

Progressive Tinnitus Management: An Interdisciplinary Approach

James Henry, PhD

VA RR&D

National Center for Rehabilitative Auditory Research (NCRAR)

Portland VA Medical Center

Caroline Schmidt, PhD

VA Connecticut Healthcare System

West Haven, CT

Co-Developers of PTM

Tara Zaugg, AuD
Paula Myers, PhD

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Poll Question #1

What is your primary role in VA?

- A. A physician in Primary care
- B. A Physician in Specialty services such as Otolaryngology, Psychiatry, or Anesthesiology
- C. A Mental health provider
- D. Work in Audiology
- E. Another discipline not listed?

What is Tinnitus?

- *Transient ear noise* = unilateral sudden tone with other auditory sensations that decay within about 1 min
 - **NOT TINNITUS**
- *Tinnitus* = ear/head noise lasting >5 min that occurs >once/wk (textbook)
- *Chronic tinnitus* = continuous ear/head noise that is extended in duration, and persistent over time

Poll Question #2

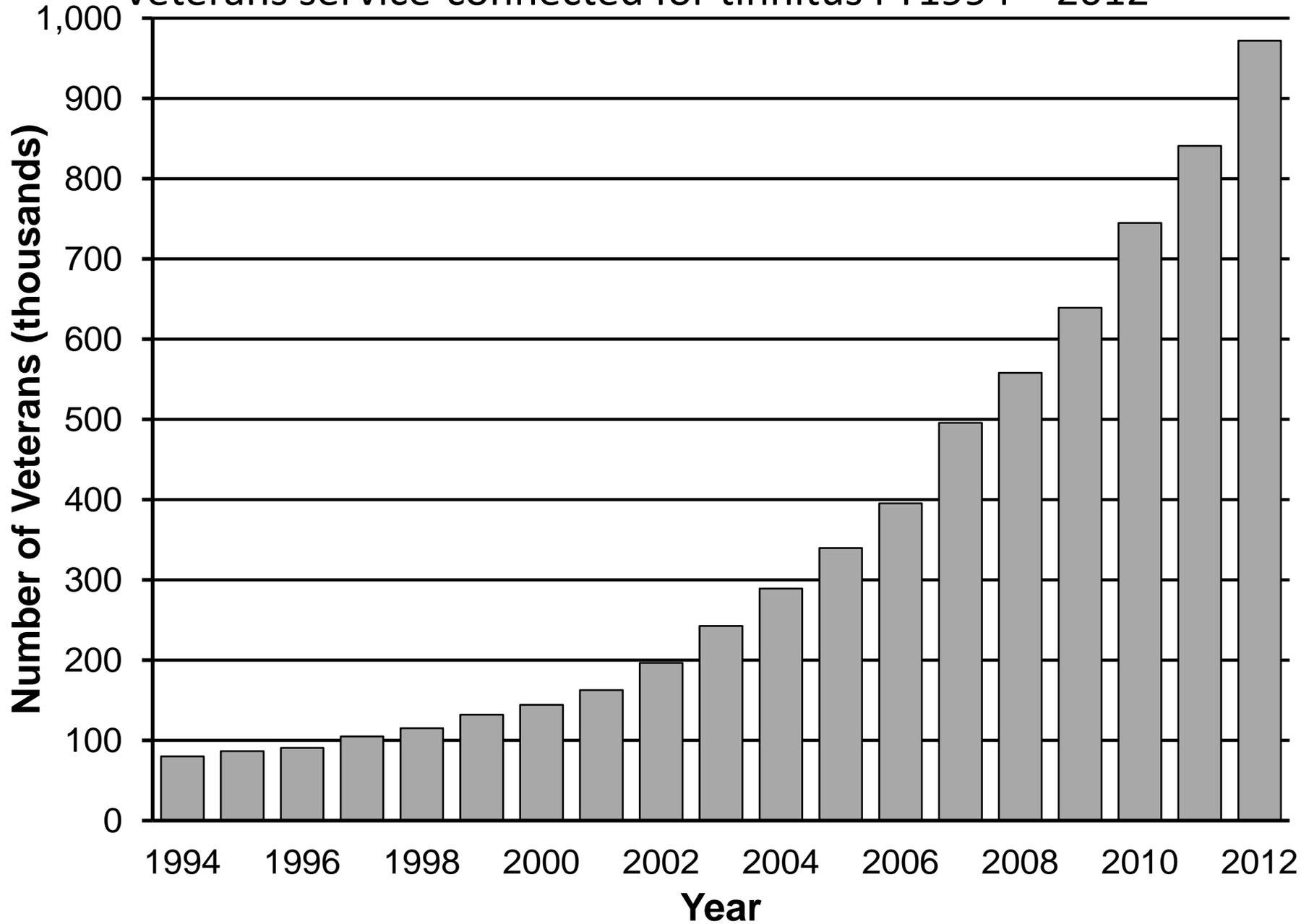
- *Do you have tinnitus?*
 - A. Yes
 - B. No



For Veterans, Tinnitus is #1 (unfortunately)

- Most prevalent service-connected (SC) disability for Veterans receiving compensation at the end of FY 2012 (**971,990** Veterans SC for tinnitus)
- Also the most prevalent SC disability for Veterans who *began* receiving compensation during FY12 (**115,638** Veterans)

Veterans service-connected for tinnitus FY1994 – 2012



Risk Factors for Tinnitus

- Age
- Cardiovascular/cerebrovascular disease
- Drugs/medications
- Ear infections/inflammation
- Head/neck trauma and injury
- Hyper- and hypothyroidism
- Loud noise exposure
- Meniere's disease

Risk Factors (cont.)

- Otosclerosis
- Presbycusis
- Sudden deafness
- Acoustic neuroma
- *Anything that can cause hearing loss can also cause tinnitus*
 - Exact mechanisms for how these factors interact or cause tinnitus is not understood

Mechanism(s) of Tinnitus— Contemporary View

- Although tinnitus may be triggered by ear injury, neural generators are most likely in central auditory pathways
- Plasticity is main component, with reduced auditory nerve input triggering a shift in balance of central excitation and inhibition
- Onset and maintenance of tinnitus may involve different mechanisms

TBI and Tinnitus

- Clinical & epidemiologic studies confirm TBI is strongly associated with tinnitus
- Tinnitus can occur not only as a direct consequence of the event causing TBI, but also as a side effect of medications commonly used to treat cognitive, emotional, and pain problems associated with TBI

Poll Question #3

Are you involved in direct care of Veterans with TBIs?

