

Adult Tinnitus Management Clinical Practice Recommendation

James Henry (National Center for Rehabilitative Auditory Research, VA Portland Health Care System), Tara Zaugg (National Center for Rehabilitative Auditory Research, VA Portland Health Care System), Paula Myers (James A. Haley VAMC, Tampa FL), Caroline Schmidt (VA Connecticut Healthcare System), Cheri Ribbe (VA Boston Healthcare System), Katie Edmonds (Bay Pines VA Healthcare System), Scott Forbes (Houston VAMC), Emily Thielman (National Center for Rehabilitative Auditory Research, VA Portland Health Care System)



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Purpose: This statement and accompanying algorithm describe the audiologic care provided to patients reporting tinnitus, and are based on the clinical protocol known as Progressive Tinnitus Management (PTM). The PTM program involves five hierarchical levels of care: (1) Referral, (2) Audiologic Evaluation, (3) Skills Education, (4) Interdisciplinary Evaluation; and (5) Individualized Support. With this program, patients receive only the level of care required to adequately mitigate any problems associated with tinnitus.

Background: There is no cure for tinnitus, nor has any method been shown to permanently reduce the intensity of tinnitus. There is also no FDA-approved drug for tinnitus. Tinnitus management therefore involves the use of behavioral methods to reduce the effects of tinnitus on the patient's life. PTM is a behavioral methodology that is designed to facilitate the development of self-efficacy skills in patients so that they are able to draw upon those skills to self-manage their reactions to tinnitus—for a lifetime if necessary.

Goals and Philosophy. The overall goal of the tinnitus working group was to develop tinnitus clinical management recommendations that are (1) relevant to the majority of VA audiology clinics, and (2) applicable to the Veteran population. Therefore, the recommendations are focused on tinnitus assessment and management that are used widely and most likely available to the majority of VA audiologists who practice tinnitus management. The tinnitus management recommendations are not intended as a tutorial or as a sole source of guidance. The recommendations are intended to assist clinicians by providing an evidenced-based framework for decision-making strategies and are not intended to replace clinical judgment.

The components of patient care described herein are not intended to be all-inclusive. Professional judgment and individual patient characteristics may substantially affect the nature, extent, and sequence of services provided. Decision making and interpretation regarding diagnostic and rehabilitative implications of information, observations, and results occur throughout this process. All services are provided in compliance with State and Federal legislation and regulations.

Tinnitus Management Recommendations. These guidelines take into account the Clinical Practice Guideline (CPG) that was published by the American Academy of Otolaryngology – Head and Neck Surgery Foundation (AAO-HNSF) (see Tunkel et al., 2014). The CPG provides recommendations for clinical management of tinnitus based on research evidence that was available at the time the CPG was developed. PTM is also based on research evidence, and, since the CPG was published, a multi-site randomized controlled trial of PTM has been completed. Results of that trial revealed positive outcomes with PTM, although a report of the trial is not yet published at the time of this writing. It should be noted that the PTM methodology is mostly consistent with the CPG. The main difference is that PTM offers an organized structure for providing interdisciplinary care flexible enough to meet each patient's individual needs, whereas the the AAO-HNSF guidelines describe a more compartmentalized (non-integrated) approach of making specific recommendations for different clinical presentations, and (2) provide recommendations for, as well as against, different approaches to tinnitus care.

Personnel: Audiologists are autonomous professionals who diagnose and treat individuals with auditory, balance, and related disorders. Audiologists have Masters and/or Doctoral

degrees in Audiology from regionally-accredited universities. Most states have audiology licensure, certification, or registration. National professional organizations have codes of ethics and specific credentials for clinical practice; the American Speech-Language-Hearing Association requires the Certificate of Clinical Competence—Audiology (CCC-A) and the American Academy of Audiology recommends Board Certification in Audiology, American Board of Audiology.

Referrals: Audiologists receive referral for service from a variety of sources, e.g., educators, healthcare professionals, government and private agencies, consumer organizations, as well as self referral. The typical terminology used in referrals for tinnitus assessments and management includes “hearing test/examination/exam/assessment,” “tinnitus evaluation/assessment/exam,” and “comprehensive audiometry.” Audiologists refer out to other professionals. Referral also may be made using Common Procedural Terminology (CPT) codes and/or affiliated nomenclature.

Associated CPT Codes: Depending on the services required for the patient, the following CPT codes may be appropriate:

- 92556 (Speech/word recognition testing)
- 92557 (Comprehensive audiometry)
- 92558 (Otoacoustic emissions, screening)
- 92567 (Acoustic immittance)
- 92587 (Otoacoustic emissions, limited)
- 92588 (Otoacoustic emissions, comprehensive)
- 92625 (Assessment of Tinnitus)
- 92700 (ALD device eval/selection)
- 98960 (Education and Training, Individual)
- 98961 (Education and Training, 2-4 Patients)
- 98962 (Education and Training, 5-8 Patients)
- 92590 (Hearing Aid Assessment, Monaural)
- 92591 (Hearing Aid Assessment, Binaural)
- 97762 (Hearing Aid Fitting/Orient/ALD Issue)
- V5299 (Outcome Measure)

Associated ICD-9 Diagnostic Coding Options: The following common ICD-9 diagnostic codes may be appropriate:

- 388.31 Tinnitus, subjective
- 388.32 Tinnitus, objective
- 388.40 Unspecified abnormal auditory perception
- 388.42 Hyperacusis
- 388.44 Recruitment
- 389.15 Central hearing loss
- 389.15 Sensorineural hearing loss, unilateral
- 389.16 Sensorineural hearing loss, asymmetrical
- 389.18 Sensorineural hearing loss, bilateral
- 389.8 Other specified forms of hearing loss
- 389.9 Unspecified hearing loss

Associated ICD-10 Diagnostic Coding Options: The following common ICD-10 diagnostic codes may be appropriate:

- H93.1 Tinnitus
 - H93.11 Tinnitus, right ear
 - H93.12 Tinnitus, left ear
 - H93.13 Tinnitus, bilateral
 - H93.19 Tinnitus, unspecified ear
- H93.2 Other abnormal auditory perceptions

Excludes: auditory hallucinations (R44.0)

- H93.21 Auditory recruitment
 - H93.211 Auditory recruitment, right ear
 - H93.212 Auditory recruitment, left ear
 - H93.213 Auditory recruitment, bilateral
 - H93.219 Auditory recruitment, unspecified ear

H93.22 Diplacusis

- H93.221 Diplacusis, right ear
- H93.222 Diplacusis, left ear
- H93.223 Diplacusis, bilateral
- H93.229 Diplacusis, unspecified ear

H93.23 Hyperacusis

- H93.231 Hyperacusis, right ear
- H93.232 Hyperacusis, left ear
- H93.233 Hyperacusis, bilateral
- H93.239 Hyperacusis, unspecified ear

H93.29 Other abnormal auditory perceptions

- H93.291 Other abnormal auditory perceptions, right ear
- H93.292 Other abnormal auditory perceptions, left ear
- H93.293 Other abnormal auditory perceptions, bilateral
- H93.299 Other abnormal auditory perceptions, unspecified ear

Other clinical and/or educational management and diagnostic codes may apply.

Population: Adults 18 years and older.

Clinical Indicators: Any individual who reports the presence of persistent tinnitus. Such individuals would respond affirmatively to the question “When you are in a quiet location, can you usually hear your tinnitus?”

Objectives:

- To inform local/regional medical community of guidelines for properly referring patients who report the presence of tinnitus.
- To determine the presence of tinnitus and if the tinnitus is problematic.
- To determine clinical needs with respect to referral/consultation, ear-level or other devices, auditory rehabilitation, tinnitus and hyperacusis/misophonia management.
- To complete needs assessment regarding amplification or other options, and complete audiologic procedures necessary to initiate a treatment plan.

- To select and fit the ear-level or other devices most appropriate for the communication and tinnitus needs of the patient.
- To counsel the patient, family, and/or caregiver on the use and care of ear-level or other devices, and to foster realistic expectations of performance with the devices.
- To determine the need for tinnitus-specific management following successful use of amplification (hearing aid fitting does not preclude higher-level services for tinnitus).
- To conduct comprehensive tinnitus assessments for patients who need services beyond basic tinnitus-skills education.
- To provide stepped-care tinnitus management based upon tinnitus assessment results.

