing-loss-induced deficits of function, activity, participation, and quality of life through sensory management, instruction, perceptual training, and counseling” (p. 63). While the use of hearing aids enhances auditory sensitivity, many individuals who use hearing aids continue to struggle with communication because hearing aids do not provide a cure for hearing loss. Further, Kelly et al. (2013) found that older adults have a desire for and could benefit from additional support both before and after being fit with hearing aids, with one delivery model for this support being group audiologic rehabilitation. When offered in a group format, audiologic rehabilitation often includes instruction, training, and counseling to maximize communication ability for those with hearing loss. For the individual with hearing loss, the psychosocial benefits of a group format for AR include the support of family members and friends (Abrahamson, 2000) as well as a chance to develop coping mechanisms through the sharing of thoughts and feelings with other individuals with hearing loss (Preminger & Yoo, 2010; Kelly et al., 2013).

The University of Arizona (UA) Hearing Clinic offers a student-led group AR program titled *Living Well with Hearing Loss (LWHL)*. This program is organized into three-week groups, consisting of two-hour sessions held once a week at the UA Hearing Clinic. Each group serves between 8-12 people, including those with hearing loss as well as their frequent communication partners. The goal of the program is to “help those with hearing loss and their families cope with the effects of the impairment” (Marrone & Harris, 2012, p. 6). The program is open to the public.

Past participants of the program have included a mix of UA Hearing Clinic patients as well as individuals from the community. For individuals who purchase their hearing aids at the UA Hearing Clinic, the *LWHL* program is included as part of their service agreement at no additional cost. Patients are informed about this program by their audiologist, most often at their initial hearing aid fitting appointment. However, the audiologists may recommend the class to a patient at a different type of appointment (audiologic evaluation, hearing aid follow-up, troubleshooting, etc.) if they feel as though the patient could benefit. Individuals from the community who attend are informed about the program outside of the clinic through the *Living Well with Hearing Loss* website ([www.lwhl.arizona.edu](http://www.lwhl.arizona.edu)), community outreach events such as hearing screenings and lectures, word of mouth by past program participants, or referrals from other audiologists in and around the Tucson area. Additionally, outreach groups have been held in the past at St. Luke’s Home (local assisted living facility), El Pueblo Senior Center, and Himmel Park Library. Figure 1, below, shows attendance of adults with hearing loss from 2011-2016 for on-campus groups, with patients classified based on amplification status at the time of group.

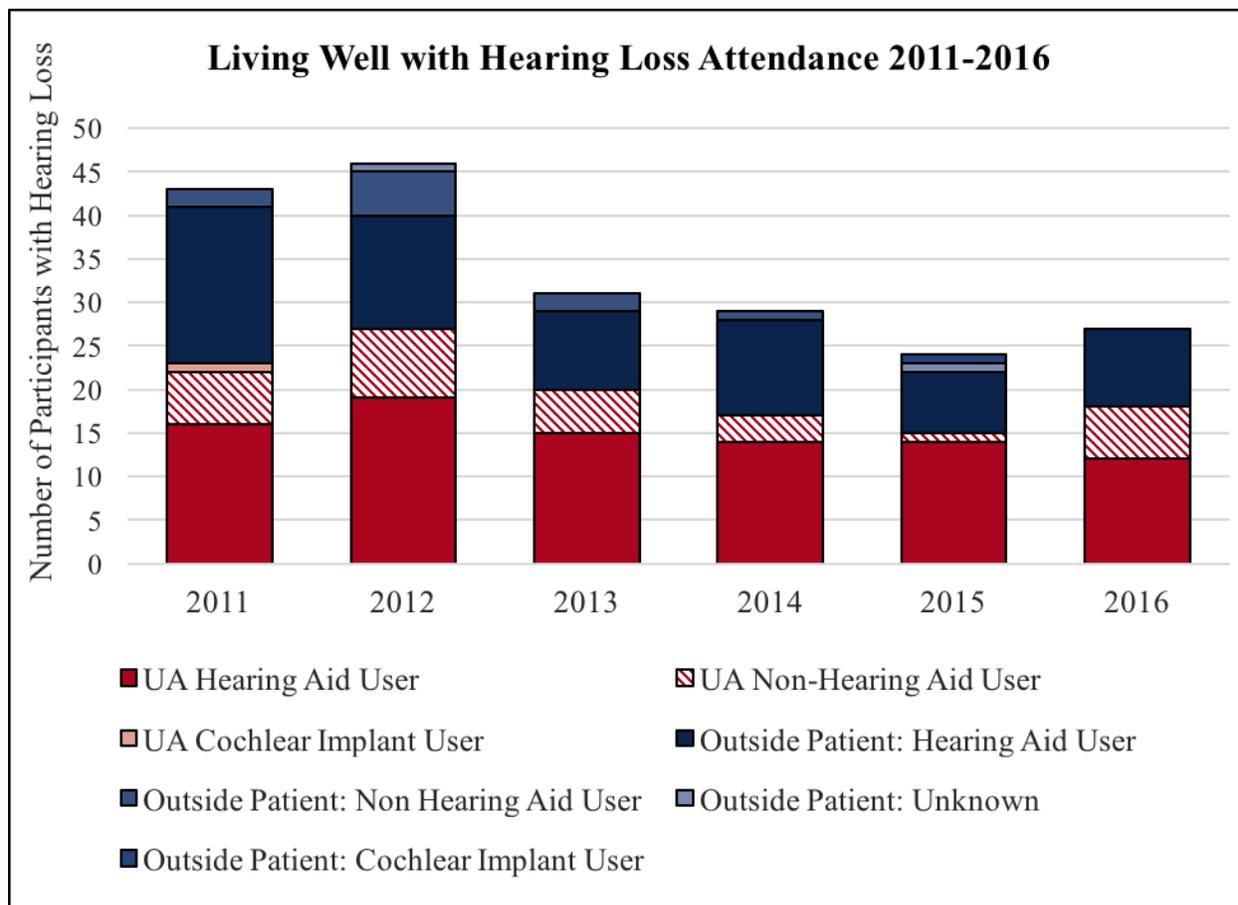


Figure 1: Living Well with Hearing Loss program attendance data from 2011-2016<sup>1</sup> for adults with hearing loss (not including communication partners).

