This article and any supplemental material should be cited as follows: Myers PJ, Griest S, Kaelin C, Legro MW, Schmidt CJ, Zaugg TL, Henry JA. Development of a progressive audiologic tinnitus management program for Veterans with tinnitus. J Rehabil Res Dev. 2014;51(4):XX–XX. http://dx.doi.org/10.1682/JRRD.2013.08.0189

APPENDIX 1

Development of Clinical Materials

Level 1 Triage

Triage guidelines were created for non-audiologists who encounter patients complaining of tinnitus [51]. The guidelines specify that all patients reporting tinnitus should be referred to Audiology for an audiologic assessment, unless certain symptoms (especially sudden hearing loss or severe mental health symptoms) indicate the need to refer to another clinic prior to referral to audiology.

Level 2 Audiologic Evaluation

Because tinnitus is usually associated with some degree of hearing impairment, all patients with tinnitus should receive a standard hearing evaluation [30, 36, 42]. As described in detail [23], the Level 2 audiologic evaluation involved a standard audiologic assessment (at JAHVH this included otoscopy, air and bone conduction audiometry, speech audiometry, immittance measures, otoacoustic emission testing, and hearing aid assessment if needed) to determine if intervention was needed for a hearing problem, and if a medical assessment was indicated. Patients requiring amplification were fit with hearing aids or combination instruments.

A patient take-home workbook (*How to Manage Your Tinnitus: A Step-by-Step Workbook, First Edition*) was developed and professionally produced [19]. The workbook, designed to be given to patients with a confirmed tinnitus-specific problem at the end of Level 2, had the following features: (a) contained useful, actionable information, including a fairly detailed overview of tinnitus—what it is, what causes it, why it becomes a problem, and the different ways of using sound to manage reactions to tinnitus; (b) utilized a structured format (including worksheets) for experimenting with different types of sound to maximize reductions in distress

caused by tinnitus; (c) developed so that the information was comprehensible to people with low health literacy, using principles previously described [52], and using principles and application of adult learning theory [29].

Level 3 Group Education

Level 3 was developed to provide tinnitus-specific intervention to patients whose tinnitus complaints were not sufficiently resolved during Level 2. Level 3 utilized a group education format to provide information to patients that would lead to self-efficacy in managing their reactions to tinnitus [29]. Studies have supported the use of group education for basic tinnitus intervention [10, 14, 15]. Group education offers several advantages for clinical management of tinnitus: (a) one clinician can provide intervention to a group of patients at one time; (b) patients are empowered to make informed decisions about self-management that involves minimal expense; and (c) intervention is provided in a supportive peer-group milieu.

Level 3 was designed to involve two sessions separated by 2 weeks. During each session, an audiologist formally taught tinnitus management principles. During the first session, principles of using sound to manage reactions to tinnitus were explained, and patients would identify an individualized action plan (using the *Sound Plan Worksheet*) for managing their most bothersome tinnitus situation [53]. Their “homework” was to implement the action plan and to bring their completed *Worksheet* to the follow-up session. During the second session, each patient’s action plan was discussed and revised as necessary. Objectives of the second session were to ensure that patients understood how to use the *Sound Plan Worksheet* to generate a sound plan for any tinnitus-problem situation, engage in collaborative problem solving, and develop an improved sound plan if indicated. New information was covered, including: (1) description of devices capable of producing sound that might be unfamiliar to participants; (2) ideas for using sound at

night; (3) different sound-based methods of tinnitus management; and (4) hearing conservation and various other lifestyle factors that can affect tinnitus and hearing.

Two PowerPoint presentations (*How to Manage Your Tinnitus: What to Do and How to Do It*—Parts 1 and 2) were created for the Level 3 workshops. The presentations were designed to be used by audiologists with little or no experience leading tinnitus groups, and as such included all details that needed to be covered to lead the group through all of the content required for each session. The presentations incorporated adult educational theories, principles, and teaching strategies [29], including use of visuals, auditory demonstrations, interactive discussion, individualized plans for using sound to manage reactions to tinnitus, and prompts to use the teach-back method to ensure patient understanding. Videos on DVD were created with the Subject Matter Experts (JAH, TLZ) to serve as a model for audiologists how to present the content for the two Level 3 workshops.

Level 4 Tinnitus Evaluation

Level 4 was developed for patients who attended the Level 3 workshops, but who still had a significant problem with their tinnitus. These patients would “progress” to the Level 4 Tinnitus Evaluation, which was conducted to determine the need for further intervention. Systematic progression through the different levels of PATM ensured that patients reaching Level 4 had a tinnitus problem severe enough to warrant a comprehensive tinnitus assessment, which included an intake interview, tinnitus psychoacoustic assessment, trial use of tinnitus management devices (including ear-level devices and personal listening devices), and screening for referral for mental health conditions and sleep disorders. Due to the severity of their problem with tinnitus, it was expected that Level 4 patients would be more likely to have comorbid mental health symptoms or sleep disorders that would require an interdisciplinary approach to management.

The Level 4 evaluation could result in two possible outcomes (in addition to any referrals that may result). First, it could determine that individualized intervention (Level 5) was required. The decision to pursue one-on-one intervention and the specific intervention plan would be arrived at collaboratively between clinician and patient, based primarily on information gathered as part of the intake interview. Second, some patients were considered unlikely to benefit from any additional intervention following the assessment—the process of conducting the interview, testing, explaining test results, and answering questions (in addition to the previous levels of intervention) would be sufficient to address any remaining concerns.

