Stop the Madness

* Title inspired by Roeser and Clark (2008)

Verify Hearing Aid Fittings! Hope for the Future?*

BY LATA A. KRISHNAN AND JENNIFER M. SIMPSON

One student noted an increase in the use of REM by audiologists after they experienced a decrease in return visits when they performed REM.

Hearing aid dispensing has been included in the scope of practice of audiologists in the United States since at least 1978, when the Executive Board of the American Speech-Language-Hearing Association (ASHA) recommended a change in the Code of Ethics that would permit audiologists to engage in the sale of hearing aids.

Surveys of audiology practice over the years indicate that the proportion of audiologists who dispense hearing aids has increased from 47 percent in 1985 (Martin and Sides, 1985) to 68 percent in 1989 (Martin and Morris, 1989), 80 percent in 1994 (Martin et al, 1994), and 83 percent in 1998 (Martin et al, 1998).

With advances in technology, hearing aid selection methodology has evolved over the years from comparative procedures (e.g., Carhart, 1946; Jerger and Hayes, 1976) to the prescriptive methods commonly in current

use (e.g., Keidser et al, 2011; Scollie et al, 2005). Similarly, procedures for the verification of hearing aid fittings evolved from coupler and functional gain measurements (e.g., Hawkins and Haskell, 1982) to the use of real-ear measurements (REM) (e.g., Ringdahl, Leijon, and Linden, 1984).

There is a significant body of literature on the value of using real-ear measurements in conjunction with a prescriptive method to verify and optimize hearing aid fittings, as summarized in the document on Hearing Aids for Adults (ASHA) and the best practice guidelines from the American Academy of Audiology (Academy), which state that "prescribed gain (output) from a validated prescriptive method should be verified using a probe-microphone approach that is referenced to ear canal SPL" (Academy, 2006, p. 26).

Other evidence in favor of using REM to verify hearing aid fittings includes increased patient satisfaction and fewer return visits (Kochkin et al, 2010) and more positive perceived quality and value (Amlani, Pumford, and Gessling, 2016). Additionally, multiple studies have demonstrated that using manufacturer "first-fit" methods, even ones that claim to use prescriptive methods, provide insufficient/inappropriate amounts of gain (Aazh and Moore, 2007; Sanders et al, 2015) and poorer speech recognition in noise (Leavitt and Flexer, 2012).

Despite the evidence indicating that real-ear measurements are the best method to verify audibility, comfort, and tolerance—and the guidelines from both the Academy and ASHA—only about 40 percent of the practitioners who dispense hearing aids use REM (Mueller and Picou, 2010). Of greater