While there have been over 600 individuals served by this program since its beginning in 2010, there are numerous individuals who are patients of the UA Hearing Clinic who have not participated. A chart review that examined attendance for the year 2015 revealed that many patients did not attend the first available LWHL class following their initial hearing aid fitting,

<sup>1</sup> Data from 2010 was not included in the analysis because an article about LWHL was featured in a local magazine in 2010 which resulted in an increased number of interested participants from the community and a wait list for groups. In order to meet the increased demand, two-week groups were offered during this time period. Therefore, data from 2010 was not included as a disproportionate number of community members receiving services outside of the UA Clinic attended group and the format of the group was changed to a two-week design. Only data from participants who attended three-week long sessions was included in this review.

sometimes waiting a period of months or years before participating in the program. Previous research by Laplante-Lévesque, Hickson, & Worrall (2010) found that level of self-perceived hearing disability had a negative influence on individuals' choice to attend a group communication program; that is, those with a lower self-perceived level of hearing disability did not feel as though they would benefit from this intervention option. Other factors were found to have both positive and negative influences on a participant's decision to participate in other forms of hearing health care. These factors include convenience, expected adherence and outcomes, financial costs, nature of the intervention, other people's experiences, recommendations and support, as well as availability of preventive and interim solutions (Laplante-Lévesque et al., 2010). Although there has been previous research examining adults' hearing healthcare needs through qualitative data collection, there is a research gap that exists for examining barriers specific to participation in *group* rehabilitation programs.

The UA Hearing Clinic serves a diverse population; the patients are classified into the following billing groups: Medicare, Self-Pay, Vocational Rehabilitation (VR), EPIC provider group, and Sertoma Arizona Hearing Aid Bank (HAB). The HAB population was of particular interest in this study, as observed attendance for this group has been low for *LWHL* since the beginning of the program. The Hearing Aid Bank is run in cooperation with the Tucson Sertoma Clubs, the Community Outreach Program for the Deaf (COPD) and the University of Arizona Hearing Clinic. COPD's role is to determine financial eligibility. Qualification requirements for the HAB program include age (65 and older) and low income level (Medicaid criteria). Once an individual qualifies they first pay a \$25 processing fee to COPD and are referred to the UA Hearing Clinic for a hearing aid and related services. These services include the selection and fitting of one used hearing aid and six months of follow-up service for the price of \$70. After the

initial six months of service, HAB patients are charged \$10 per office visit for hearing aid services. The *LWHL* group is a \$5 charge for HAB patients.

## **PURPOSE OF THE CURRENT STUDY**

The purpose of this audiology doctoral project was to identify the barriers to participation in group audiologic rehabilitation for adults served in the UA Hearing Clinic. Predicted barriers for all patients include the following: transportation, scheduling conflicts, and lack of perceived benefit. A pre-existing barrier that has been present since *LWHL*'s beginning is the lack of a Spanish-language only group in the on-campus clinic. Based on a 4-week sample of appointments, approximately 8% of patients served in the UA Hearing Clinic were Spanish-speaking only.

The COM-B Model of Behavior Change (Michie, Atkins & West, 2014) was used to classify responses regarding barriers to participation in the *LWHL* group. This framework was developed by Michie, van Stralen, & West (2011) as one component of what is known as the Behavior Change Wheel (BCW), a structure that was comprised from an analysis of 19 behavior change models. The initials of the COM-B represent 'capability', 'opportunity', 'motivation', and 'behavior', with each of the COM components being further divided into two subcategories. Capability can be divided into 'physical' and 'psychological', opportunity can be divided into 'social' and 'physical', and motivation can be divided into 'automatic' and 'reflective' subcategories. Using this model, modifications to the *LWHL* program are proposed based on theory-based strategies to address the patient-reported barriers to participation in the program.

## **METHODS**

The methods utilized in this study were approved by the University of Arizona Institutional Review Board (Project #1604499816; Appendix A).

## **PARTICIPANTS**

Potential participants were identified at pre-existing hearing aid appointments at the UA Hearing Clinic using convenience sampling. For a given day of the week, clinic patients were recruited for the study prior to their appointment in the clinic waiting area. Only established adult patients of the UA Hearing Clinic that were receiving hearing aid services were recruited. Patients were excluded who were being seen for an initial audiologic evaluation, an initial hearing aid consult, a hearing aid fitting, or cochlear implant services. Patients were also excluded if they did not previously express willingness to be contacted regarding research opportunities.

Recruitment was done in person by principal investigator and a research assistant while the patient was waiting for their appointment. Participants were recruited in person using an IRB-approved script which was available in English and Spanish. If the patient agreed to participate, the interview took place by the investigator or research assistant immediately following the clinic appointment. The study was also advertised with a flyer at the University of Arizona Speech and Hearing Clinic Office and on the *Living Well with Hearing Loss* website. Recruitment took place between May 2016 and October 2016 with a sample of 30 participants, which included a purposeful oversampling of 15 HAB patients. Participants were given a hearing aid care kit as compensation for their participation in the research project.