Expected Outcomes:

- Provide recommendations for medical/surgical or mental health referral.
- Development of a culturally-appropriate audiologic rehabilitative management plan, including referral plans if needed.
- Preparation of a report summarizing findings, interpretation, recommendations, and audiologic management plan.
- Coordinate with mental health providers to work collaboratively with patients requiring tinnitus-specific services.
- Provision of patient-centered educational counseling specific to tinnitus self-management.
- Validation of the benefit to and the satisfaction of the patient regarding the tinnitus management received.

Audiologic Clinical Process: The assessment and management process may vary from this statement based on patient needs. The procedures of tinnitus education and management process listed below require the completion of an audiologic assessment within the prior 12 months. The components described are not designed to be all-inclusive. The clinical decision making process is based on professional judgment and individual patient characteristics that may significantly influence the nature and course of the tinnitus intervention. The process may also vary from this guideline based on patient needs, cooperation, comprehension, and the process setting.

The components of tinnitus assessment and management may include:

- Referring patients at clinical point-of-contact (PTM Level 1 Referral)

- Referral as necessary to emergency care, mental health, otolaryngology, and/or audiology
- Audiologic assessment and brief assessment of tinnitus (PTM Level 2 Audiologic Evaluation)
 - Standard audiologic assessment
 - Hearing aid assessment as warranted
 - Referral to otolaryngology as warranted
 - Development of recommendations for rehabilitative follow up and referral for and coordination with other services
 - Qualitative assessment of tinnitus handicap using appropriate questionnaires (Tinnitus Functional Index—[TFI](#) and Tinnitus and Hearing Survey—[THS](#) should be used; if PTM Level 3 Skills Education is offered, Self-efficacy for Managing Reactions to Tinnitus—[SMRT](#)—should also be used). Based on audiologic testing and tinnitus questionnaires, determine if patient would benefit from education specific to developing tinnitus self-help skills to manage reactions to tinnitus; if so, recommend PTM Level 3 Skills Education.
 - Determine tinnitus handicap pre- and post-management to verify benefit and/or satisfaction to the patient, family, and/or caregiver
 - Determine if hyperacusis/misophonia is a severe problem requiring dedicated services
- Ear-level devices
 - Determine if amplification is necessary [Reference Statement 3: Joint Audiology Committee Statement of hearing Aid Selection and Fitting (adult)]
 - Determine if combination instruments would be warranted
 - Determine if tinnitus-specific services are required following successful use of ear-level or other devices
 - Patient, family, and/or caregiver orientation to device
 - Verification of the appropriateness of the acoustic output of the devices in the ear of the patient
- Basic tinnitus intervention (PTM Level 3 Skills Education)
 - Provide group education workshops if feasible; otherwise provide skills education in one-on-one clinical setting

- Coordinate with mental health provider to ensure patient receives supplemental skills education based on cognitive-behavioral therapy coping skill techniques
- Determine if the basic intervention adequately addressed the patient's tinnitus needs; if not, recommend Level 4 Interdisciplinary Evaluation
- Comprehensive tinnitus assessment (PTM Level 4 Interdisciplinary Evaluation)
 - This level of service is reserved for patients whose tinnitus needs are not met after receiving Level 2 and 3 clinical services
 - Conduct interview designed to determine specific issues that are causing patient to not make adequate progress following skills education; ensure that patient also receives a Level 4 evaluation by a psychologist (or other qualified diagnostician)
 - Conduct tinnitus psychoacoustic measures if appropriate and necessary (not normally recommended with PTM)
 - Determine if ear-level or other devices are optimal for patient; make changes as necessary
 - Make recommendations as to the need for intensive and ongoing tinnitus management services and proper referrals as warranted; coordinate with psychologist to specify further tinnitus services as part of Level 5 Individualized Support
- Individualized care (PTM Level 5 Individualized Support)
 - Provide individualized skills education for as long as needed
 - Provide follow-up services to ensure optimal use of ear-level devices
 - Coordinate with mental health provider if mental health services are required
 - Determine if further tinnitus services are needed, such as multiple sessions of cognitive-behavioral therapy, provision of other forms of counseling, and/or trials with other tinnitus devices approved by the FDA; referral and coordination with other services as appropriate

Equipment and Test Environment: Testing is conducted as appropriate in an environment where ambient noise levels meet (when necessary) American National Standards Institute (ANSI) standards. Electroacoustic equipment meets manufacturers' and the current ANSI standards for such equipment. Specialized equipment specific to each amplification system is available on-site for the evaluation and diagnostic checks for each device employed.

Safety and Health Precautions: All procedures ensure the safety of the patient and audiologist and adhere to Standard Health Precautions (e.g., prevention of bodily injury and transmission of infectious disease).

PTM Level 1 Referral: Patient comes to Audiology by:

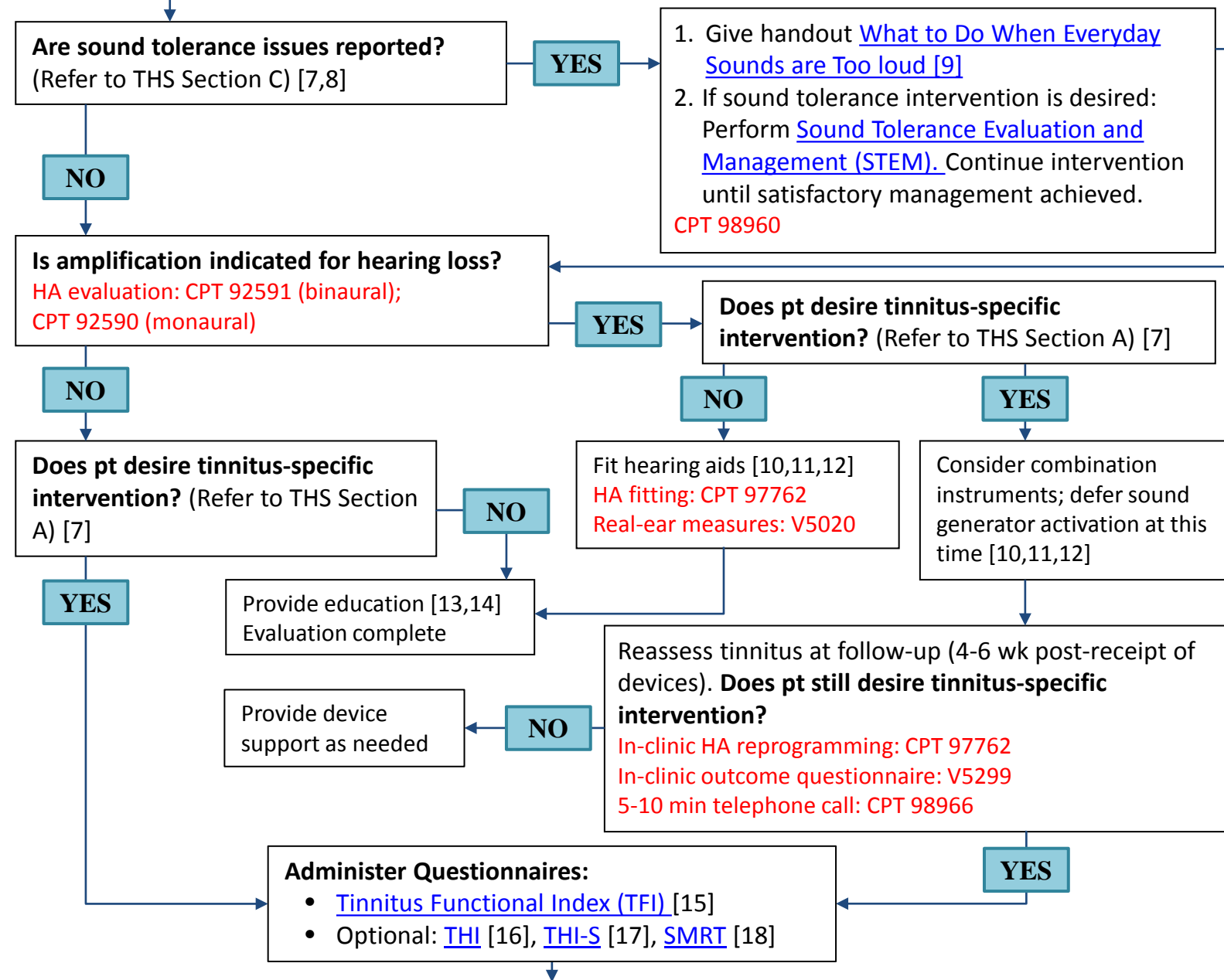
- Self-referral
- Referred by non-audiologist [1] (note: brackets [] refer to References)