- Yes
- No

Blast-Related TBI and Tinnitus

- When TBI is blast induced, the onset of tinnitus is even more likely (but typically under-reported)
- Studies:
 - 49% of blast injured patients at Walter Reed Army Medical Center reported tinnitus (Cave et al, 2007)
 - 38% of inpatients with blast injury at Palo Alto VA Polytrauma Rehabilitation Center complained of tinnitus (Lew et al., 2007)

International State-of-the-Science Meeting on Blast-Induced Tinnitus

- November 15-17, 2011
- Collaboration between:
 - DoD Blast Injury Research Program Coordinating Office
 - DoD Hearing Center of Excellence
 - Department of Veterans Affairs
- 107 participants from 8 countries
 - Representing DoD, VA, NIH, academia, medicine, and industry

International State-of-the-Science Meeting on Blast-Induced Tinnitus

- Objectives:
 - Assess current knowledge regarding cause, diagnosis, and treatment of tinnitus
 - Identify research gaps for further investigation
 - Foster collaboration among researchers and inform DoD research investment strategies
- Proceedings published
 - Major findings
 - Priority recommendations for research

Key Questions on Blast-Induced Tinnitus

- What are the clinical characteristics and co-morbidities of blast-induced tinnitus?
 - Are there different subforms of blast-induced tinnitus?
 - How is blast-induced tinnitus associated with hyperacusis, headache, depression, anxiety, and somatic modulation of tinnitus?
 - How is blast-induced tinnitus related to other blast-induced symptoms (e.g., migraines, memory impairment, or PTSD)?

Key Questions on Blast-Induced Tinnitus (not all listed)

- What are the effects of blast alone, blast plus concussion, and concussion alone on the development of tinnitus?
- Are there other factors or conditions that induce or potentiate tinnitus in combination with blast or noise?
 - While limited data exist, need to determine why nonauditory areas of the brain are involved such as those related to attention and emotional processing

Conclusion of Meeting

- *“Continued research and development are needed to resolve key barriers in the ability to effectively diagnose and treat tinnitus, and thereby reduce the impact of tinnitus on the DoD and VA”*
- Proceedings available – contact:
james.henry@va.gov

There is No Cure for Tinnitus

- No method has been shown to **consistently and safely** reduce or eliminate the sound of tinnitus
- Any claim to reduce or eliminate tinnitus is not credible



There is No Drug for Tinnitus

- No drug has received FDA approval for treating tinnitus
- All drugs used for tinnitus are approved to **treat other conditions** – typically depression, anxiety, insomnia, & epilepsy



What Can be Done About Tinnitus?

- Tinnitus = perception/sensation
 - Not the problem
- Reactions = functional effects, suffering, distress, disturbance, etc.
 - **The problem**
- Patients can be helped if they learn to **manage their reactions** to tinnitus

Three Essential Components to Manage Reactions to Tinnitus

1. Education

- Ideally teaching self-management skills

2. Therapeutic sound

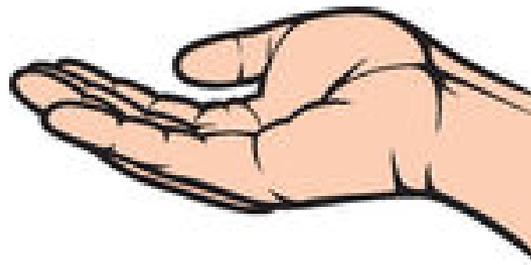
- Any combination of soothing sound, interesting sound, and background sound

3. Stress reduction

- Relaxation exercises, lifestyle modifications

Which Methods Are Effective?

- Dozens of methods are used to treat tinnitus
- Only a handful of methods have an **evidence-basis** from controlled clinical studies



Methods That Have an Evidence-basis

- Hearing aids
- Tinnitus Masking
- Tinnitus Retraining Therapy (TRT)
- Cognitive-Behavioral Therapy (CBT)
- Progressive Tinnitus Management (PTM)
- Neuromonics Tinnitus Treatment*
- *others?*

Which Method is the Most Effective?

- Cochrane Reviews:
 - **CBT has the strongest research evidence**
 - Sound therapy is effective when provided along with counseling
- No evidence proving any one method is more effective than any other

Poll Question #4

Challenges to applying tinnitus interventions at your VA include (select all that apply):

- Lack of support by administration (staff allocation)
- No available audiology staff
- No available mental health staff
- Not enough patients would be interested
- The interventions are too difficult to implement
- I want to see more research before implementing PTM at my site

Research Leading to PTM



Controlled Clinical Studies (Completed)