## **PROCEDURES**

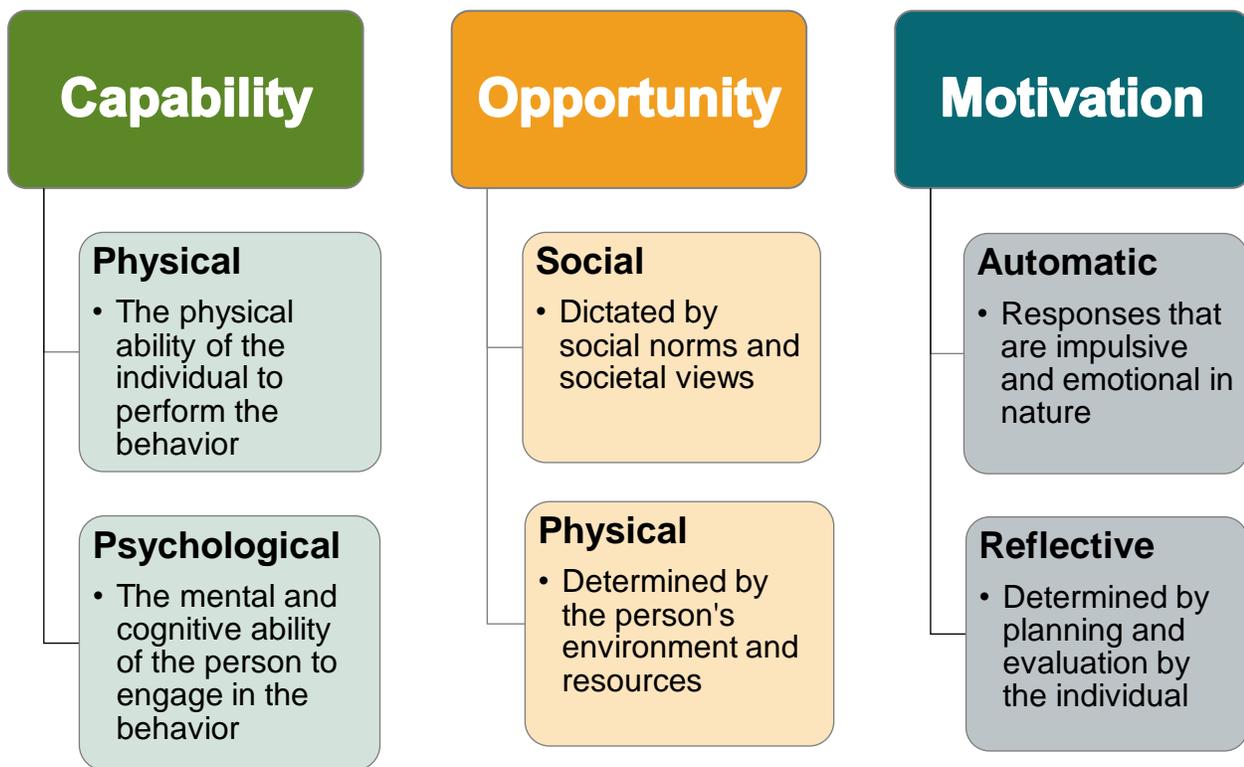
Participants were read a disclosure statement and asked to verbally consent to take part in the study (Appendix B). If family members or friends accompanied the participant to their appointment they were invited to participate in the interview as well. The semi-structured interviews were audio-recorded using a portable digital recorder and later transcribed for

qualitative analyses. Interview topics included patients' perceived AR needs, perceptions of the group AR program, and ideas for how to make the group AR program more accessible (see Appendix C for the interview questions). Questions 1 and 3, which asked about the subject's duration of hearing loss and whether or not they experienced tinnitus, were added to the interview script after data collection began; therefore this information was not self-reported for participants 1-9 but obtained from the participant's medical record chart. Participants were informed that they may decline to respond to any question(s). Each interview was 5-10 minutes in duration. If the participant was Spanish-speaking only, the bilingual research assistant was present to read the disclosure, ask for verbal consent, and administer the interview in Spanish. A chart note was made in each patient file and the following information was recorded and stored for each participant in a separate data file: date interviewed, gender, age, patient code, degree and type of hearing loss, number of hearing aids, language, whether or not the individual experienced tinnitus, duration of hearing loss, and duration of hearing aid use.

The interview transcripts were coded and analyzed using NVivo (QSR International, Melbourne). Coding methods were consistent with qualitative content analysis described by Knudsen et al. (2011). This process began with the development of a codebook (Appendix D) after all interview transcripts were read by the first author (C. Robbins) and reviewed by the faculty mentor (Dr. Marrone). Coding of the interview content was performed by the principal investigator as well as an undergraduate research assistant. Interview responses regarding topics other than barriers to participation in the *LWHL* program were grouped into the following categories: positive patient experiences, negative patient experiences, communication needs, and needs of the community.

## **COM-B MODEL**

The COM-B model was chosen for this project due to its systematic, comprehensive, and multi-factorial approach to assessing behaviors such as help-seeking and participation in interventions. The model has been applied previously in the field of audiology for the development of interventions to increase hearing aid use in adults by targeting behavior change in audiologists (Barker, Atkins & de Lusignan, 2016; Barker, de Lusignan, & Cooke, 2016). A schematic of the COM-B framework with definitions can be viewed in Figure 2, below. Once the behavioral change targets were identified using the COM-B framework, intervention options were chosen using the corresponding Behavior Change Wheel (BCW) components as described by Michie et al. (2014). For more detail about the BCW, a method to systematically develop complex interventions targeting behavior change, the reader is referred to Michie et al. (2014).