PTM Level 2 Audiologic Evaluation [2,3,4]

- [Tinnitus and Hearing Survey \(THS\)](#) [5,6,7]

Referral to other disciplines PRN (Mental Health, PCP, ENT) [1,6]

- Examples of behaviors to look for: Pt is crying, pt verbalizes SI



PTM Level 3: Audiology and Mental Health Skills Education [19]

- Group education is preferred*
- Mental Health** and Audiology services each provide skills education at Level 3 [20,21,22]
- *If group education is unavailable or inappropriate for a particular patient, give one-on-one skills education
- ** Mental Health skills education can be provided by any mental health professional with training and experience in Cognitive Behavioral Therapy

Education and training (individual): CPT 98960
 Education and training (2-4 pts): CPT 98961
 Education and training (5 or more pts): CPT 98962
 If outcome questionnaires re-administered: CPT V5299

Follow-up Tinnitus Assessment: 4-12 weeks following completion of skills education

5-10 min telephone call: CPT 98966

- Administer [6-Week Post-Workshop Telephone Interview](#)* to determine one of the following:

*If unable to do Interview, mail [Tinnitus Workshop Follow-up](#) and [TFI](#) to pt to complete at home and return by mail

1. Pt is doing well
2. Pt is doing reasonably well, but likely to benefit from activation of sound generator in combination instrument
3. Pt has not grasped and/or implemented concepts from Level 3 groups
4. Pt has attempted skills learned in Level 3 and still needs more intervention

No further tinnitus help needed.

Schedule appointment to activate sound generator and counsel the patient.

Offer option to repeat some or all of Level 3 group sessions or go on to Level 4 Interdisciplinary Evaluation

PTM Level 4: Interdisciplinary Evaluation [23]

- Ideally, the pt will be evaluated by both an audiologist and a psychologist* in an in-depth one-on-one assessment
 - Administer [Tinnitus Interview](#)
- *It is recommended that this evaluation should be performed by a professional who diagnoses mental health conditions, such as a psychologist or psychiatrist.

If outcome questionnaires re-administered: CPT V5299

Assessment by audiologist

- Re-administer [THS](#) (other tinnitus questionnaires optional)
- If pt uses ear-level or other devices, questions should be answered as though pt is wearing/using devices
- Conduct the [Tinnitus Interview](#)
- If the pt is **not** wearing ear-level devices, conduct assessment for ear-level devices
- Demo inexpensive (< \$200) tinnitus devices (e.g. table top sound generator, pillow speaker, etc.)

Demo other than HAs: CPT 92700

If outcome questionnaires re-administered: CPT V5299

HA assessment: CPT 92591 (binaural); CPT 92590 (monaural)

If HA fitting: CPT 97762

Real-ear measures: V5020

Assessment by psychologist

- Discuss use of and barriers to use of coping skills
- Conduct mental status (orientation and risk of violence)
- Screen for mental health symptoms
- Ask if pt is engaged in mental health services already (engage clinician if possible)
- Assess sleep disruption and knowledge of sleep hygiene
- Assess maladaptive coping (substance abuse, avoidance, etc.)
- Discuss other health conditions (pain, sleep apnea, etc.)
- Assess psychosocial impact of tinnitus (family, social, work, hobbies, stress)
- Level 4 psychologist consult with Level 3 mental health provider (if necessary)

If outcome questionnaires re-administered: CPT V5299

Audiologist, mental health provider and patient collaboratively determine next steps (if any) after Level 4. **Is further intervention needed?**

YES

NO

Intervention complete

PTM Level 5: Individualized Support [24]

- A series of structured appointments with an audiologist and/or a mental health provider (typically a psychologist) who provide one-on-one individualized support to the patient.
- The primary goal of individualized support is teaching self-efficacy skills.

Individualized sessions with an audiologist (if part of the Level 5 management plan):

- Review skills learned in group education
- Further education about using sound to self manage reactions to tinnitus
- More expensive specialized tinnitus devices (other than hearing aids and combination instruments) can be used at this level as part of a customized, structured tinnitus condition management plan. Audiologists may exercise clinical judgment about when to use these devices. However, it is recommended that expensive (>\$200) tinnitus devices be reserved for use as part of a progressive tinnitus plan.

Education and Training (individual): CPT 98960
 Demo other than hearing aids: CPT 92700

Individualized sessions with a mental health provider (if part of the Level 5 management plan):

- Review skills learned in group education.
- Offer additional coping skills as needed.

Education and Training (individual): CPT 98960

Administer Questionnaires:

- [TFI](#) [15]
- Optional: [THI](#) [16], [THI-S](#) [17], [SMRT](#) [18]

Additional codes that can be used at any point:

- Team conference (3 or more clinicians and pt): CPT 99366
- Team conference (3 or more clinicians and no pt): CPT 99368
- Tinnitus psychoacoustic assessment: CPT 92625
- Telehealth implementation of tinnitus education
 - Education and training (individual): CPT 98960
 - Education and training (2-4 pts): CPT 98961
 - Education and training (5 or more pts): CPT 98962

Legend:

- CPT = Common Procedural Terminology
- ENT = ear, nose, and throat physician (otolaryngologist)
- HA = hearing aid
- PCP = primary care provider
- PRN = as needed
- pt = patient
- PTM = Progressive Tinnitus Management
- SI = suicidal ideation
- SMRT = Self-efficacy for Managing Reactions to Tinnitus questionnaire
- STEM = Sound Tolerance Evaluation and Management
- TFI = Tinnitus Functional Index
- THI = Tinnitus Handicap Inventory
- THI-S = Tinnitus Handicap Inventory – Screening version
- THS = Tinnitus and Hearing Survey

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Glossary:

Acoustic Desensitization Protocol trademarked name that is a more generic alternative to Neuromonics Tinnitus Treatment

ACT (abbreviation for **Acceptance and Commitment Therapy**); ACT is a psychotherapeutic approach similar to CBT (Cognitive Behavioral Therapy), and sometimes called a ‘third wave’ of CBT approaches. ACT involves mindfulness, which is aimed at reducing psychological distress, depressive symptoms, and anxiety by focusing on the present moment. ACT has its roots in the behavioral tradition, though focuses less on the accuracy or the content validity of cognitions and behaviors, but more on functional usefulness of thoughts and actions. One of the key elements of ACT is to decrease experiential avoidance by advocating experiencing psychological events (thoughts, perceptions, emotions) in a non-judgmental way, not trying to change or modify those events, thereby increasing awareness of how thoughts and emotions can create distress. Effects of ACT have been investigated in different populations, including patients with different psychological disorders (e.g., anxiety and depression), and chronic health conditions (e.g., chronic fatigue and chronic pain), as well as in the healthy population. The third wave CBT approaches have been making their way into tinnitus intervention research as well.

acute tinnitus also referred to as “recent-onset” or “new-onset” tinnitus; acute tinnitus has been experienced either persistently or recurrently for less than 6 months; most clinicians and researchers identify 6 months as the time point when *acute* tinnitus becomes *chronic* tinnitus; other opinions for this transitional time point range from 3 to 24 months.

American Academy of Audiology (AAA) the world's largest professional organization of, by, and for audiologists; with an active membership of more than 11,000 audiologists, the Academy promotes quality hearing and balance care by advancing the profession of audiology through leadership, advocacy, education, public awareness, and support of research; Academy-approved continuing education activities (offering CEUs) can be used to maintain licensure to practice audiology; for more information about AAA, visit www.audiology.org and www.HowsYourHearing.org.