The clinical handbook developed for the study contained the *Intake Interview* and screening tools for mental health symptoms and sleep disruption requiring referral to other disciplines. Also included were descriptions of procedures to conduct the interview and psychoacoustic evaluation, and for demonstrating and selecting tinnitus management devices.

Level 5 Individualized Management

Certain criteria had to be met for patients to progress to Level 5 Individualized Management: (a) PATM Levels 2-4 were completed and Level 5 was deemed appropriate; (b) all referrals had been made to otolaryngology, mental health, etc.; and (c) the patient understood the Level 5 Individualized Management protocol and was motivated to participate.

Because it was more likely that patients progressing to Level 5 would be those with the most severe tinnitus problem, Level 5 had to be flexible to meet individual needs. Repeated visits could be provided for up to 6 months or more—scheduled as necessary. Counseling provided during these visits involved the same principles of using sound to manage reactions to tinnitus as presented during Level 3. Intervention ended whenever the patient reported that assistance was

no longer needed. Any patient completing Level 5 was advised to telephone the audiologist whenever questions or issues arose, and to request special appointments if needed.

If ear-level devices (hearing aids, sound generators, or combination instruments) were prescribed during the Level 4 assessment, fitting of these devices would take place at the beginning of the first Level 5 visit, and patients would be encouraged to use them every day and as much as possible for maximum benefit. These devices could be purchased through normal VA channels for eligible veterans. If personal listening devices (personal radios, tape players, CD and MP3 players) were recommended, patients would be asked to purchase them on their own if they did not already own them (unless extenuating circumstances allowed for VA purchase).

Patients would continue to learn about tabletop (stationary) sound-generating devices, including CD and tape players, and radios. During the counseling, different tabletop and personal-listening devices would be demonstrated as warranted. In-clinic demonstrations of different devices provided the best means of conveying their benefit to patients, with the intent of highlighting the usefulness of devices they may already own, or to demonstrate the usefulness of devices that patients may want to purchase.

Regardless of whether ear-level devices were used or not, strategies for using sound to manage reactions to tinnitus were an essential part of the Level 5 counseling. At each Level 5 visit, the audiologist would stress the importance of filling quiet environments with sound, and help the patient come up with ideas for sounds and devices to accomplish this purpose. The *Sound Plan Worksheet* [53] was developed to facilitate this discussion, and provided an individualized action plan for using augmentative sound. The *Worksheet* would be updated at every visit, and patients would be encouraged to use the *Worksheet* at home.

This article and any supplemental material should be cited as follows: Myers PJ, Griest S, Kaelin C, Legro MW, Schmidt CJ, Zaugg TL, Henry JA. Development of a progressive audiologic tinnitus management program for Veterans with tinnitus. J Rehabil Res Dev. 2014;51(4):XX–XX. http://dx.doi.org/10.1682/JRRD.2013.08.0189

A patient counseling guide (*Progressive Audiologic Tinnitus Management: Counseling Guide*) was developed to be used in a flip-chart format. The book was laid flat between audiologist and patient, with one page facing the audiologist and the other facing the patient. The audiologist's pages contained scripted talking points, and the patient's corresponding pages showed simplified bulleted points and professionally illustrated graphics. The counseling guide corresponded with the Level 3 PowerPoint presentations (*Managing Your Tinnitus: What to Do and How to Do It*). The flip chart also included a section on reduced sound tolerance for use with patients who needed treatment specific to sound tolerance problems.

Please note that the majority of these materials are available electronically at http://www.ncrar.research.va.gov/Education/Documents/TinnitusDocuments/Index.asp. This website contains the latest versions of these materials and is continually updated.

This article and any supplemental material should be cited as follows: Myers PJ, Griest S, Kaelin C, Legro MW, Schmidt CJ, Zaugg TL, Henry JA. Development of a progressive audiologic tinnitus management program for Veterans with tinnitus. J Rehabil Res Dev. 2014;51(4):XX–XX. http://dx.doi.org/10.1682/JRRD.2013.08.0189

APPENDIX 2

Online Training Course for Audiologists

An early, central element of implementing the PATM protocol involved clinician education. A comprehensive web-based training course was developed by the study team to teach the principles and procedures of PATM to audiologists. Content was tested repeatedly by audiologists, external specialists, and media specialists. The information was chosen to match the modified PATM model. During the second year of the study the course was posted as an internal website in an interactive modular design using FlashMedia. The PATM audiologists received protected time to take the course during their standard work tour of duty. Each of the 15 modules required approximately 60 minutes of online study and testing. Audiologists had to respond accurately to questions asked during each module, pass a test at the end of each module, and complete an overall exam that covered all the modules. Efforts were made to secure credit for professional education for completion of the course.

The 15 modules provided in-depth training in the following areas: (1) defining tinnitus and its effects; (2) overview of methods for managing tinnitus; (3) principles of tinnitus masking; (4) principles of tinnitus retraining therapy; (5) overview of audiologic tinnitus management; (6) “progressive intervention” for tinnitus management; (7) screening for severity of problem with tinnitus; (8) tinnitus assessment: part 1; (9) tinnitus assessment: part 2; (10) assessment of patients for wearable ear-level instruments; (11) individualized intervention; and (12) group education for tinnitus. As most audiologists are not trained in educational counseling, additional modules were created to provide training in: (13) health literacy; (14) patient education principles; and (15) teaching strategies.