*Figure 2: COM-B framework based on Michie et al. (2014). Each of the three main components of the model, 'capability', 'opportunity', and 'motivation' all influence the target behavior (not depicted), which in this case would be participating in the Living Well with Hearing Loss intervention.*

## RESULTS

Characteristic	Hearing Aid Bank	Self-Pay	EPIC	Vocational Rehabilitation	Medicare	n
<b>Gender</b>						
Female	8	2	2	1	4	17
Male	7	3	1	-	2	13
<b>Age</b>						
<60 years of age	3	-	1	1	-	5
61-70 years	4	2	1	-	1	8
71-80 years	5	-	1	-	2	8
81-90 years	3	3	-	-	3	9
<b># of Hearing Aids</b>						
Unilateral	12	-	-	-	-	12
Bilateral	3	5	3	1	6	18
<b>Language</b>						
English	10	5	3	1	6	25
Spanish	5	-	-	-	-	5
<b>Tinnitus</b>						
Yes	8	1	1	1	3	14
No	7	4	2	-	2	15
Unknown	-	-	-	-	1	1
<b>Duration of Hearing Loss</b>						
<1 year	-	1	-	-	-	1
1-5 years	2	-	2	-	-	4
6-10 years	3	-	-	-	1	4
11-20 years	4	1	-	-	1	6
>20 years	3	1	1	1	1	7
Entire life	2	1	-	-	1	4
Unknown	1	1	-	-	2	4

Table 1: Demographic information for participants categorized by the number of individuals with each type of insurance.<sup>2</sup>

### PARTICIPANT CHARACTERISTICS

A table of demographic and person-centered variables for the 30 participants interviewed for the study can be viewed in Table 1, above. Of the participants, half received services funded by the Hearing Aid Bank. Over half of the participants (56%) were over age 70 years, with only 16% of participants under 60 years of age. The sample also included a mix of unilateral and

<sup>2</sup> As access to the patient's physical chart and audiogram was not permitted for this study, a quantitative measure of hearing loss, such as pure tone average, was not obtained and therefore not reported in this table.

bilateral hearing aid users (40% unilateral), as well as individuals with tinnitus (47% with tinnitus). The majority of participants were English-speaking (83%).

## **QUALITATIVE FINDINGS WITHIN COM-B MODEL**

Of the 30 participants interviewed, barriers to participation in the *LWHL* program were found in the COM-B areas of physical capability, physical opportunity, automatic motivation, and reflective motivation.

### ***Capability***

There was only one interview in which a barrier in physical capability was mentioned. For this interview the participant was interviewed along with her caregiver who noted, “...*she has cerebral palsy...She’s not going to understand anything*” (Interview 24). The participant demonstrated difficulty hearing and responding to the questions, therefore the caregiver completed a majority of the interview questions. In this instance the participant’s symptoms of cerebral palsy indicate that she may benefit from a different delivery method than the group AR format currently used in *LWHL*, as verbal communication for this participant is challenging. None of the interviews included comments representing factors related to psychological capability.

### ***Opportunity***

Although factors related to social opportunity were not represented within participant’s interviews, many participants discussed various factors related to physical opportunity that posed obstacles to their participation in *LWHL*. One individual commented that transportation was a barrier to attending, saying:

*“When I lost my hearing and all, I had a heart attack, so I was not allowed to drive. The doctor sent someone to take my license away and so I struggle a lot...I don’t have anyone that can pick me up and bring me here.”* (Interview 19)

This sentiment was echoed by another participant:

*“I would love to do it, and then I also don’t drive right now...unless they have a hearing test thing or a class over there that would be the only thing that I could say, that would be where I could actually walk to it.”* (Interview 20)

Other responses included, *“I think so, but it’s hard for me because I barely drive and I would need to make sure I would be able to come”* (Interview 21), and *“let me check...to see if they would give me transportation”* (Interview 27).

In addition to transportation, geographic location proved to be a barrier for some participants. Some of the interviewees reported that they lived too far out of town to make multiple trips to the university once a week and when they otherwise did not have to:

*“Well, no, I mean I live I live outside the city limits so it takes me a good hour and a half-two hours depending on traffic, just to get to the city limits...So I already come into town as it is...I live in a ranch so I usually I have a lot of work to catch up on so I hardly ever come into town... You know, um just getting here it took me about a little over an hour...I doubt if I’d be coming in you know just for the simple fact that I live so far out...I hate driving to begin with.”* (Interview 10)

Another participant commented, *“I hate coming in town...I hate driving...Just like this morning it’s rare you get me to this side of the mountain...Unless I have an appointment specifically”* (Interview 14).

Scheduling was another factor for physical opportunity that influences participants' decision to attend the program. Participants reported that they already had their schedules filled with other activities such as going to the gym and working. One participant noted, *“Depending on the day that its offered on...cause I have Monday and Wednesdays off during the week and that would work those weekdays”* (Interview 1). Another participant stated:

*“It’s just a matter of...scheduling and so on...With my practice, my wife’s a psychotherapist in a private practice and you know sometimes we’re having busy schedules all day we sort of just don’t want to go out and drive back and forth all day to the university.”* (Interview 12)

Another participant commented, *“Well I go to the gym Monday, Wednesday and Friday mornings...Tuesdays and Thursdays are usually pretty good, or afternoons”* (Interview 17).

There was also one participant who had signed up for the *LWHL* program but later had to cancel due to schedule conflicts, saying *“I had signed up and the days that they had available I had things planned for that time...I had different activities that I didn’t wanna give up”* (Interview 5).

While some participants reported scheduling conflicts with other activities and/or work, other participants reported that they simply did not have room in their schedule at all for additional time commitments, with one participant disclosing, *“Probably could benefit from it but I don’t have the time to do it”* (Interview 3), while another said *“I don’t want a commitment”* (Interview 5).

Finally, there were individuals who commented on financial barriers, including one participant who reported a lack of financial resources to take part in the intervention, saying, *“Sometimes I don’t even have the money to take the bus...I don’t have the money that the class wants for it”* (Interview 20). A different participant mentioned finances as a potential barrier for

others, commenting, “...*would be difficult depending on your financial circumstances*” (Interview 25), and another participant simply asked about the price, “*I don’t know, what does it cost?*” (Interview 7).

### ***Motivation***

Both the automatic and reflexive subcategories of motivation were represented in patient responses. When asked if they felt if they could benefit from the group AR class, some respondents answered with little hesitation that they did not feel as though it would help them:

*“No. I do it fine by myself...I say it’s just a question of attitude. Um, sure I’d like to have my hearing back. I know I’m not going to. I’m fine the way I am. You take my hearing aids away, I’m still fine.”* (Interview 13)

Another responded reflexively, “*I’m not much of a group guy*” (Interview 27).