American Speech Language and Hearing Association (ASHA) professional, scientific, and credentialing organization for speech-language pathologists and audiologists; ASHA offers guidance to audiologists regarding scope of practice, ethics, and best practices; many audiologists maintain professional certification through ASHA, though it is not necessary to be ASHA-certified to practice audiology; continuing education units (CEUs) offered by ASHA can be used to maintain licensure to practice audiology; for more information about ASHA, visit: www.asha.org

American Tinnitus Association (ATA) nonprofit organization started in the 1970s by Drs. Jack Vernon and Charles Unice; the mission of the ATA is to “to cure tinnitus through the development of resources that advance tinnitus research”; the ATA works to improve the resources, information, and assistance available to sufferers of tinnitus, and serves as a patient advocacy group in Washington, D.C.

aminoglycoside antibiotics any of a group of antibiotics derived from various species of *Streptomyces* that inhibit bacterial protein synthesis and are active especially against gram-negative bacteria; aminoglycosides include streptomycin, gentamicin, amikacin, kanamycin,

tobramycin, and neomycin, among others; all can be highly toxic and should require monitoring for early signs of toxicity—particularly ototoxicity and nephrotoxicity.

annoyance often-used word to describe negative emotional reactions to tinnitus; an unpleasant nuisance that causes irritation; annoyance level can be rated on a scale of, e.g., 1-10, where 1 represents no annoyance and 10 represents the most annoyance imaginable.

audiobook audio recording of a book or magazine that can be listened to as an alternative to visual reading. Audiobooks can be used as “sound therapy” for tinnitus management, especially for distracting attention away from the tinnitus.

audiologic clinical masking the use of external sound in one ear to prevent cross-hearing during auditory threshold testing in the contralateral ear.

auditory gain the auditory system has a “gain control” like the volume control on a stereo; the level of gain determines the degree to which environmental sounds are amplified, or enhanced; the level of gain changes automatically to adjust to the level of sound; as the sound level decreases, the gain increases, and vice versa; gain is controlled partially by the outer hair cells, which mechanically amplify sounds, and partially by neural networks that respond to different levels of sound.

auditory hallucinations usually perceived as voices or music (and sometimes as environmental sounds, e.g., barking dog); have been studied primarily in the context of mental health; some individuals who experience auditory hallucinations do not have discernible mental illness; the prevalence of auditory hallucinations is unknown, although small studies have reported rates of 2 to 32%; auditory hallucinations without mental illness are more common in women than men, and increase with age and with hearing loss; the most common manifestation is hearing repetitive musical patterns, with or without lyrics (“musical hallucinations”).

auditory imagery a normal phenomenon that occurs for all people; generally refers to the imagination of sound, such as repeating a phone number in one’s head, or recalling a musical song or passage.

augmentative sound any sound used therapeutically for tinnitus management, exclusive of sound from ear-level devices

augmentative sound device any device (other than ear-level device) that produces sound that can be used therapeutically for tinnitus management; can include TV, radio, mp3 player, fan, satellite radio, smartphone, and “sound spa”

autonomic nervous system controls basic bodily functions such as heartbeat, blood pressure, breathing, body temperature, sweating, etc.; these are automatic functions that we cannot normally control; to an extent, these functions can be modified by exercising or relaxing; also, techniques such as biofeedback and hypnosis can provide a certain amount of control over the autonomic nervous system; the method of Tinnitus Retraining Therapy (TRT) describes the autonomic nervous system as part of the “neurophysiologic model of tinnitus,” which is essential to the TRT counseling.

Baroque music style of classical music composed between 1600 and 1750; the wearable device used by Neuromonics Tinnitus Treatment includes 2 hours of Baroque music for two of its four tracks of music.

Bluetooth utilization of short wave radio frequencies to permit wireless communication between computers, cell phones, printers, audio devices, and a variety of other applications; enables wireless “streaming” of audio signals from Bluetooth-enabled devices to some hearing aids.

British Tinnitus Association mission statement from website: “The British Tinnitus Association strives to be the primary source of support and information for people with tinnitus and their careers in the UK and to advocate on their behalf. We aim to encourage prevention through our educational programme and to seek effective management of tinnitus through a medical research programme.”

broadband noise wide band of sound, configured such that each frequency within the band produces comparable output; often referred to as “masking” noise for purposes of delivering sound as therapy for tinnitus

brown noise broadband noise similar to pink noise in that the sound pressure level drops as the frequency rises, though with brown noise the sound pressure level drops faster than it does with pink noise; brown noise is perceived by a normal human ear to have more low-frequency than high-frequency energy; brown noise is sometimes used to manage reactions to tinnitus

CBT (abbreviation for Cognitive-Behavioral Therapy); method of psychotherapy that has undergone three decades of development based on theoretical and clinical research; its earliest use was to treat mood disorders such as depression and anxiety; use of CBT for tinnitus was first described by an audiologist who adapted CBT as used for pain management; since then, numerous studies of CBT for tinnitus have been published as well as a detailed text outlining the components and relevant exercises for implementing CBT for tinnitus; CBT is now viewed as a psychotherapy offered only by mental health clinicians specifically trained to provide this particular intervention; the primary components of CBT for tinnitus include education, cognitive restructuring, attention control, and imagery and relaxation training.

chronic tinnitus tinnitus experienced either persistently or recurrently over a long duration of time; VA and numerous entities define chronic as lasting more than 6 months, although the transitional time point from *acute* to *chronic* tinnitus is not consensual (see “acute tinnitus”)

cisplatin a chemotherapeutic drug used to treat a variety of cancers, which has the highest ototoxic potential of all the platinum compounds in clinical use

clinical masking see “audiologic clinical masking”

combination instrument an ear-level device, either custom in-the-ear or behind-the-ear, containing both an amplification circuit and a separate circuit for production of a generally broadband or filtered noise; these instruments are used when patients require amplification for hearing loss and also experience tinnitus; the noise is usually shapeable and can be beneficial to patients for tinnitus management.

complete masking of tinnitus use of sound to completely suppress the perception of tinnitus; although complete masking was originally the intent of Dr. Vernon's method of Tinnitus Masking, it soon became clear that "partial masking" was also effective for patients

continuous positive airway pressure (CPAP) medical device used to treat obstructive sleep apnea; a face mask is worn that provides continuous positive airway pressure to improve breathing during sleep; most CPAP machines make a constant sound that many people with tinnitus find helpful for tinnitus at night; some CPAP machines are designed to be especially quiet—this may be undesirable for someone whose tinnitus is bothersome at night.

conventional masking the use of one external sound to alter the perception of another external sound

coping skills any strategy, such as "using soothing sound," designed to benefit a person with respect to reducing their reactions to tinnitus; coping skills that are taught by Cognitive-Behavioral Therapy (CBT) include stress management, distraction, behavioral activation, sleep hygiene via stimulus control, and cognitive restructuring.

CPAP see "continuous positive airway pressure"

decreased sound tolerance inability to tolerate everyday sounds that most people tolerate easily (see related terms "hyperacusis," "misophonia," and "phonophobia")

distraction general approach of directing one's attention away from a disturbing symptom or problem; a technique that can be helpful in managing reactions to tinnitus.

ear-level device in-the-ear or behind-the-ear instrument used for amplification and/or tinnitus management; includes hearing aid, masker, and combination instrument.

eHealth literacy an individual's ability to search for, successfully access, comprehend, and appraise desired health information from electronic sources and to then use such information to attempt to address a particular health condition

fight-or-flight response the autonomic nervous system becomes strongly activated when there is danger or fear; specifically, the sympathetic part of the autonomic nervous system induces changes in the body that prepare it for fight-or-flight; these changes include release of adrenaline into the bloodstream, increased muscle tension, increased heart rate, increased rate of respiration, and shutting down of digestive processes; the fight-or-flight reaction is so powerful that it can be sustained for only a brief period of time; the method of Tinnitus Retraining Therapy (TRT) refers to the fight-or-flight phenomenon as part of its structured counseling.

general literacy an individual's ability to read, write, and speak in English, and compute and solve problems at levels of proficiency necessary to function on the job and in society, to achieve one's goals, and develop one's knowledge and potential

habituation conscious or unconscious progressive decrease in response due to repeated stimulation; the stimulus can be auditory, visual, or tactile; the main goal of treatment with Tinnitus Retraining Therapy (TRT) is habituation of the *reactions* to tinnitus; the secondary goal of treatment with TRT is habituation of the *perception* of tinnitus.