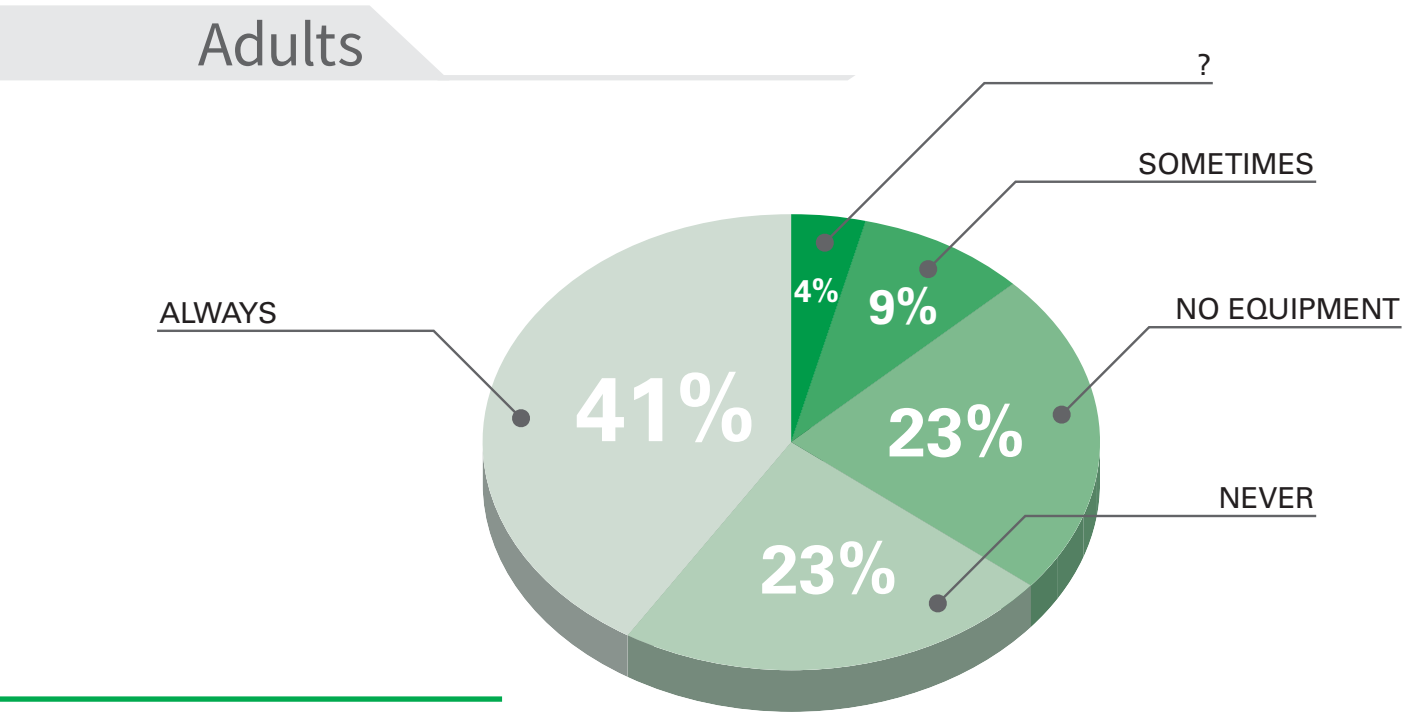

FIGURE 1. Percentage of use of REM for adult hearing aid fittings at off-campus facilities (? denotes the respondent was not certain how frequently REM was used).

Pediatrics

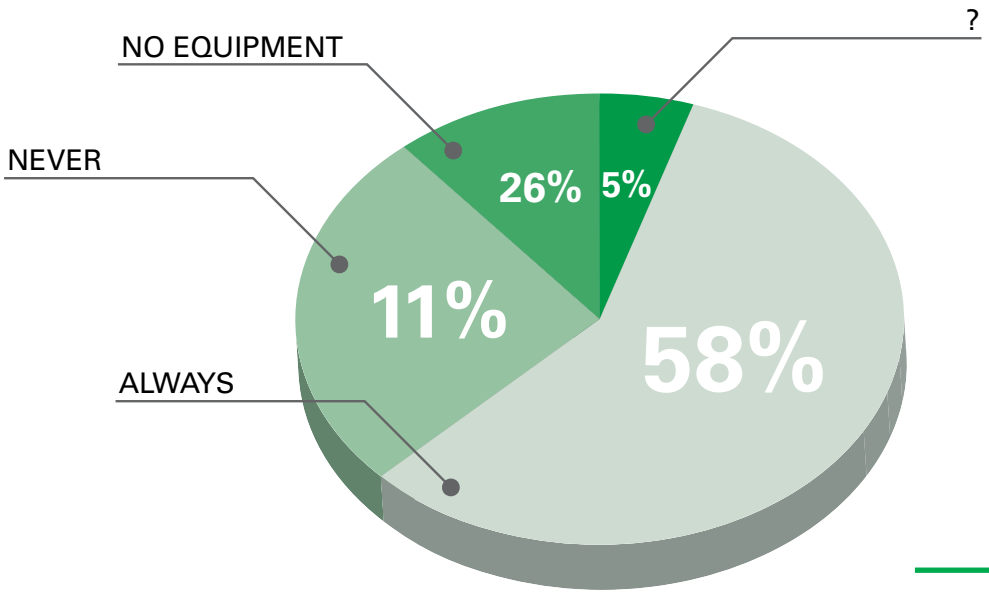

FIGURE 2. Percentage of use of REM for pediatric hearing aid fittings at off-campus facilities (? denotes the respondent was not certain how frequently REM was used).

concern, however, may be the fact that the number of practitioners who use REM to verify hearing aid fittings has remained relatively stagnant since 1995 (Mueller and Picou, 2010).

Surveying Our Students

As a university clinic, we have a particular focus on educating students regarding evidence-based practice (EBP) and use REM in 100 percent of our pediatric and adult hearing aid fittings. Students routinely perform REM during all adult and pediatric fittings during the first two years of their doctor of audiology (AuD) program in the university clinic. As is typical, third- and fourth-year students work at off-campus locations to continue their clinical education with audiologists in diverse settings.

We decided to ask our students about their experience with REM at those locations. During the spring of 2018, we surveyed all of our third- and fourth-year AuD students about the use of REM with adult and pediatric patients at their off-campus placement sites. Thirteen of 14 students returned the surveys, providing data on 30 different sites. Three sites did not dispense hearing aids and were excluded, leaving a total of 27 sites. Of these, 16 sites were in Indiana and 11 sites were in seven other states (Illinois, Michigan, Missouri, North Carolina, Ohio, Texas, and Wisconsin).