Others demonstrated reflective motivation as a barrier and demonstrated more reasoning in their responses by offering insight into why they did not think they would benefit:

*“I’m not sure. I’m quite happy with having a hearing loss, it doesn’t bother me that much. The communication strategies is interesting. Um, my main problem is I go to meetings like neighborhood meetings and things like that and it’s hard to hear what’s happening sometimes. And I say dumb things because I’ve misunderstood something.”*

(Interview 11)

Others reasoned, “Just three weeks? I don’t know, I don’t know if it would benefit, but I would, it might be interesting to go. What days did you have it?” (Interview 17). Another participant articulated that not only does she feel as though her difficulties are somewhat specialized and therefore a group discussion would not help, but that she did not have a partner to bring with her:

*“I’m not sure because I’m constantly having to adjust my life to my hearing aids and my hearing situation...I doubt that there’s much I don’t know, that I need to do to make changes...I don’t think anybody would in a group, would be able to help me for instance as a professional musician uh to, unless they themselves are musicians who have had to go through the same thing...And I don’t think that’s something that a group discussion would benefit me in anyway...The other thing is I don’t have a spouse, I am a widow. I have only one relative here in Tucson, my son, and he is so busy, I barely get to see him myself. Uh, so I don’t know if, and I don’t have any close friends, so I don’t know anyone that could come with me.” (Interview 22)*

Another participant explained that his long-standing hearing loss would prevent him from receiving benefit:

*“Well no, I think that like me who has had hearing loss for such a long time well I already know how it all works, I know how to work myself, with all this time, my participation wouldn’t work much.” (Interview 29)*

Another participant reiterated this feeling, remarking, *“Well, I don’t think so because many years ago... that I have lost... it does not affect me at all, I am very used to it that it does not affect me. There are many people who feel bitter” (Interview 30).*

## **POSITIVE PATIENT EXPERIENCES**

In addition to asking about access to the *Living Well with Hearing Loss* program, the participants were also asked about positive experiences resulting from hearing aid use.

Participants mentioned increased ease of communication including improved conversational ability and better communication with their spouse, being able to hear the television, and being better connected to the world/environmental sounds. Regarding increased communication ability,

one participant stated, *“I can hear better...I’m able to communicate much better without having to read lips much...just overall communication and just being able to function in a hearing world is a lot better and a lot more pleasant”* (Interview 1), while another commented, *“I can understand conversations”* (Interview 11). Other participants commented on improved communication with their spouse, with one participant mentioning, *“I’m happy, you know, uh I don’t have to hear my wife yell at me anymore... You know, I have no complaints”* (Interview 10). Others expressed an appreciation of being more connected to the world around them, with one participant explaining, *“I can function better- much better. I can drive, I can uh be in crowds and participate in society, see my friends”* (Interview 2), and another saying, *“I could actually hear birds chirping, um my dogs drinking water, the refrigerator running, I mean all these things that and actually people talking to me in a soft voice”* (Interview 20). Patients also noted improvement with television-watching; one participant said, *“I can lower the TV...I don’t get yelled out for having my TVs too loud”* (Interview 28).

## **NEGATIVE PATIENT EXPERIENCES**

Although not directly asked about this topic, interviewees offered information about negative experiences both prior to using hearing aids and difficulties they experience with hearing aid use. Participants disclosed that they did not feel safe before the use of amplification, with one participant noting:

*“There was a snake right there...I couldn’t hear... It’s actually a danger sometimes when you’re in certain situations when you need to hear... I’m one of those people that like to pay attention to my surroundings and without hearing you lose some of that.”* (Interview 14)

Some participants expressed frustration with background noise and hearing aid use, expressing *“The communication strategies is interesting. Um, my main problem is I go to meetings like neighborhood meetings and things like that and it’s hard to hear what’s happening sometimes. And I say dumb things because I’ve misunderstood something”* (Interview 11). Another participant noted *“but when you’re in a group, a crowd, a restaurant, at a club it (the hearing aid) doesn’t help at all”* (Interview 13) while another said *“and people think they’re perfect and they’re not (referring to hearing aids). And it’s a lot of that kind of understanding that it’s hard for people to understand. And I say if they were perfect, there wouldn’t be so many in drawers”* (Interview 16).

## COMMUNICATION NEEDS

During the interview, participants were asked if there were any helpful behaviors for others to perform during communication and if there is anything that would generally make communication easier for them. Participants reported that they felt as though communication was made easier when done face-to-face to facilitate lipreading, with one participant stating:

*“And keep their visual- their face clear and not their hand or not look away. That’s really important just to look straight cause people with, I have a hard time understanding and then if I have a clear visual reference it’s a lot better.”* (Interview 1)

Another respondent disclosed, *“You learn to focus on who’s talking, especially when you’re in a crowd...you have to focus on whose talking, almost to the point of reading lips sometimes”* (Interview 13), while another stated *“Talking to me and not behind me is always going to be better”* (Interview 16). Other participants reported on the importance of rephrasing instead of repeating:

*“I’d like people to understand that if you say ‘what’ that saying the same thing over and over again in a louder voice doesn’t work, you need to rephrase it. And I need to learn to say ‘could you please rephrase that?’ ...if someone rephrase it different words all of a sudden something clicks.”* (Interview 11)

Another participant expressed that communication would be improved if they had normal hearing back, *“having perfect hearing back, bilaterally”* (Interview 12). Others reported that communication would be easier with the use of bilateral amplification rather than unilateral, stating *“What do you think that would make communication easier? I think if she had another one (hearing aid) in the other ear”* (Interview 24), and *“The only other thing that probably helps is to have another hearing aid for the other side”* (Interview 28).