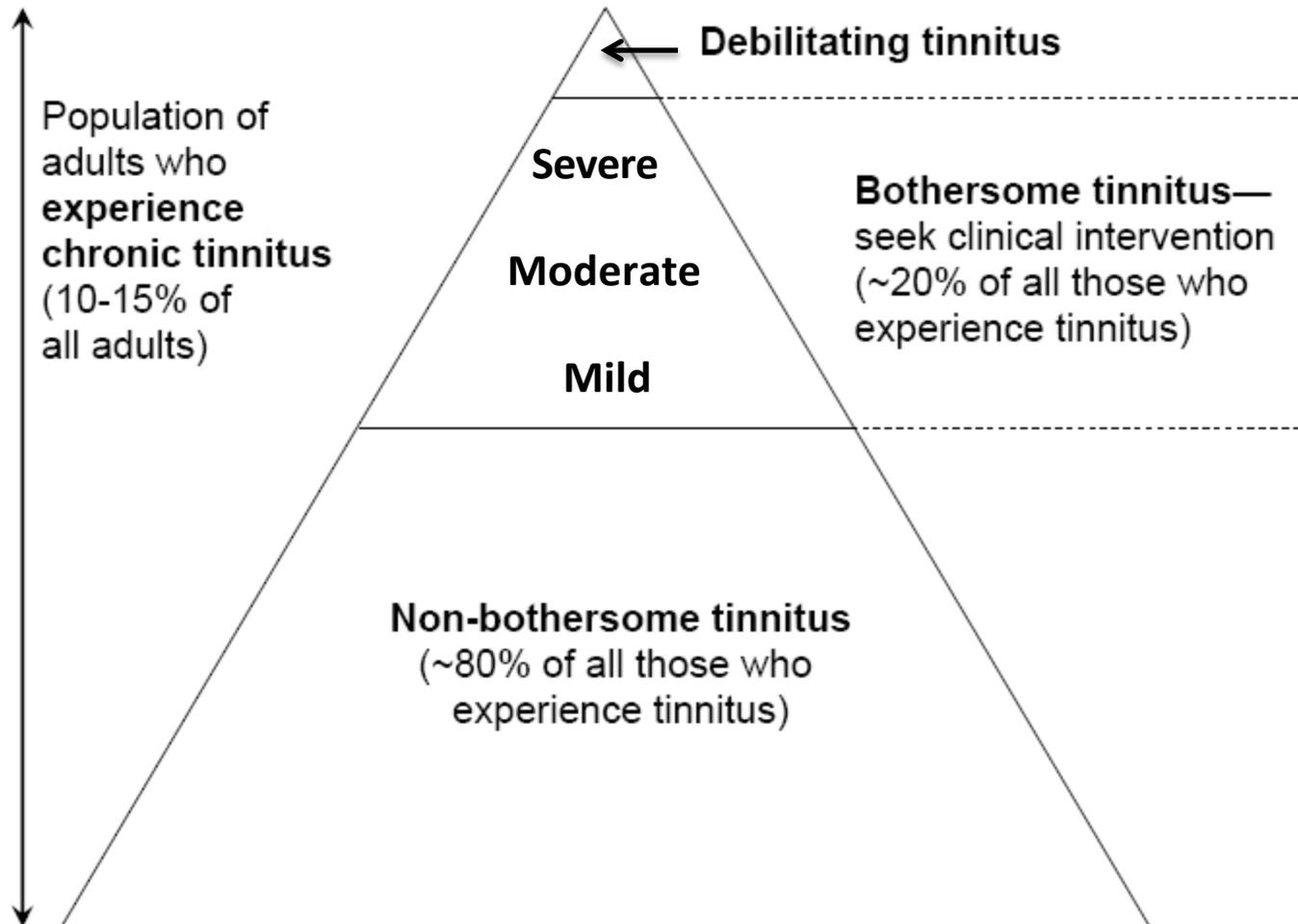
- Comparison of Masking and TRT (**n=126**)
- Group education using TRT counseling (**n=269**)
- Multi-site study to compare masking, TRT, and “tinnitus education” (**n=149**)
- Development and piloting of PTM (**n=221**)
- Adaptation of PTM for telephone-based counseling of TBI patients (**n=36**)
- Pilot study of CBT for tinnitus (**n=25**)

Controlled Clinical Studies (Current)

- ***Multi-Site Evaluation of Progressive Tinnitus Management***
- ***Telehealth Tinnitus Intervention for Patients with TBI***
- Comparison of combination instruments to hearing aids for tinnitus management
- Transcranial Magnetic Stimulation (PI: Bob Folmer, PhD)

PTM is based on
13 principles learned
from our research and
clinical experience

1. *Clinical services for tinnitus should be progressive*



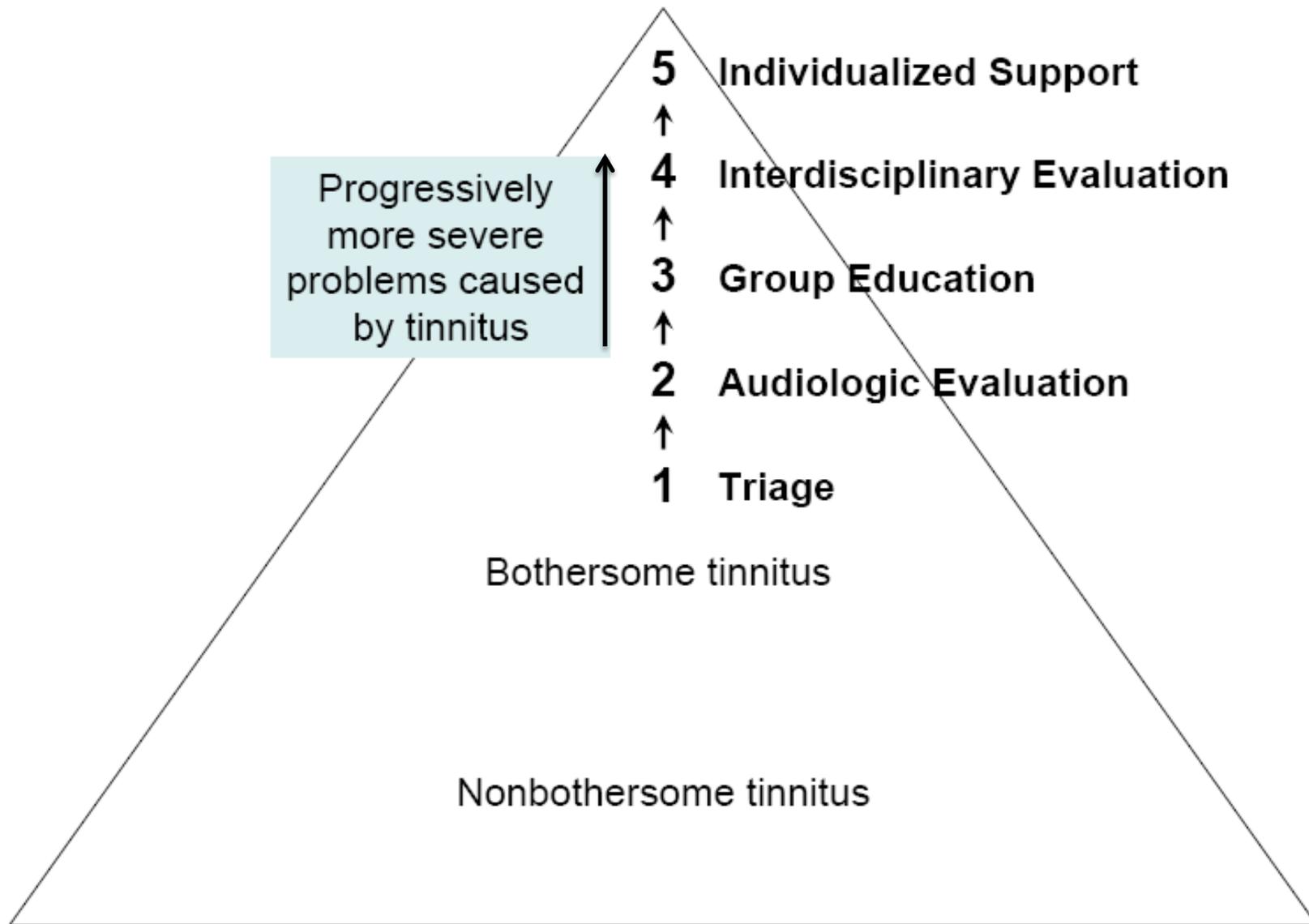
2. Use an interdisciplinary approach
3. Clinicians need training in tinnitus management
4. All patients reporting tinnitus need an audiologic evaluation
5. Determine if the tinnitus problem is “clinically significant”
6. Questionnaires are the best way to determine tinnitus severity
7. Make sure the tinnitus problem is not a hearing problem