Figure 1 shows the frequency of use of REM for adult hearing aid fittings at the off-campus sites. Consistent with previous surveys, only 41 percent of sites always use REM during adult hearing aid fittings and 9 percent use it some of the time. Forty-six percent of sites never use REM, although half of these sites have the equipment available to do so.

Figure 2 shows the data for pediatric hearing aid fittings. A positive finding here is that a slightly larger proportion of sites (58 percent) use REM for

HAVE REM EQUIPMENT	DO NOT HAVE REM EQUIPMENT
Try all manufacturers and see what the patient likes the best.	Program hearing aids using a fitting formula. Adjust according to patient report. I think REM is not used because of the expense of the equipment and because of the audiologist's belief that REM is not necessary.
Fit to adaptation Level 3 and adjust from there based on patient comments.	Choose first fit. Turn down max output at least 4–5 clicks (or until around 110 or 105 dB max output). Ask patient how it sounds, adjust occlusion, feedback, and frequencies as requested.
She (preceptor) had been in the field for 20+ years and was confident in her "eyeballing" it and trusting the majority of manufacturer's first fits.	We would use the first fit and occasionally do functional gain in the booth. If the child was capable of talking and giving feedback, changes would be made, but that never happened when I was there. They (audiologists) said it was too expensive and took too much time. They feel the manufacturer software does a good job on its own (from a pediatric facility).
We really only put in the audiogram into the appropriate hearing aid (HA) manufacturer software and used what the manufacturer suggested. The "Help" portion in the software was used for specific complaints.	Program hearing aids using a fitting formula. Adjust according to patient report. The audiologist wants REM equipment and has tried for a couple of years to get it, but the hospital has not approved it.
They use REM for pediatric fittings but not for adult fittings. I believe that the feeling is that REM is not necessary for adults because of the ability to make adjustments according to patient report.	
My supervisors believed that subjective report was more reliable than "a machine" telling them how to fit the hearing aids. Instead, they relied on the manufacturer's first fit.	
One audiologist used REM almost 100 percent of the time. The other two audiologists used REM when convenient, but did not go far out of their way to use it. However, I began when they first started using the equipment and, throughout the semester, all of the audiologists noticed a decrease in return visits when REM was used at fittings. So, by the end of the semester, all of the audiologists were trying to use REM when able.	
I mostly did diagnostics there, so I am not sure how often they used it. They had equipment, however I was teaching them how to use it! Hopefully they're comfortable with it now.	

TABLE 1. Student responses to the question: "If not using REM, describe the procedure used for hearing aid verification."

pediatric hearing aid fittings. However, 11 percent never use REM, despite having equipment, and more than one quarter of sites (26 percent) that fit children with hearing aids do not have equipment to perform REM.

The students also were asked an open-response question: "If not using REM, describe the procedure used for hearing aid verification." In addition to answering the question, several students included their opinion on why REM was not used at a facility. The responses were categorized based on whether or not the facility had REM equipment and are summarized in TABLE 1.

Most of these comments confirm the "disconnect" or misunderstanding cited in Mueller and Picou (2010) that selecting a prescriptive formula within a manufacturer's software indicates that you are verifying the fitting following current EBP guidelines. They also appear to indicate that the majority of practitioners at these facilities may not have the knowledge or understanding of the evidence base regarding the value of REM.

Some comments, however, gave us hope. One student noted an increase in the use of REM by the audiologists after they experienced a decrease in return visits when they performed REM. Another noted that the audiologist had requested REM equipment at her hospital, although her requests had been denied so far.

Overall, this limited survey highlights the continued lack of use of EBP in hearing aid fitting protocols for adults (41 percent of fittings always verified) and children (58 percent of fittings always verified). Despite multiple publications on this topic in recent years in easy-to-read, clinician-oriented, and no-cost publications (Beck, 2017a, b; Mueller and Picou, 2010; Palmer, 2009), many audiologists continue to ignore the evidence that performing REM leads to more accurate hearing aid fittings and higher patient satisfaction. It is difficult to pinpoint the reason for this lack of action, but it exists in other areas of audiology practice as well, such as the use of live-voice speech-recognition testing (Roeser and Clark, 2008).

The Positive Changes Ahead

Instead of ending with a list of trite excuses as to why audiologists don't perform REM (such as a lack of time and funds), and repeating that these practices are unacceptable and ethically questionable, we were inspired by a recent alumna who shared a success story.