## **NEEDS OF THE COMMUNITY**

Lastly, participants were asked about what they would like to see happen in their community for those with hearing loss. Some participants noted that an increased awareness of resources available such as the Hearing Aid Bank as well as assistive devices for use in public places would be helpful, *“Maybe if [available services] was more known, because you know she had to do a lot of checking around, research. We just happened to come across somebody we knew”* (Interview 14). Others expressed a desire for an increased education about hearing loss for the general public, noting:

*“I think if people had a better understanding of people with a hearing loss or of people being hard of hearing...if they had a better understanding of...the difficulties that people like me experience it would be better because I don’t think that people- hearing people- normal hearing people can relate to or understand, they just think oh you can’t hear volume... I’ve noticed that buildings that have telecoil don’t always have it turned*

*on...and the people that are working there that are supposed to know how to turn it on and operate it- don't.*" (Interview 1)

Another participant discussed the importance of increased awareness as well, stating

*"Because it (hearing aid) has to connect the brain and the ears and everything. And it's hard for people to understand that it's not perfect (the hearing aid). And it's the best we have right now...I just think that the more people are aware of it. And I think that if they don't expect it to be back to what they originally had, because I've never had that kind of hearing."* (Interview 16)

A reduction in stigma was another topic discussed by participants. One participant stated that they wished, *"That it becomes not ok to make fun of it. People don't say, 'Oh, you're a cripple!' but people will quite happily say 'well you're deaf' ...it's a disability that's still ok to make fun of"* (Interview 11).

Another theme that emerged was affordability for hearing healthcare and devices. One participant disclosed:

*"The fact that you could afford hearing aids which are not cheap not everybody can have them even though they have a hearing loss....But I suppose I would you know, hypothetically hope that those that need um hearing aids could afford to have them."*

(Interview 3)

Another participant expressed a desire for insurance coverage for hearing healthcare, stating:

*"I would like to see insurance companies start helping pay for hearing loss because...that's a medical problem. I guess I could say that it improves the quality of life so much that it would help to become to remain healthier if you had one."* (Interview 4)

## IDENTIFICATION OF NEW INTERVENTION FUNCTIONS FOR *LWHL*

After categorizing the participants' responses using the COM-B Model, potential intervention functions for modifications to the *LWHL* program were identified based on the BCW (Michie et al., 2014). The matrix created by Michie et al. (2014) links each COM-B component with the corresponding intervention function found in the BCW. The matrix can be viewed in Table 2, below.

COM-B Components	Intervention Functions								
	Education	Persuasion	Incentivisation	Coercion	Training	Restriction	Environmental restructuring	Modeling	Enablement
Physical capability									
Psychological capability*									
Physical opportunity									
Social opportunity*									
Automatic motivation									
Reflective motivation									

\* Category not represented within the interview data.

Table 2 Based on Michie et al. (2014), p. 116

Although every intervention function was considered in developing recommendations, not every function was deemed feasible. Table 3, below, outlines each COM-B component and corresponding barrier, feasible intervention function(s), and subsequent recommendation(s). The interview analyses were further analyzed by separating responses into two participant groups: HAB and non-HAB patients. Barriers identified based on responses from the HAB group included: challenges with spoken communication (co-morbid disability), lacking transportation, and concerns related to affordability of the intervention. Barriers specific to responses from the

non-HAB group included time and scheduling. Some barriers were represented by both patient groups, including concerns with geographic location of the program as well as forms of perceived lack of benefit from the program. Subsequently, using the BCW, specific feasible intervention functions were linked to the coded results of the patient interviews and recommended changes to *LWHL* were made for future program planning.

COM-B component	Barrier	Intervention function	Recommendation
Physical capability	Spoken communication	Enablement	At home program
Physical opportunity	Transportation	Environmental restructuring	At home program Community location for group
	Affordability		At home program
	Geographic location	Environmental restructuring	At home program Community location for group
	Time	Environmental restructuring	At home program
	Scheduling		
	Automatic motivation	Lack of perceived benefit	Incentivization
Reflective motivation	Lack of perceived benefit	Education Incentivization	Education on potential benefits of group AR Offering reward at end of program (i.e., hearing aid kit or batteries)

Table 3: Based on Michie et al. (2014), p. 121<sup>3</sup>. Barriers identified by only HAB patient responses are shaded in pink, while responses from non-HAB patients are shaded in blue. Responses represented by both groups are shaded in tan.

<sup>3</sup> Note: One recommendation not represented in this table is the addition of a Spanish-language on-campus group. This barrier was not classified in the COM-B framework, but was identified based on the demographics of the clinic's patient population.

## DISCUSSION

This study explored the audiologic rehabilitation needs of adults with hearing loss receiving hearing aid services at the University of Arizona Hearing Clinic. Results provided insight into ways to make the current group audiologic rehabilitation program, *Living Well with Hearing Loss*, accessible for more patients. The COM-B model of behavior change developed by Michie et al. (2011) was used for classifying patient responses and identifying intervention functions to increase access to this program. The following components of the COM-B model were represented from the 30 patient responses: physical capability, physical opportunity, automatic motivation, and reflective motivation. Psychological capability and social opportunity were not represented; this could be due to the methods of this study, including the oversampling of the HAB population as well as the use of convenience sampling.

As summarized in Table 3, there were categories of barriers that were exclusively represented by either HAB or non-HAB participants. For example, HAB participants were the only participants to report transportation as a barrier, and the participant who demonstrated a barrier for physical capability was a HAB patient. Although the barrier of language is not represented in Table 3, it should be noted that the 5 patients who were Spanish-speaking only were patients receiving services through the HAB. Additionally, while one non-HAB participant asked the cost of the program, HAB patients were the only participants to explicitly report a lack of financial resources to participate. Finally, non-HAB patients exclusively reported a lack of time and scheduling conflicts as barriers to participation.