8. *Intervention should start with patient education*
9. *Address the problem of low health literacy*
10. *Patients are best served if they learn self-efficacy skills*
11. *Patients should learn different methods of using therapeutic sound*
12. *Patients should learn psychological coping techniques*
13. *Patient education can be provided effectively by telephone*

Overview of PTM

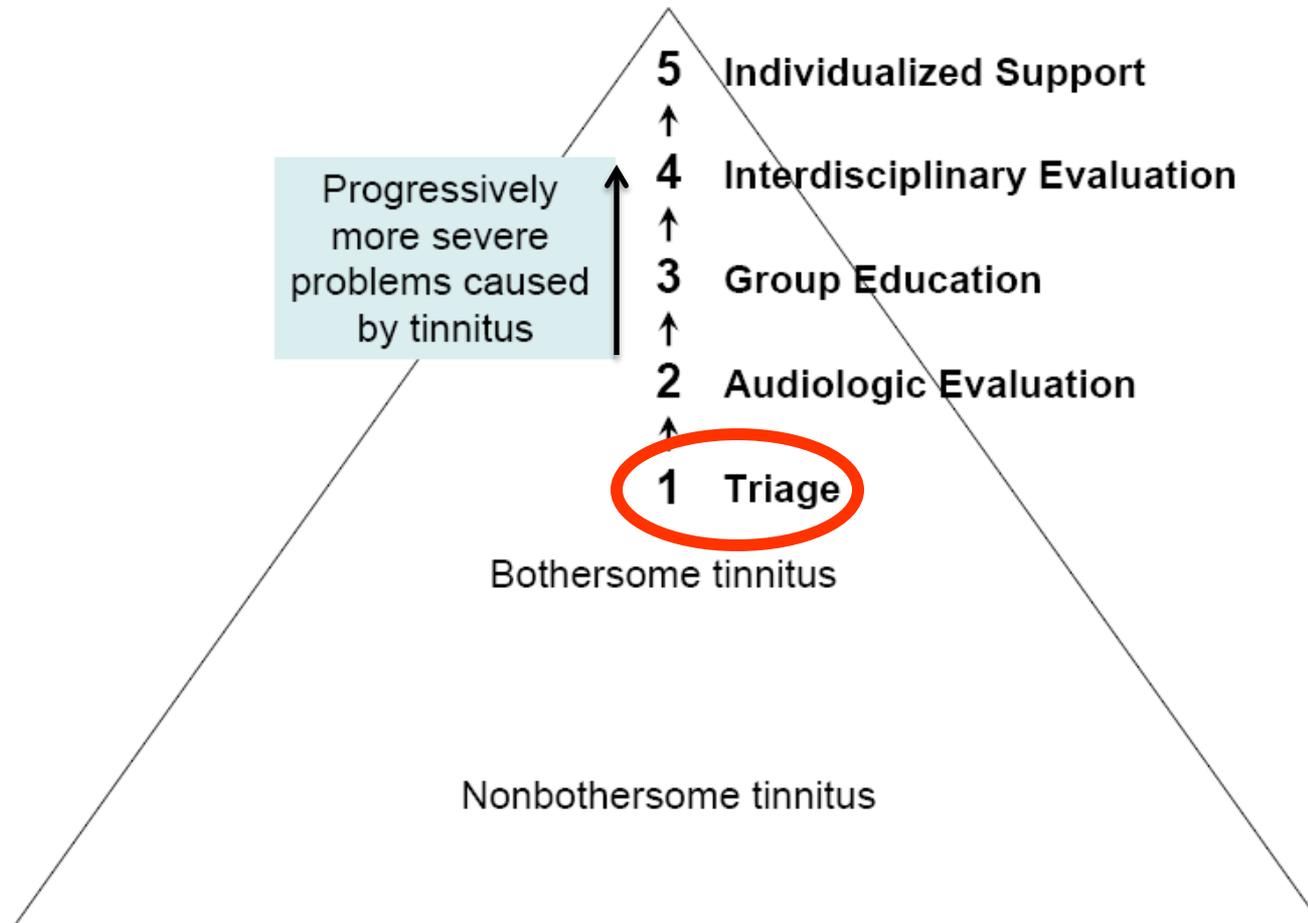


Five Hierarchical Levels of Clinical Services with PTM



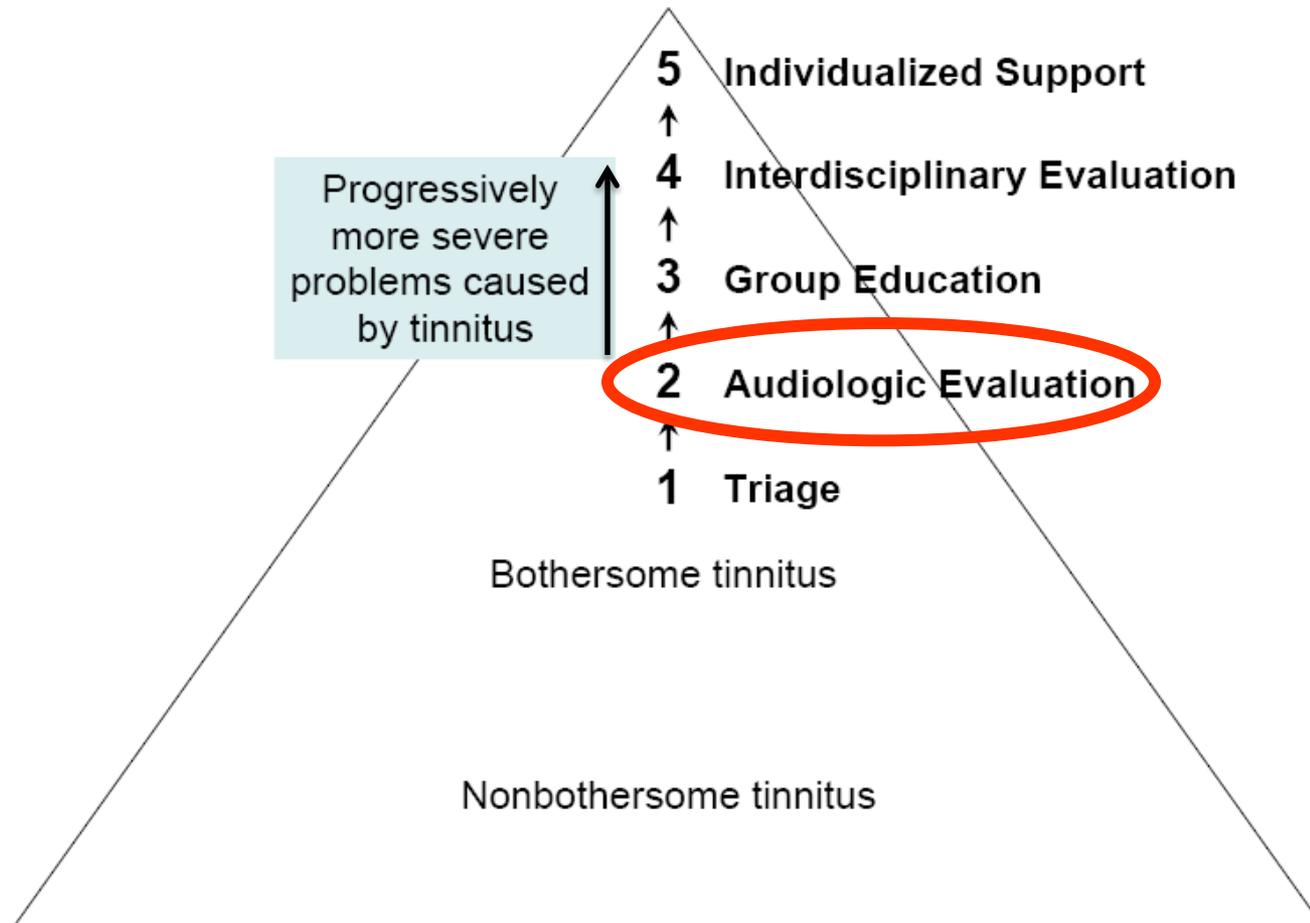
Level 1 Triage

- Referring patients at **initial point-of-contact**



Level 2 Audiologic Evaluation

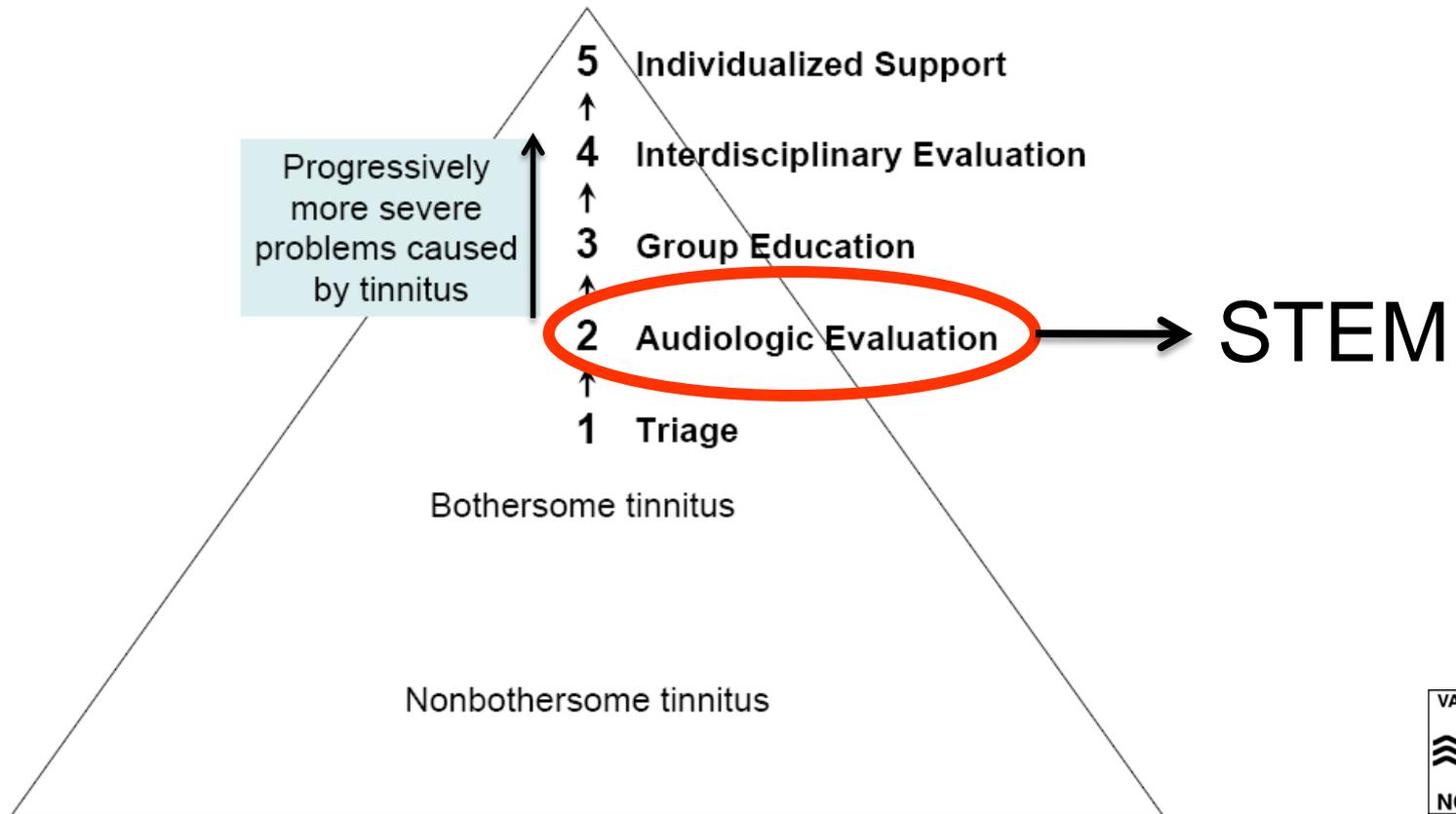
- Includes **brief assessment** of tinnitus impact