During the previous three years at her first job, she gathered data regarding hearing aid fittings at the practice's multiple offices, shared current research regarding satisfaction and lower return rates, and persuaded the administrators and physicians in the practice to approve the purchase of a portable REM unit to be used in multiple locations at their offices.

We are also encouraged about the future by the level of engagement among our students regarding this and other professional issues, and their leadership roles on the national level in the Student Academy of Audiology (SAA) and the Purdue Chapter of the SAA.

Based on these examples of advocacy for patient care and the profession, we offer here our thoughts to the next generation of audiologists for positive change in the future.

Lata A. Krishnan, PhD, is a clinical professor in the Department of Speech, Language, and Hearing Sciences at Purdue University in West Lafayette, Indiana.

Jennifer M. Simpson, AuD, is a clinical professor in the Department of Speech, Language, and Hearing Sciences at Purdue University in West Lafayette, Indiana.

Dear New Generations of Audiologists,

Although fewer than half of our generation of audiologists has embraced REM, we believe the next generations can do better, and so we write you this:

We have confidence in you. Your doctoral education has empowered you with foundational knowledge in hearing science, advanced clinical skills, and an understanding of how to use research to guide your independent clinical decision-making.

Expect the best from yourselves and for your patients. Use data to drive decision-making in your work place. Use evidence-based, clinically relevant research to shape your care of patients. Your patients and your profession are counting on you.

With much respect,
Older Generations of Audiologists

References

American Academy of Audiology (Academy). Guidelines for the Audiologic Management of Adult Hearing Impairment. https://audiology-web.s3.amazonaws.com/migrated/haguidelines.pdf_53994876e92e42.70908344.pdf (accessed Aug. 17, 2018).

American Speech-Language-Hearing Association (ASHA). Hearing Aids for Adults. https://www.asha.org/PRPSpecificTopic.aspx?folderid=8589935381&section=Key_Issues (accessed Aug. 17, 2018).

Aazh H, Moore BC. (2007) The value of routine real ear measurement of the gain of digital hearing aids. *J Am Acad Audiol* 18(8):653–664.

Amlani AM, Pumford J, Gessling E. (2016) Improving patient perception of clinical services through real-ear measurements. *Hear Rev* 23(12):12.

Beck DL. (2017a) Speech mapping and probe microphone measurements: An interview with Gus Mueller. *Hear Rev* 24(8):38–39.

Beck DL (2017b) Best practices in hearing aid dispensing: An interview with Michael Valente. *Hear Rev* 24(12):39–40.

Carhart R. (1946) Tests for selection of hearing aids. *Laryngoscope* 56(12):780–794.

Hawkins DB, Haskell GB. (1982) A comparison of functional gain and 2 cm ~ coupler gain. *J Speech Hear Disord* 47:71–76.

Jerger J, Hayes D. (1976) Hearing aid evaluation: Clinical experience with a new philosophy. *Archiv Otolaryngol* 102(4):214–225.

Keidser G, Dillon H, Flax M, Ching T, Brewer S. (2011) The NAL-NL2 prescription procedure. *Audiol Res* 1(1).

Kochkin S, Beck DL, Christensen LA et al. (2010) *Hear Rev* 17(4):12–34.

Leavitt RJ and Flexer C. (2012) The importance of audibility in successful amplification of hearing loss. *Hear Rev* 19(13):20–23.

Martin FN, Armstrong TW, Champlin CA. (1994) A survey of audiological practices in the United States. *Am J Audiol* 3(2):20–26.

Martin FN, Champlin CA, Chambers JA. (1998) Seventh survey of audiometric practices in the United States. *J Am Acad Audiol* 9(2).

Martin FN, Morris LJ. (1989) Current audiologic practices in the United States. *Hear J* 42:25–44.

Martin FN, Sides DG. (1985) Survey of current audiometric practices. *ASHA* 27(2):29–36.

Mueller HG, Picou EM. (2010) Survey examines popularity of real-ear probe-microphone measures. *Hear J* 63(5):27e28.

Palmer CV. (2009) Best practice: It's a matter of ethics. *Audiol Today* 21(5):31–35.

Ringdahl A, Leijon A, Linden G. (1984) Analysis of hearing aid fittings using insertion gain measurements. *Scan Audiol* 13:179–185.

Roeser RJ, Clark JL. (2008) Live voice speech recognition audiometry–stop the madness. *Audiol Today* 20(1):32–33.

Sanders J, Stoody T, Weber J, Mueller HG. (2015) Manufacturers' NAL-NL2 fittings fail real ear verification. *Hear Rev* 21(3):24.

Scollie S, Seewald R, Cornelisse L, et al. (2005) The desired sensation level multistage input/output algorithm. *Trends Amp* 9(4):159–197.