Health Belief Model a conceptual framework developed in the 1950s by social psychologists Hochbaum, Rosenstock, and Kegels designed to elucidate underlying factors in predicting an individual's ability to adopt a positive health-maintaining behavior; the components of the model include the person's own perception of susceptibility to a disease or condition, the perceived likelihood of contracting that condition, the perceived severity of the consequences of contracting the condition or the disease, the perceived benefits of care and barriers to preventive behavior, and the internal or external stimuli that result in appropriate health behavior by the person; these key components influence how the patient may respond to health advice; most of the key concepts of the Health Belief Model pertain to tinnitus management.

health literacy the ability to read, understand and use healthcare information to make decisions and follow instructions for treatment or management; low health literacy reduces the success of treatment and increases the risk of medical error; various interventions, such as simplified information and illustrations, avoiding jargon, "teach back" methods, and encouraging patients' questions, have improved health behaviors in persons with low health literacy.

hyperacusis condition of physical discomfort or pain in response to sound at levels that are comfortable for most people. People with hyperacusis find all sounds are uncomfortable once they reach a certain loudness level. The level at which sound becomes uncomfortable varies from person to person with hyperacusis.

LDL see "loudness discomfort level"

limbic system a group of interconnected deep brain structures, common to all mammals, and involved in olfaction, emotion, motivation, behavior, and various autonomic functions; the limbic system is explained as part of the structured counseling for Tinnitus Retraining Therapy (TRT), and is specifically included in the "neurophysiological model"; there are direct connections between the limbic system and the auditory nervous system; it is through these connections that sounds can evoke emotional responses due to their association with certain memories; bothersome tinnitus is thought to activate the limbic system, which further activates the autonomic nervous system.

Locus of Control Theory framework of Rotter's (1954) social-learning theory of personality referring to the extent to which individuals believe they can control events that affect them; a person's "locus" is conceptualized as either internal (the person believes they can control their life) or external (meaning they believe their decisions and life are controlled by environmental factors that they cannot influence); according to the Locus of Control Theory, patients who believe they are in charge of their own health status are more likely to make the necessary changes to manage a health condition than people who believe their health is in their provider's hands (or fate, luck, or chance); intervention by the clinician teaching patients how to develop their own management plan to manage their reactions to tinnitus, supports them in their efforts to develop and implement a tinnitus management plan that puts the patient in charge of managing the condition—not the provider, and not fate.

loudness contrast relative difference in loudness between different acoustic percepts in a particular acoustic environment; with respect to tinnitus, there may be a clear contrast between the loudness of tinnitus and the ambiance of a quiet environment; adding any sound to the environment will reduce the contrast between the sound of the tinnitus and the ambient sound; this is often accomplished simply by the use of hearing aids.

loudness discomfort level (LDL) level at which sound becomes uncomfortably loud; commonly measured clinically in a sound booth using pure tones and/or speech as the stimuli; there is no standardized procedure for measuring LDLs, which can be problematic because procedures for measuring LDLs can significantly affect test results; one method for testing LDLs is to start at a comfortable level and slowly raise the level until the patient indicates that the sound would be too loud to tolerate for more than a few seconds; of note, patients often find this testing to be aversive, and no research evidence supports LDL test results as a good indicator of a patient's ability to tolerate everyday sound outside of the test environment

loudness matching perceptual task, usually administered by an audiologist, in which patients are asked to match the loudness of an externally presented tone to the perceived loudness of their tinnitus; commonly, a tone is presented at a level below the perceived tinnitus loudness and the level is increased until the patient reports that the tone is equally as loud as the tinnitus (a "loudness match"); although this testing is commonly performed, the results are of little value with respect to assessment of the problem, determining a course of therapy for tinnitus management, or outcomes of intervention.

loudness recruitment condition that naturally results from sensorineural (cochlear) hearing loss. With sensorineural hearing loss, sound becomes just-perceptible (i.e., hearing threshold) at a louder level than it does for people with normal hearing. However, the level at which sound becomes uncomfortably loud usually remains within the same range as for people with normal hearing. This means that the range in perceived loudness between the hearing threshold and the level at which sound becomes uncomfortably loud is narrowed. Consequently, the perception of loudness grows more rapidly in this range than for people with normal hearing. Thus, loudness recruitment per se does not indicate reduced tolerance to sound.

masker most generally refers to an ear-level sound-generating device; the method of Tinnitus Masking can utilize any device that presents sound to the ear, and if such a device provides relief—whether or not it totally eliminates that patient's perception of tinnitus—it is referred to as a "masker"; thus, even hearing aids and combination instruments are each referred to as maskers when their main purpose is to provide relief for the tinnitus patient.

masking term used in audiology for many years and can be defined as the "increase in the threshold or threshold shift for one sound in the presence of another" (Gelfand, 1990) (p. 307); Gelfand expanded this definition to include "the reduction in loudness that can occur when a second sound is presented, a process referred to as partial masking"; thus, one sound can be completely or partially masked by another sound; many audiologists do not make a distinction between partial and complete masking; because of the type of clinical training that most audiologists receive, their interpretation of masking is often the *elimination* of the perception of one sound by the presentation of another sound; thus, when the term masking is used to describe a method to treat tinnitus, the assumption may be that a masking sound will be presented in the attempt to eliminate the perception of an individual's tinnitus.

masking of tinnitus conventional (sound-on-sound) masking obeys a number of rules that are consistent between individuals; such effects have received extensive investigation and the rules are well defined; many studies have been conducted to determine if these same rules apply to the masking of tinnitus; these studies have generally concluded that there are many dissimilarities between masking a tinnitus signal and conventional sound-on-sound masking; for example, with conventional masking the "critical band" refers to a particular frequency region

surrounding a tone; masking of the tone will occur only if the masking sound contains energy within the critical band; sounds outside of the critical band will not mask the tone; with tinnitus, however, the critical band phenomenon does not apply to most patients; in fact, patients vary widely with respect to their tinnitus “maskability”; for some, almost any sound will mask their tinnitus, while for others almost no sound will produce masking; some patients do apparently experience optimal masking when the masking sound approximates the sound of their tinnitus. (see “complete masking of tinnitus” and “partial masking of tinnitus”)

mindfulness (see Acceptance and Commitment Therapy)

minimum masking level (MML) in the clinic, minimum masking level (MML) refers to the minimum level of broadband noise required to render a patient’s tinnitus inaudible; clinical measurement of MML has involved bands of noise, primarily because tonal maskers are not well tolerated by most patients; data from the Oregon Health & Science University (OHSU) Tinnitus Clinic show that tinnitus can be completely masked by broadband noise presented at 6 dB SL for 42% of patients, and within 12 dB SL for 70% of patients; these data suggest that tinnitus is easily masked for most patients; other reports, however, suggest that many patients with bothersome tinnitus perceive it most of the time, even in loud environments.

minimum suppression level (MSL) Dr. Pawel Jastreboff coined the term “minimum suppression level” (as a replacement for “minimum masking level”) to describe the suppression of neural activity that results in elimination of the perception of tinnitus as a result of an external sound; the term “masking,” however continues in common use.

misophonia term coined by Dr. Pawel Jastreboff to describe “dislike of sound”; in cases of misophonia, it is not the loudness of a sound that dictates whether or not the listener finds the sound to be uncomfortable (as is the case with hyperacusis), but an emotional reaction to the sound that causes it to be experienced as uncomfortable; with misophonia, it is common for a patient to find particular sounds to be uncomfortable at a relatively low level, but to find other sounds at the same level to be acceptable.

monitoring diary booklet designed to help patients identify and avoid lifestyle and environmental factors that may trigger problems in their individual cases; the booklet contains diary forms to aid in long-term monitoring of potential triggers, context symptoms, and symptom action plan adherence; Symptom Action Plans and monitoring diaries are recommended in international guidelines for chronic disease management; a Symptom Action Plan normally is developed to assist patients in monitoring and responding appropriately to symptoms associated with a chronic disease; an action plan is created for each symptom and depending on the characteristics of the symptom (which are monitored by the patient), the patient produces behaviors according to the action plan; Progressive Tinnitus Management employs the use of a symptom action plan/monitoring diary concept via the self-help workbook (“How to Manage Your Tinnitus: a Step-by Step Workbook”) and the worksheets contained in the workbook; with tinnitus, patients normally should not monitor the symptom; however, they should identify situations when their tinnitus is problematic and develop action plans to deal with those situations; the worksheets (Sound Plan Worksheet and Changing Thoughts and Feelings Worksheet) serve two purposes; first, they provide patients with the structure to develop specific action plans to manage their reactions to tinnitus; second, they provide the means to monitor the efficacy of each action plan that is implemented.

musical hallucinations see “auditory hallucinations”

musician's earplugs custom or non-custom hearing protective plugs that also permit perception of clear sound to enable verbal communication or accurate musical perception; custom-fit musician's earplugs may be the optimal choice of protection from loud sound, especially for patients with hyperacusis, because they allow for near-normal hearing while providing protection from aversive or dangerous sounds; if properly cared for, they will last for years.