Level 2 also includes screening for
a sound tolerance (hyperacusis)
problem

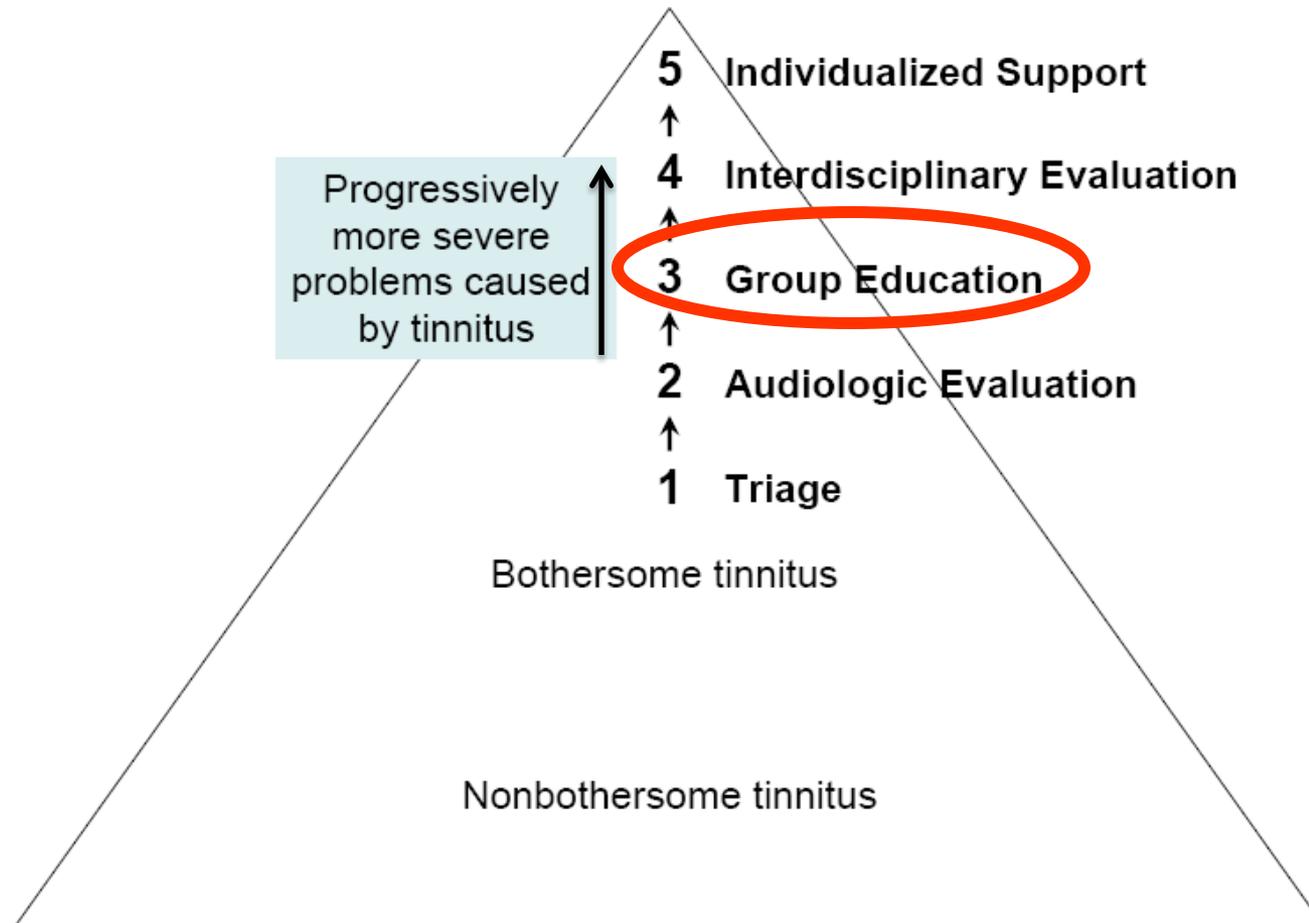
Sound Tolerance Evaluation and Management (STEM)