The advantages of using the COM-B model of behavior change for this qualitative study include the systematic approach the model employs as well as the interdependency of each component of the model on the target behavior (participation in a group AR program). Further,

the comprehensive nature of the model allows the professional to consider not only the target behavior, but competing behaviors as well. Coulson, Ferguson, Henshaw, & Heffernan (2016) challenge that some of the most widely used health behavior change models, such as the Health Belief Model, Theory of Planned Behavior, and Transtheoretical model, are limited in their utility based on evidence from outside the audiology field. The authors recommend the use of newly developed frameworks such as the COM-B due to the model's integration of the newest evidence in behavioral science. One disadvantage to using the COM-B model for this study is its previous limited application to audiology, though that also represents a unique contribution of this study.

Previous studies evaluating barriers to other areas of hearing healthcare such as help-seeking and hearing aids, found similar results that include financial concerns and the need for personal motivation to facilitate hearing health change (Holliday et al., 2015; Laplante-Lévesque et al., 2012; Laplante-Levesque et al., 2010). However, there has been limited consideration in the previous literature of next steps to take in order to address these barriers. Another contribution of the current study is the linkage of specific COM-B areas with feasible intervention functions for service-delivery within an ongoing group AR program. This step addresses an important research-to-practice gap. By implementing theory-based strategies in response to local needs, clinical outcomes and the quality of care may be improved. Implications of the current study include the recommendation of the following: 1) An at-home program which could include the participants completing a workbook or viewing previously held groups via video, 2) a Spanish-language in-person group at the UA Hearing Clinic, 3) a community location for groups, and 4) offering an incentive at the end of the final session in order to increase participation in the program.

There were several limitations that should be considered for this study, the first of which is the use of convenience sampling. With this sampling method, there may be biases introduced because the sample is not wholly representative of the population of adults with hearing loss. For example, all of the participants were individuals who were already engaged with clinical services and findings may have differed for those who had not yet obtained hearing aids. Another consideration is the limitation of the study sample to one university-based clinic and the absence of a separate needs assessment for frequent communication partners of individuals with hearing loss. Consequently, there may be other barriers to participation in the program that are unique to individuals from outside the university clinic or unique to communication partners which were not represented here. Finally, patient factors such as self-reported level of disability and severity of tinnitus were not explored for this patient sample, which could have provided insight into whether or not AR needs differ depending on these factors between individuals.

Despite the limitations, there were also strengths in the methods employed in this study. Utilizing qualitative research methods provided insight into unique patient perspectives that otherwise would not be captured through quantitative data collection. By interviewing participants in person with open-ended questions, as opposed to administering a written survey, a broader range of interpersonal and psychosocial factors were captured. Additionally, administering the interviews at pre-existing clinic appointments resulted in a high uptake rate for the study and provided the subject with the highest level of convenience for participation, eliminating the need for a separate trip to the university for the sole purpose of research participation.

## **FUTURE DIRECTIONS**

There are a number of modifications to the *LWHL* program that could be implemented in the future based on the outcomes of this study. In order to address the language barrier for the Spanish-speaking patients, an on-campus Spanish AR group is currently in development. Steps to further the implementation of the other three recommendations should be followed using the BCW guide (Michie et al., 2014). This involves identifying policy categories, identifying behavior change techniques, and identifying the mode of delivery. It is suggested that the efficacy of these recommendations should also be evaluated during and after implementation.

In addition, future study that should be considered includes a separate needs assessment for frequent communication partners, a needs assessment for cochlear implant users, and expansion of the study sample to include members of the community who do not receive hearing services at the UA Clinic. In order to gain further insight, an evaluation of the behavior of audiologists (informing patients about the *LWHL* group) using the COM-B and BCW framework would be beneficial. For example, are there factors that can be identified using the COM-B model that would facilitate increased recommendations for the program or counseling on the part of the audiologist? The COM-B and BCW has been previously applied in this context in an attempt to increase hearing aid use in adults (Barker et al., 2016a).

## **CONCLUSION**

The results of this study provide evidence for the need to modify the group AR program and theory-based strategies that could be implemented in order to serve more patients of the UA Hearing Clinic and reach more of the broader community. The first steps have been taken to increase access to this program with the development of a Spanish-language program that will be offered at the UA Hearing Clinic. Implementation and subsequent assessment of the other

recommendations, including an at-home program, community programs, and offering incentives for participation, should be performed as well.

## APPENDIX A



**Research**  
Office for Research & Discovery

Human Subjects  
Protection Program

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**Date:** April 26, 2016  
**Principal Investigator:** Chloe Elizabeth Robbins  


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**Protocol Number:** 1604499816  
**Protocol Title:** AUDIOLOGIC REHABILITATIVE NEEDS OF ADULTS WITH HEARING LOSS  


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**Level of Review:** Exempt  
**Determination:** Approved

**Documents Reviewed Concurrently:**

**Data Collection Tools:** *Group Audiologic Rehabilitation Interview.docx*  
**Grant/Contracts:** *SERTOMAggrant2016-HearingBetterTogether.pdf*  
**Grant/Contracts:** *SERTOMAggrant2016-HearingBetterTogether.pdf*  
**HSPP Forms/Correspondence:** *Appendix F.doc*  
**HSPP Forms/Correspondence:** *F107.doc*  
**HSPP Forms/Correspondence:** *Robbins-F200-AR Needs.docx*  
**Informed Consent/PHI Forms:** *Disclosure.pdf*  
**Informed Consent/PHI Forms:** *Disclosure Spanish.pdf*  
**Participant Material:** *Clinic Forms 01-14-16\_Acknowledge of Health Information Practices\_English.pdf*  
**Participant Material:** *Contact information for subjects\_English.docx*  
**Participant Material:** *Contact information for subjects.docx*  
**Participant Material:** *UA SLHS NOPP approved final.pdf*  
**Recruitment Material:** *Hearing Better Together Flyer.docx*  
**Recruitment Material:** *Recruitment Script.docx*

This submission meets the criteria for exemption under 45 CFR 46.101(b). This project has been reviewed and approved by an IRB Chair or designee.