National Center for Rehabilitative Auditory Research (NCRAR) The VA Rehabilitation Research and Development (RR&D) National Center for Rehabilitative Auditory Research (NCRAR) is dedicated to alleviating the communicative, social, and economic problems in Veterans resulting from their auditory system disorders; the NCRAR consists of a multi-disciplinary team of research audiologists, auditory rehabilitation researchers, educators, and support personnel; NCRAR funding is not structured to directly fund specific research projects, but rather to provide a core of support services, shared equipment, and facility resources for researchers and engineers pursuing areas of inquiry that are consistent with the overall mission and goals of the NCRAR; tinnitus clinical research is a major focus of the NCRAR.

Neuromonics Tinnitus Treatment originally developed by Paul Davis, PhD; with NTT, patients use a proprietary wearable device (similar to an MP3 player) for two stages of treatment; the device is pre-loaded with 2 hours each of Baroque and New Age music selected for its relaxation-inducing qualities; during stage 1, "shower noise" is mixed with the music; the acoustic signal is equalized to levels just above hearing thresholds at frequencies up to 12 kHz; patients are instructed to use the device at least 2-3 hours per day during times when their tinnitus is most disturbing; the goal of using sound during stage 1 is similar to the goal of using sound for Tinnitus Masking, i.e., to provide a sense of relief from stress caused by tinnitus; the goal of using sound in stage 2 is similar to the goal of using sound for TRT, i.e., to use background sound to make it easier for the tinnitus to go unnoticed; the company has recently offered lower-cost versions of their device, which do not require post-fitting appointments.

neurophysiologic tinnitus tinnitus that has a neurophysiologic origin—generated somewhere within the auditory nervous system; this is the most common type of tinnitus, with respect to origin, in contrast with "somatic tinnitus" that has a mechanical origin in the head or neck.

neurophysiological model of tinnitus developed by Dr. Pawel Jastreboff; the model depicts tinnitus as neural activity in the auditory nervous system, with other parts of the central nervous system (cortical, limbic, and autonomic nervous systems) involved in those persons for whom tinnitus becomes annoying or intrusive – approximately 20% of all individuals who experience constant tinnitus; for this subgroup, a vicious circle or positive feedback is described by the model as a progressive enhancement of cortical, limbic, and autonomic activity that is triggered by the tinnitus-related neural signal; the neurophysiological model is the center of focus for TRT counseling.

New Age music umbrella term for style of various down-tempo music intended to induce relaxation; the melodies are often repetitive, to create a hypnotic feeling, and sometimes recordings of nature sounds are used as an introduction to a track or throughout the piece; the wearable device used by Neuromonics Tinnitus Treatment includes 2 hours of New Age music for two of its four tracks of music.

Newest Vital Sign bilingual screening tool designed to identify patients who are more likely to demonstrate low health literacy that can be administered in a clinical setting in 3 minutes; the test result provides information about the patient that will allow providers to appropriately adapt their communication practices in an effort to achieve better health outcomes.

new-onset tinnitus see “acute tinnitus”

noise generators see “sound generating devices”

non-psychiatric auditory hallucinations auditory hallucinations that are not associated with psychopathology; non-psychiatric auditory hallucinations are typically experienced by hard of hearing, socially isolated, elderly people who may also have tinnitus. (see “auditory hallucinations”)

non-specific effects effects due to a patient’s expectations of treatment outcomes; a non-specific effect is essentially a placebo effect, and its effectiveness is achieved through psychological processes.

objective tinnitus head or ear noises that can be heard not only by the patient but also by the examiner; the sounds are generated mechanically in the body and have their origin in vascular, muscular, skeletal, or respiratory structures (usually in the head or neck); a rare condition that warrants an evaluation by an otologist or otolaryngologist; objective tinnitus is, by definition, a somatosound; some professionals use the terms “objective” and “somatic” tinnitus interchangeably (see “somatic tinnitus”)

ototoxic drug a drug having the capability of damaging the eighth cranial (vestibulocochlear) nerve or the organs of hearing and balance; the most common ototoxic drugs that can cause irreversible hearing loss and/or tinnitus are the aminoglycoside antibiotics and the cancer chemotherapeutic cisplatin.

overuse of hearing protection (overprotection) some patients who have reduced tolerance to sound (hyperacusis and/or misophonia) will begin using hearing protection even when not necessary—often due to a fear that environmental sound will become uncomfortably loud (i.e., phonophobia); wearing hearing protection when sounds are not uncomfortably loud is very likely to make a sound tolerance problem worse; it is important for patients with reduced sound tolerance to understand the importance of only using hearing protection when needed either to protect from dangerously loud sound or to allow oneself to be around sounds that would otherwise be uncomfortably loud.

parasympathetic nervous system part of the involuntary nervous system that serves to slow the heart rate, increase intestinal and glandular activity, and relax the sphincter muscles; the parasympathetic nervous system, together with the sympathetic nervous system, constitutes the autonomic nervous system; Tinnitus Retraining Therapy (TRT) counseling includes descriptions of the sympathetic and parasympathetic nervous systems to help explain the “neurophysiological model.”

partial masking of tinnitus occurs when external sound causes spectral changes in the tinnitus and/or the external sound reduces the perceived loudness of tinnitus (consistent with psychoacoustics, i.e., presentation of one sound can reduce the perceived loudness of a second sound)

patient centered care the Institute of Medicine (IOM) defines patient-centered care as: Health care that establishes a partnership among practitioners, patients, and their families (when appropriate) to ensure that decisions respect patients' wants, needs, and preferences, and that patients have the education and support they need to make decisions and participate in their own care; patient centered care presumes active involvement of patients and their families in the design of new care models and in decision-making about individual options for management or treatment.

permanent tinnitus persistent tinnitus experienced for a duration of at least 6 to 12 months, at which time it is not expected to resolve; similar to "chronic tinnitus," although the point at which tinnitus becomes permanent cannot be known with any certainty; the longer a person has had tinnitus, the more likely it is to be a permanent condition.

personal listening device generally portable, electronic audio devices; examples include Walkman radio, iPod, MP3 player, smartphone, etc.; any personal listening device can potentially be used as "sound therapy" for tinnitus.

phantom auditory sensation an internally generated sound can be termed a "phantom auditory sensation" (PAS) because no corresponding sound source exists in the listener's environment; a PAS can include all manifestations of auditory hallucinations and tinnitus.

phantom limb the sensation that an amputated or missing limb is still attached to the body and is moving appropriately with other body parts; a phantom auditory sensation would be analogous to phantom limb.

phantom pain the sensation of pain in a part of the body that has been removed; a phantom auditory sensation would be analogous to phantom pain.

phonophobia fear that normal levels of sound will be uncomfortably loud, damage hearing, make tinnitus louder, or cause other problems. People with phonophobia may use hearing protection in anticipation of loud sound (even when loud sounds are not present). Such "overprotection" can result in increased tinnitus awareness and increased sensitivity to everyday sounds.

pink noise broadband noise in which the sound pressure level drops as a function of increasing frequency; because of how the human auditory system processes sound, pink noise is perceived by normal human ears to have relatively equal energy across the frequency range when compared to white noise that is perceived to have more high-frequency energy; pink noise is sometimes recommended for use by people with hyperacusis to improve the condition, and is sometimes used to manage reactions to tinnitus.

pitch matching perceptual task in which patients match the pitch of an externally presented tone to the perceived pitch of their tinnitus; there is no standardized clinical method for obtaining a pitch match; commonly, two tones of different pitches are presented one after the other and the patient is asked to identify which tone is closer in pitch to the tinnitus; if the higher pitch is chosen, then the chosen pitch is played with a new tone that is higher in pitch than either of the first two tones and the patient is again asked which tone is closer in pitch to the tinnitus; the procedure is continued until a pitch match is identified; research has shown that very often when

pitch match procedures are repeated, substantial variability in the pitch match is seen within a single patient (typically over a range of 2-3 octaves).

podcast a multimedia digital file made available on the Internet for downloading to a portable media player, computer, etc.; examples of podcasts include talk radio programs, audio books, web TV shows, web movies.