- Procedures to **evaluate and treat a severe sound tolerance problem**



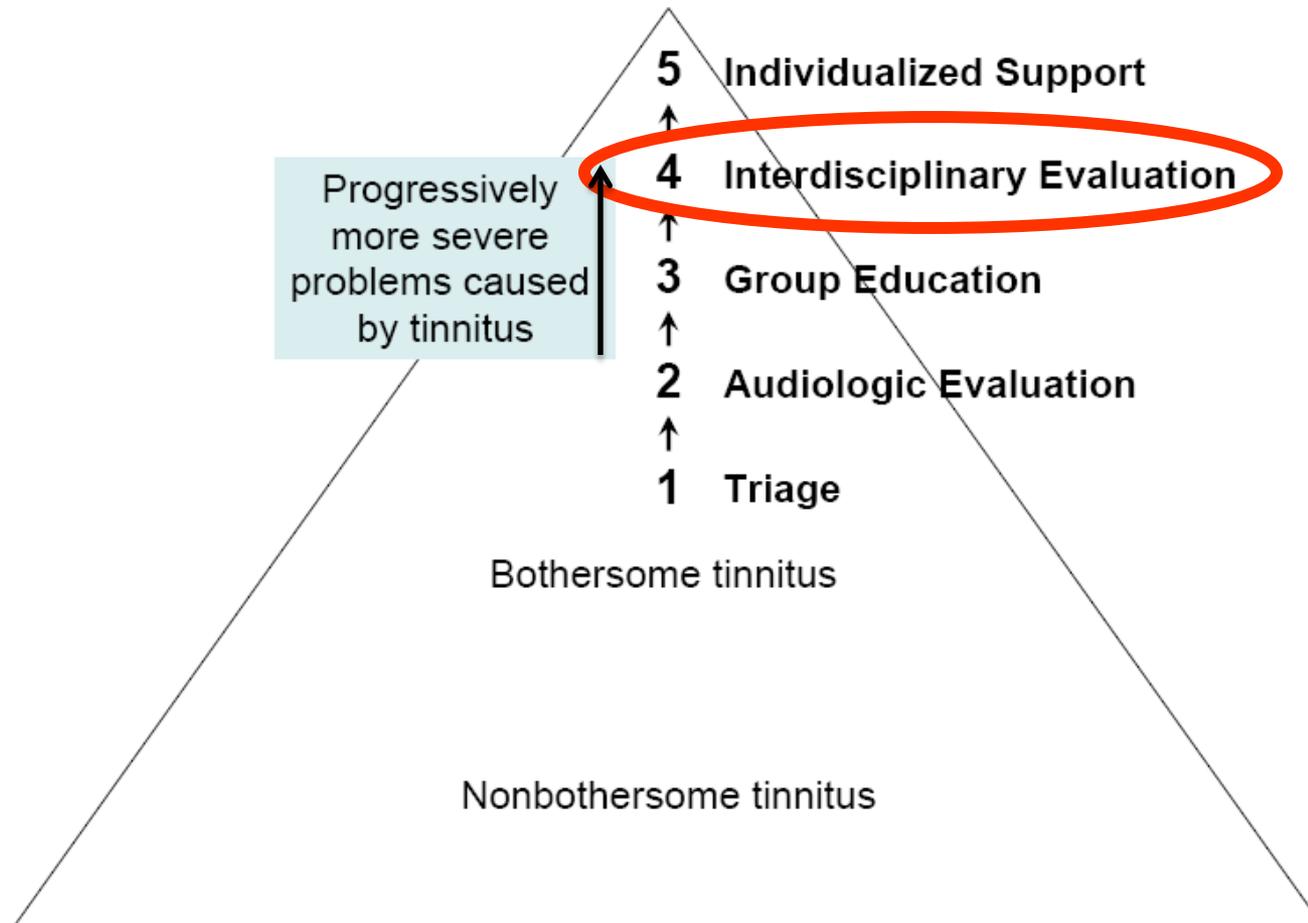
Level 3 Group Education

- **Workshops** for patients who require tinnitus-specific intervention



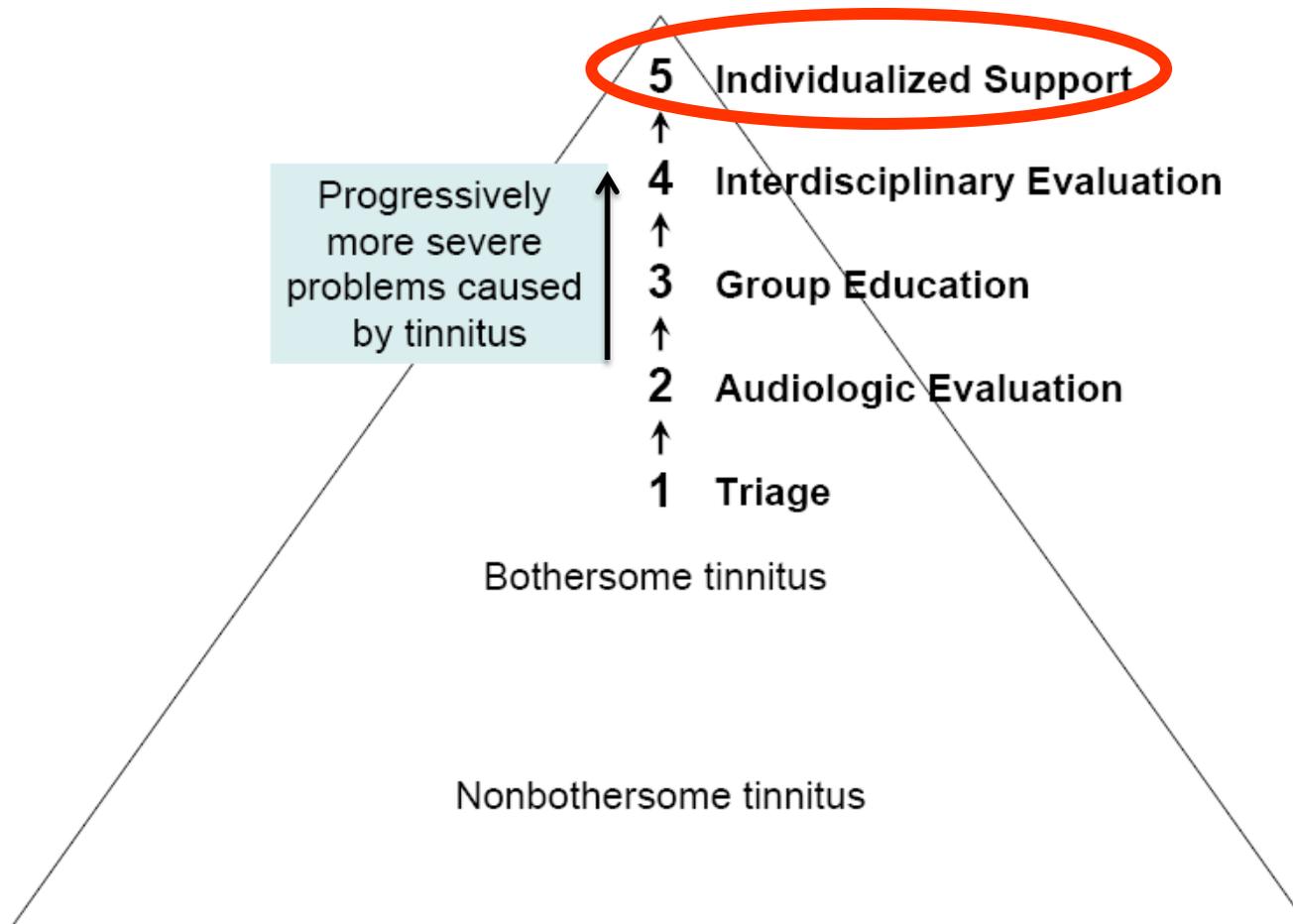
Level 4 Interdisciplinary Evaluation

- **In-depth tinnitus evaluation** by audiologist and psychologist



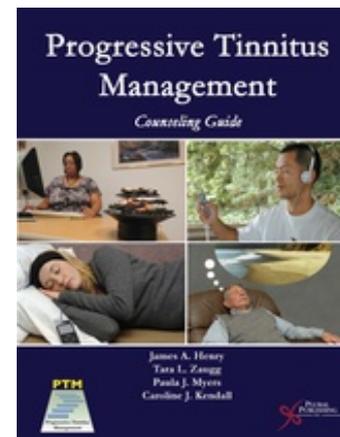
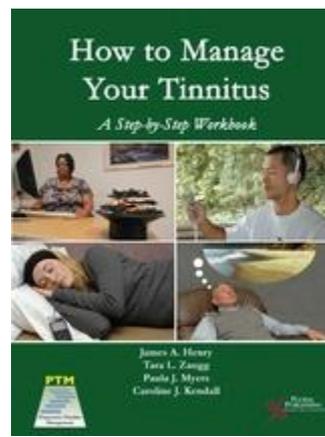
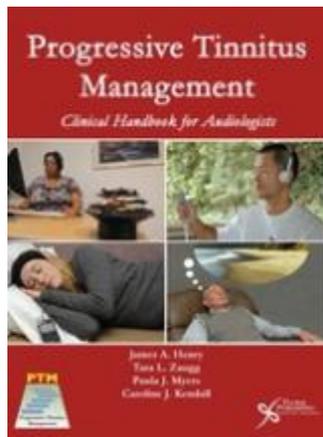
Level 5 Individualized Support