- The University of Arizona maintains a Federalwide Assurance with the Office for Human Research Protections (FWA #00004218).
- All research procedures should be conducted according to the approved protocol and the policies and guidance of the IRB.
- Exempt projects do not have a continuing review requirement.
- Amendments to exempt projects that change the nature of the project should be submitted to the Human Subjects Protection Program (HSPP) for a new determination. See the Guidance on Exempt Research information on changes that affect the determination of exemption. Please contact the HSPP to consult on whether the proposed changes need further review.
- You should report any unanticipated problems involving risks to the participants or others to the IRB.

## APPENDIX B

### **University of Arizona—Research Disclosure**

#### **Adult Group Audiologic Rehabilitation Survey**

The purpose of this anonymous interview is to understand hearing healthcare rehabilitative needs for adults with hearing loss served through the University of Arizona Hearing Clinic.

This research has been reviewed and approved by the University of Arizona Human Subjects Protection Program.

Participation in this study involves completing an audio-recorded in-person interview that will last about 10 minutes. Your responses are completely anonymous. Participation is voluntary and you may withdraw at any time. Whatever decision you make will have no effect on your relationship with the University of Arizona Hearing Clinic. You will receive a hearing aid care kit as compensation for your participation in this research project.

If you have questions about your rights as a participant in this study or to discuss other study-related concerns with someone who is not a part of the research team, you may contact the Human Subjects Protection Program at <http://rgw.arizona.edu/compliance/human-subjects-protection-program>. Contact information has also been provided in a separate document.

By completing this interview, I consent to participate in this research project.

Version date: April 20, 2016

Protocol 1604499816 Approved by Univ. of Arizona IRB on 25-Apr-2016

## APPENDIX C

### Interview Protocol

I am working with the University of Arizona Hearing Clinic on a new project about hearing loss needs for adults with hearing loss. I am going to develop a program that addresses these needs and I am interested in your ideas and experiences.

1. How long have you had hearing loss?
2. How long have you been using hearing aids?
3. Do you experience tinnitus?
4. What things have been going well for you since you were fit with your hearing aid?
5. What would make communication easier for you?
6. Is there anything that you wish you knew about hearing loss or hearing aids that you do not know now?
7. Do you think there are any benefits of having a hearing loss?
8. How would you like others to communicate with you? (restaurants, public places)?
9. What does it mean for you to “live well with hearing loss?”
10. At the University of Arizona Hearing clinic, we offer a program called *Living Well with Hearing Loss*. It consists of a group of 8-10 participants, including those with hearing loss and a frequent communication partner, such as a spouse, family member, or friend. During these sessions, various topics are discussed such as types of hearing loss, explanation of hearing results, the impact of hearing loss on a person’s life, communication strategies, hearing aids, and assistive devices. Our focus is to help those with hearing loss overcome obstacles they face with communication in their everyday life through group discussion and shared learning. The classes are held once a week for three weeks, on a weekday for 2 hours each session. Graduate student clinicians lead the group and the groups are offered throughout the calendar year.
11. Does this group sound like something that you could benefit from?
12. What would make this program more accessible for you?
13. What would you like to see happen in your community to help people who have hearing loss?
14. Is there anything else you would like to share?

## APPENDIX D

**Group AR Project Code Book****COM-B Model (NVivo nodes and sub-nodes)**

- **Capability**
  - **Psychological- does the individual have the knowledge and skills needed to perform the behavior?**
    - Comorbidities
      - Intellectual disability
      - Dementia
  - **Physical- Is the individual physically able to perform the behavior?**
    - Comorbidities
      - Disabilities affecting speech production
- **Opportunity**
  - **Social- dictated by cultural norms and how society thinks about things**
  - **Physical- determined by the person's environment**
    - Transportation
    - Geographic location
    - Affordability
    - Time
    - Scheduling
- **Motivation**
  - **Automatic-involves emotional/impulsive responses. Involves innate disposition**
  - **Reflective- determined by evaluation and planning**
    - Perceived Benefit of Group
      - Needs met with hearing aids

Definitions:

*Capability:* individual's psychological and physical capacity to engage in the activity. Having necessary knowledge and skills.

*Opportunity:* all the factors that lie outside of the individual that make it possible for them to engage in the intervention. Can be physical opportunity (environment) or social (cultural).

*Motivation:* brain processes that energize and direct behavior. Can be automatic (impulse-emotional) or reflective (analytical decision-making).

**Positive Patient Experiences**

- Increased ease of communication
  - Increased conversational ease- *not having to say "what as often"*
  - Better communication with spouse
- Hearing the television
- Better connected to the world around them

**Negative Patient Experiences**

- Background Noise
- Safety
  - Did not feel safe without amplification

### **Communication Needs**

- Face-to-face
- Lipreading (visual cues)
- Binaural amplification

### **Needs of the Community**

- Accessibility
  - Assistive listening devices in public places
- Affordability
  - Insurance coverage
- Awareness
  - Stigma
  - Public knowledge
    - Knowledge about the hearing aid bank
    - General knowledge about hearing loss
    - Knowledge about hearing loss prevention
  - Public services- *advocacy such as obtaining a license plate with hearing handicap signal*
    - Knowledge of availability of assistive devices in public places

### **Duration of Hearing Loss**

- Less than 1 year
- 1-5 years
- 6-10 years
- 11-20 years
- More than 20 years
- Lifetime

### **Duration of Hearing Aid Use**

- Less than 1 year
- 1-5 years
- 6-10 years
- 11-20 years
- More than 20 years
- Lifetime

### **Tinnitus**

- Yes
- No

### **Spanish Speaker**

- Yes
- No

### **Hearing Aid Bank**

- Yes
- No

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