Progressive Tinnitus Management (PTM) a stepped-care approach designed to be maximally efficient to have the least impact on clinical resources, while still addressing the needs of all patients who complain about tinnitus; PTM consists of five levels to provide a systematic framework for providing only the level of services required by the individual patient: (1) Level 1 Referral; (2) Level 2 Audiologic Evaluation; (3) Level 3 Skills Education; (4) Level 4 Interdisciplinary Evaluation; (5) Level 5 Individualized Support; the method was developed by researchers and clinicians who work for the Veterans Health Administration, but is adaptable to any clinic that provides tinnitus services.

psychiatric auditory hallucinations auditory hallucinations that are associated with psychopathology; hallucinations that are a sign of mental illness and have nothing to do with the auditory system. (see “auditory hallucinations”)

post-traumatic stress disorder (PTSD) also known as shell shock and combat stress; persons who have experienced severe trauma or a life-threatening event may develop PTSD; PTSD that is co-morbid with tinnitus can exacerbate reactions to tinnitus.

pulsatile tinnitus perception of abnormal pulsing sounds in the ears or head; usually caused by blood flow disturbance, a blood vessel abnormality, or, more uncommonly, a vascular tumor; pulsatile tinnitus pulses in synchrony with the heartbeat, and is the most common somatosound; patients suspected of having pulsatile tinnitus should be referred for an assessment by an otologist or otolaryngologist.

quinine an ototoxic medication primarily used as an antimalarial agent; quinine is therapeutically available as sulfate or hydrochloride; can cause temporary hearing loss and/or tinnitus; these effects are generally reversible once the quinine delivery is stopped.

recent-onset tinnitus see “acute tinnitus”

recruitment see “loudness recruitment”

reduced contrast tinnitus in a very quiet environment would represent maximum contrast, while tinnitus in a background of sound that decreases perception of tinnitus would be described as reduced contrast; commonly given visual analogy is a light source in a dark room as compared with a light source in a brightly lit room; this idea may have originated with the counseling for Tinnitus Retraining Therapy that describes the “candle in the dark room.”

reduced sound tolerance see “decreased sound tolerance”

residual inhibition (RI) phenomenon in which prolonged exposure to broadband noise (clinically 1 minute of broadband noise is presented at 10 dB above the minimum masking level) results in complete or partial elimination of the perception of tinnitus for a short period of time after cessation of the broadband noise; the effect usually lasts less than 1-3 minutes.

salicylate class of pain relief drug that can be ototoxic in large doses; aspirin is an example of a salicylate; auditory effects can include reduced hearing sensitivity and tinnitus; these effects are generally temporary.

Self-Efficacy for Managing Reactions to Tinnitus (SMRT) 17-question outcome measure designed to assess the degree of confidence patients have in their ability to manage their reactions to tinnitus; the first six questions were derived directly from the Self-Efficacy for Managing Chronic Disease 6-item Scale, which has been fully documented for its psychometric properties; the 6-item Scale was adapted for tinnitus assessment by replacing the word “disease” with “tinnitus” and with a few minor wording changes; the adapted version will have the same psychometric properties as the original version; in addition, 11 questions have been written that address various aspects of managing reactions to tinnitus that would be considered common to all patients who complain of tinnitus.

Self-Efficacy Theory psychological theory that describes the importance of self-beliefs that affect thinking, expectations, motivation, decisions, and a variety of other behaviors; tinnitus self-efficacy is defined as the confidence individuals have in their capabilities to perform courses of action needed to manage their tinnitus successfully; patients who display high self-efficacy beliefs for skills needed to manage a health condition demonstrate improved subjective and objective outcomes, higher ratings of quality of life, and perseverance in the face of a challenging condition.

self-management deliberate use of learned methods, skills, and strategies to maintain or modify one’s own attitudes and actions; such strategies include goal setting, self-monitoring, self-correction, and self-solicitation of feedback toward the achievement of objectives; the goal of tinnitus management is to provide education to patients to effectively self-manage their reactions to tinnitus.

sensorineural tinnitus tinnitus having a neurophysiologic origin; (see “neurophysiologic tinnitus”)

Six-Week Post-Workshop Telephone Interview approximately 6 weeks after patients have attended their last PTM Level 3 workshop, they should be telephoned by a workshop clinician who administers the Six-Week Post-Workshop Telephone Interview; the Interview contains four questions that ask: if the skills taught during the workshop are being used, what is most helpful, what is least helpful, and the overall level of satisfaction; based on the patient’s responses and ensuing discussion there are five options for the patient: (1) no further intervention; (2) attend all workshop sessions again; (3) attend some workshop sessions again; (4) watch videos that provide content from the workshops; and (5) attend Level 4 Interdisciplinary Evaluation; these options are listed on the Interview form to facilitate a collaborative decision with respect to the best course of action for the patient.

somatic tinnitus (somatosounds) refers to the perception of sound that originates within the body—in vascular, muscular, skeletal, or respiratory structures, or in the temporomandibular joint; these “body sounds” have an internal acoustic source; patients suspected of somatic tinnitus should undergo an assessment by an otologist/otolaryngologist.

sound generating devices wearable, portable, or stationary devices capable of producing various types of sound and mitigating tinnitus awareness by reducing contrast between tinnitus

and the acoustic environment, providing interesting sound, or providing soothing sound; examples include (but are not limited to) electric fan, tabletop fountain, radio, CD player, MP3 player (e.g., iPod), smartphone (e.g., iPhone), sound machine, sound pillow; note that any of these devices are suitable for tinnitus “sound therapy” depending on the particular tinnitus-problem situation.

sound therapy (also referred to as “acoustic therapy”) any use of sound to mitigate negative reactions to tinnitus; can include any type of sound that is presented at a safe and comfortable level, and that does not cause any degree of annoyance or discomfort; increasing numbers of companies provide devices that utilize a very specific sound-stimulus protocol (e.g., Neuromonics, SoundCure); other methods that primarily use sound as therapy are Tinnitus Masking and Tinnitus Retraining Therapy; the method of Progressive Tinnitus Management teaches how to use sound in a variety of ways to address specific situations when tinnitus is problematic.

specific effects effects that are directly attributable to an active intervention; as examples, insulin normalizes blood glucose levels and glasses improve vision; see “nonspecific effects”

stationary listening devices also referred to as “tabletop devices”; see “sound generating devices”

stress response constellation of physiological responses on a continuum of intensity, with fight-or-flight being the extreme of these combined responses; the physical effects of severe tinnitus are best understood in the context of the stress response.

sympathetic nervous system the autonomic nervous system becomes strongly activated when there is danger or fear; specifically, the *sympathetic* part of the autonomic nervous system induces changes in the body that prepare it for fight-or-flight; these changes include release of adrenaline into the bloodstream, increased muscle tension, increased heart rate, increased rate of respiration, and shutting down of digestive processes; the fight-or-flight reaction is so powerful it can be sustained for only a brief period of time.

Symptom Action Plan see “monitoring diary”

systematic desensitization the key to treating hyperacusis is to *desensitize* the auditory system to sound, which involves systematic exposure to sounds that cause no annoyance; over time, this process results in the ability to listen comfortably to sounds that are gradually louder; improvement in loudness tolerance can be observed in as little as a few weeks.

Teach-Back Method effective technique for ensuring that patients understand information provided by their doctor/clinician; the method involves asking patients to explain or demonstrate what they have been told; for example, the clinician can say, “I want you to explain to me how you will use sound to manage your reactions to tinnitus, so I can be sure I have explained everything correctly,” or “Please show me how you will use the combination instrument, so I can be sure I have given you clear instructions,” or “When you get home your spouse will ask you what the audiologist said—what will you tell your spouse?”

temporary tinnitus tinnitus induced, usually by loud sound or ototoxic drugs, that is reversible; temporary tinnitus usually lasts up to 1 week following the exposure; with repeated exposure to loud sound, temporary tinnitus can become permanent.

timbre combination of qualities of a sound that distinguishes it from other sounds of the same pitch and volume; tinnitus can be described as having acoustic parameters of loudness, pitch, and timbre; timbre can also be thought of as the “spectral” quality of tinnitus.

tinnitus the perception of sound in the ears or head where no external source is present; to be distinguished from “transient ear noise” and “auditory hallucinations”; tinnitus can be “subjective” or “objective” and can be “neurophysiologic” or “somatic”

Tinnitus and Hearing Survey (THS) it is common for patients to erroneously attribute hearing difficulties to tinnitus, which can complicate the process of determining which kinds of intervention (for hearing or for tinnitus) are appropriate for a given patient; the THS contains 10 items designed to help patients and clinicians quickly separate the effects of hearing loss from the effects of tinnitus; the THS also contains two items designed to screen for a loudness tolerance problem; the THS is currently the only instrument designed specifically to separate hearing problems from tinnitus problems.