- **One-on-one support** from audiologist and/or psychologist



PTM Books

1. *Progressive Tinnitus Management: Clinical Guide for Audiologists*
2. *How to Manage Your Tinnitus: A Step-by-Step Workbook*
3. *Progressive Tinnitus Management: Counseling Guide*



Additional Materials

Supporting PTM

- Tinnitus brochure
- 17-minute patient video
- 2-DVD set (7 videos: 5 PTM Level 3 workshops + 2 relaxation training)
- CD (70-minute sound therapy tutorial)
- Online training course for VA clinicians (19 modules)

Multi-Site Evaluation of Progressive Tinnitus Management

- Memphis and West Haven (CT) VAMCs (**n=300**)
- PTM vs. 6-mo Wait-List Control (WLC)
- Interim *quantitative* analysis (**n=228**)
 - PTM group showed statistically significant improvement (3 outcome measures)
 - PTM improved significantly more than WLC
- Interim *qualitative* analysis
 - Most pts using some to all methods learned in workshops
 - Only 2 patients continued to complain about tinnitus

Telehealth Tinnitus Intervention for Patients with TBI

- Subjects recruited nationwide, primarily from VA & military hospitals
- Callers passing screening consented & scheduled with Study Psychologist to determine TBI status & screen for anxiety, depression, PTSD, & sleep disorder
- Qualified candidates randomized to either “TelePTM” or 6-mo WLC

Modifying PTM for Patients with TBIs

- Delivery via telephone into homes
- Frequent and brief appts to address:
 1. Memory impairments
 2. Limited concentration
 3. Other cognitive limitations (organization)
- Appointment log for participants
- Reminder calls for appointments
- “Homework” catered to individual
- Support system utilized

Telehealth Tinnitus Intervention for Patients with TBI (cont.)

- Seven telephone appointments
 - Study Psychologist or Study Audiologist
 - 1, 2, 3, 4, and 5 weeks, and 3 and 6 months
- To date, **133** participants enrolled
- Interim *quantitative* analyses (3 measures)
 - TelePTM group showed statistically significant improvement
 - TelePTM improved significantly more than WLC
- Interim *qualitative* analyses
 - Patients' comments overwhelmingly positive
 - Central database needs improvement

Current Status of PTM

- Shown in controlled studies to reduce symptoms and improve life satisfaction for tinnitus sufferers
- Endorsed by VA Central Office as effective intervention for tinnitus and recommended for use at VAMCs
 - **But, not routinely offered to Veterans suffering from tinnitus**

Next Step:

Pre-Implementation Study

- Prepare for implementation study
 - Assess barriers, facilitators, and readiness to conduct PTM across VA clinics
 - Proposal submitted “Implementation of Progressive Tinnitus Management: An Assessment of Readiness”

Long-Term Goals

- Evaluate implementation of PTM within VA, involving (1) In-Clinic Care, (2) Clinical Video Telehealth, and (3) Home Telehealth
- Implement PTM nationally in a way that will increase & ensure patient access & ultimately reduce the burden of tinnitus among Veterans and other patients

Case Example #1 - Sam

- 65 yo Veteran served in Army (combat/Vietnam)
- TBI #1: Exposed to blast (grenade) 40 yr ago
 - Lost consciousness for 5-20 min
 - Woke up on a truck – tinnitus began
 - Treated for lacerations to arms but no specific TBI treatment
 - Service connected for PTSD, tinnitus, HL, diabetes (exposed to agent orange)

Case Example #1 – Sam (cont.)

- TBI #2 - Bicycle accident 15 yr ago
 - Lost consciousness for ~10 min
 - Headaches and sensitive to bright light persist
 - Fractured several vertebrae – pain persists
 - Tinnitus worsened
- Enrolled at local VA
- Recent treatment for alcohol dependence
- Strong support system and no recent SI

Case Example #1 – Sam (cont.)

- Response to PTM “self-management” plan:
 - Sound: Fan at night (hypervigilant)
 - Stress: Deep breathing at social gatherings
 - Distraction: Books on CD in the evening
 - Cognitions:
 - Negative thought before “*This tinnitus will eventually drive me crazy*”
 - Positive thought after – “*I’ve dealt with so many hard times in life, I can deal with tinnitus even if it gets louder*”

Case Example #2 - Steve

- 33 yo Veteran served in Navy (combat—OEF/OIF)
- TBI: At least 5 times head was “banged around” in vehicles – lost count
- Lost consciousness at least once for unknown time (less than 5 min)
 - Many times dazed and confused after
 - Never assessed after head traumas
 - Noticed tinnitus but didn’t report it

Case Example #2 (cont.)

- Enrolled at local VA – rarely visits
- Mentioned tinnitus to PCP who referred him to Audiology
- Mild unilateral HL – not hearing aid candidate (ENT workup – no significant findings)
- Works 2 jobs and enrolled in college
- Tinnitus affects sleep, mood, “ability to hear teachers,” and concentration when reading

Case Example #2 (cont.)

- Self-management plan:
 - Education: Learned tinnitus vs. hearing problems
 - Sound: Waterfall on iPod and Jazz when reading
 - Stress: Imagery when trying to sleep
 - Distraction: Frequent breaks from studying (walks for 5 min around the block)
 - Cognitions: Negative thought before “*No one cares what I’m going through.*” Positive thought after “*People forget I have tinnitus.*”

What Veterans Say...

1. *“Noticing a difference started slowly, but the more I practiced the activities that were recommended to me, the more rapidly I experienced comfort and control. I have found that using the tools provided are the keys to success.”*

What Veterans Say...

2. *“Once I accepted that the program might work, it did. I had problems thinking that anything would help my tinnitus. Your program worked for me! Thanx much!”*

What Veterans Say...

- 3. “I have included listening to soft music and nature sounds to my daily activities to help me to relax more. And the breathing techniques help a lot as well. Thanks for helping me with these things.”*

What Veterans Say...

4. *“As soon as my tinnitus becomes an issue in my life now, I know how to react to it and continue on with a quality day.”*

Questions?



www.ncrar.research.va.gov

james.henry@va.gov

caroline.schmidt@va.gov