Tinnitus Functional Index (TFI) a relatively new self-report questionnaire developed by Dr. Mary Meikle and colleagues that has documented reliability and validity both for scaling the severity and negative impact of tinnitus, and for measuring treatment-related changes in tinnitus (*responsiveness*); the TFI is useful in both clinical and research settings because of its excellent responsiveness to treatment-related change, its high construct validity for scaling the overall severity of tinnitus, and its comprehensive coverage of the negative impacts of tinnitus.

Tinnitus Handicap Inventory (THI) a commonly used quantitative outcome measure developed by Dr. Craig Newman and colleagues to indicate the effect of tinnitus on daily life; the THI has 25 items divided into three subscales: functional, emotional, and catastrophic; questions are answered with a “yes” (4 points), “sometimes” (2 points), or “no” (0 points) (the higher the score, the greater perceived handicap); the THI has excellent internal consistency, reliability, and high test-retest reliability and can be used to assess the efficacy of treatment over time.

Tinnitus Handicap Questionnaire (THQ) a quantitative outcome measure developed by Dr. Francis Kuk and colleagues that can be useful to evaluate the effects of tinnitus on lifestyle, health, hearing, and emotional well-being; the THQ can be used to assess the efficacy of treatment over time.

tinnitus impact the influence or effect that tinnitus has on an individual’s quality of life.

tinnitus instrument another term for a hearing aid that contains a sound generator; this term was used by proponents of the Tinnitus Masking method. (see “combination instrument”)

Tinnitus Interview a qualitative questionnaire designed to obtain a history and descriptive nature of the tinnitus, the impact that tinnitus has on the individual’s daily life, factors that may exacerbate or reduce awareness of the tinnitus, and a history of any other attempted tinnitus treatments; the Tinnitus Interview was developed specifically for use by audiologists to conduct their assessment as part of the PTM Level 4 Interdisciplinary Evaluation.

Tinnitus Knowledge Inventory (TKI) the intervention provided with PTM consists mainly of the Level 3 Skills Education workshops; these workshops are designed to provide patients with

skills that will facilitate self-management of reactions to tinnitus; it is essential that patients comprehend and recall the information taught during the workshops in order to acquire and benefit from the skills; the TKI was developed to evaluate patients' comprehension and recall of the key information taught during the workshops; the TKI consists of five sections—one for each of the five Level 3 workshops; each section contains five multiple-choice questions; hence, at the end of each workshop patients are asked to answer the appropriate five-question TKI, which should take less than 1 minute; patients complete the TKI along with the Workshop Evaluation Form; the completed TKI is identifiable while the Workshop Evaluation Form remains anonymous.

tinnitus loudness match see “loudness match”

tinnitus masker see “masker”

tinnitus masking see “masking of tinnitus”

Tinnitus Masking (TM) method of tinnitus management developed by Dr. Jack Vernon and colleagues in the 1970s and 80s; involves the use of wearable ear-level devices (“maskers”) that deliver sound to a patient’s ear(s); the objective of the sound presentation is to produce a sense of relief from the annoyance caused by the tinnitus sound; the relief is accomplished by “covering up” the tinnitus sound or by changing the sound of the tinnitus in some way, usually by reducing its perceived loudness; these two objectives are referred to respectively as “complete” and “partial” masking; the sense of relief from tinnitus can technically be accomplished using any form of sound that the patient chooses to provide the greatest degree of relief; ideally, the sound should be presented to the ears on a continual basis, which can only be accomplished by wearable tinnitus maskers, hearing aids or combination hearing aids/maskers (the latter termed “tinnitus instruments” by Vernon and his group).

tinnitus pitch match see “pitch match”

tinnitus psychoacoustic assessment battery of measures intended to characterize the percept of tinnitus and to assess the effects of sound on tinnitus; a tinnitus psychoacoustic assessment commonly includes pitch matching, loudness matching, measuring minimum masking levels, and testing for residual inhibition; because people with tinnitus also sometimes have problems with loudness tolerance, loudness discomfort level testing is sometimes also included.

tinnitus questionnaires quantitative or qualitative self-reported measures designed to determine the subjective impact that tinnitus has on an individual and whether or not tinnitus-specific intervention is warranted; tinnitus questionnaires can be used for pre- and post-treatment evaluation to determine efficacy of a particular intervention; commonly used for clinical research purposes.

Tinnitus Reaction Questionnaire (TRQ) a quantitative outcome measure developed by Dr. Peter Wilson and colleagues; designed to determine the psychological distress caused by tinnitus, reportedly with good psychometric properties; the TRQ is typically used with the method of Neuromonics Tinnitus Treatment.

Tinnitus Retraining Therapy (TRT) method of clinical management for tinnitus, developed by P.J. Jastreboff in the late 1980s; TRT is a clinical implementation of his “neurophysiological

model of tinnitus,” which conceptualizes tinnitus as a neural signal that can have varying effects on the central nervous system; the major components of this technique involve structured TRT counseling and sound enrichment to accomplish habituation to the tinnitus signal and habituation to the tinnitus reaction, and mitigate any activating effects to the limbic system.

Tinnitus Severity Index (TSI) a quantitative measure developed by Dr. Mary Meikle and colleagues in the 1980s and 1990s to determine the negative impact of tinnitus on an individual’s life and the subjective severity of the tinnitus, uses a 5-point rating for each of 12 items; although the TSI has been validated psychometrically, its validation has not been published in a peer-reviewed journal.

tinnitus referral guidelines evidence-based review and guide to help medical providers refer patients appropriately when they report the presence of tinnitus; these guidelines comprise PTM Level 1 Referral.

Tinnitus Workshop Follow-up contains 10 questions that assess patients’ use of the skills taught during the PTM Level 3 workshops and other factors that are important in determining if tinnitus-specific problems are still being experienced; this questionnaire is self-administered, and normally would be mailed to patients who complete it at home and return it by mail.

transient ear noise a normal auditory event experienced by almost everyone; typically described as a sudden whistling sound accompanied by the perception of hearing loss; the transient auditory event is unilateral and seems to occur completely at random without anything precipitating the sudden onset of symptoms; often the ear feels blocked during the episode; all of the symptoms generally dissipate within about a minute; transient ear noise should not be confused with tinnitus.

uncomfortable loudness level (UCL) see “loudness discomfort level”

unilateral tinnitus tinnitus that is perceived in only one ear or tinnitus that is lateralized to one side of the head; sometimes patients are aware of tinnitus in one ear only, but upon masking the tinnitus, they notice it at a lower level in the contralateral ear.

vestibular schwannoma (also known as acoustic neuroma, acoustic neurinoma, or acoustic neurilemoma) is a benign, usually slow-growing tumor that develops from the balance and hearing nerves supplying the inner ear; the tumor comes from an overproduction of Schwann cells—the cells that normally wrap around nerve fibers like onion skin to help support and insulate nerves.

wearable listening devices see “sound generating devices”

white noise broadband noise with equal sound pressure levels across the frequency range; because of how the human auditory system processes sound, true white noise is perceived by a normal human ear to have more high-pitched than low-pitched energy; the term white noise is often used to describe broadband noise that isn’t technically white noise; white noise (or broadband sound referred to as white noise) is commonly used to manage reactions to tinnitus.

wideband noise see “broadband noise”

Workshop Evaluation Form at the end of each PTM Level 3 workshop it is suggested that each patient complete the Workshop Evaluation Form; the Form consists of six questions to evaluate patients' educational needs and to identify if there were any barriers to learning; use of the Form presents an opportunity for patients to provide feedback concerning the workshop; the Form is completed anonymously to ensure that all feedback is objective and impartial.