



# The Role of the Veterans Administration Maryland Health Care System in the Diagnosis and Treatment of Tinnitus

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## Abstract

An emerging trend in VA audiology is the diagnosis, treatment and management of otological concerns that occur secondary to acoustic blast trauma. With the increase of VA enrollment of Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) veterans that have incurred such injuries, one of the most prevalent conditions that VA audiologists have encountered are complaints related to subjective tinnitus.

In the past few years, the Veterans Administration Maryland Health Care System (VAMHCS) Audiology and Speech Pathology Program has experienced an increase in referrals of veterans from OEF/OIF with normal to mildly impaired hearing acuity and/or tinnitus. These referrals have been generated from other disciplines including otolaryngology and neuropsychology.

A common thread between these individuals is a complaint of subjective tinnitus. In the Baltimore Metropolitan Area several local medical facilities offer a range of services for tinnitus management. In the past, VAMHCS chose to refer patients to these facilities due the lack of resources and the desire not to duplicate services already available in the community. With the increased patient demands, advancements in technology, research, management and treatment options for tinnitus, it was decided to pursue a newer, different, and unique approach: The Neuromonics Tinnitus Treatment Protocol.

## Statistics

- ~50 million Americans experience tinnitus to some degree.
- ~12 million have it severe enough to warrant medical attention.
- ~2 million are debilitated by tinnitus.
- 27% of these individuals are over the age of 65.
- >1 million Americans are diagnosed annually.
- To date ~ 70,000 of returning OEF/OIF veterans have been granted service connection for tinnitus.

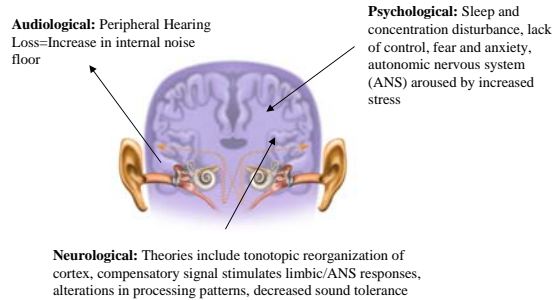
American Tinnitus Association (2008); Associated Press (2008)

## Age-related Progression of Tinnitus

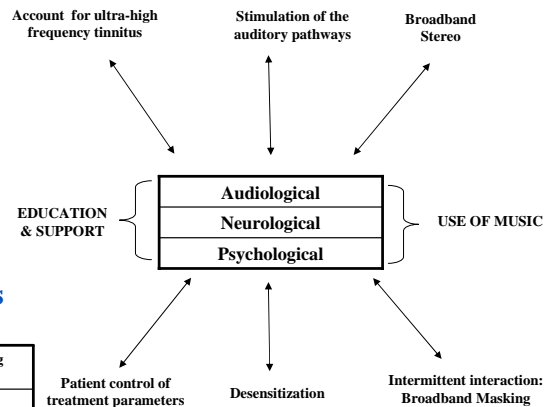
Age in Years	US NHIS Study	Beaver Dam WI Hearing Loss Study
20-29	1.4	----
30-39	2.0	----
40-49	3.7	----
50-59	5.7	7.3
60-69	7.9	10.1
70-79	9.1	9.7
≤80	8.3	5.5
Number in Study	99,435	3,737

Scheufning (1986), Vernon et al. (1992), Adams et al. (1996)

## Pathogenesis of Tinnitus



## How Can These Concerns Be Addressed?



## The Neuromonics Tinnitus Treatment Device

- FDA Approved Class II Medical Device
- Long-term reduction of tinnitus disturbance
- Designed to target the audiological, neurological, and psychological components of tinnitus
- Device customized to patient's hearing and tinnitus profile
- Higher frequency auditory stimulation

## How Does Neuromonics Work?

- Designed to interact, disrupt and desensitize the perception of tinnitus via a spectrally modified musical stimulus.
- Broadband masking noise is embedded within the music and delivered at specific intervals simultaneously.

### Purpose:

- To positively engage the limbic system
- To stimulate the auditory pathway
- To promote neural reorganization of the brain so that the tinnitus can be filtered out

## The VAMHCS Protocol for Tinnitus Evaluation

### What warrants a referral to a Neuromonics-Certified VAMHCS Tinnitus Specialist Work-up?

#### Tinnitus Screening:

1. Is the tinnitus in only one ear, or louder in one ear?
  2. Does the tinnitus keep you from sleeping?
  3. Does the tinnitus affect your ability to concentrate?
  4. Do you want to see someone to help with your tinnitus?
- \*Yes to any of these questions warrants a referral to a VAMHCS Neuromonics certified audiologist
5. A Score of 17-69 on the Tinnitus Reaction Questionnaire (TRQ) with no suicide ideation.

The TRQ is a 26 question measure used to assess tinnitus-related psychological distress administered pre- and post-treatment as well in intermediate intervals during the Neuromonics Tinnitus Protocol (Wilson et al. 1995).

### What warrants a referral to VAMHCS Department of Otolaryngology?

1. No previous ENT (medical) work-up
2. A previous medical work-up with a notable change or emergence of some medical contraindication (i.e. TMJ, unexplained conductive, asymmetrical and/or unilateral hearing loss with tinnitus of an unexplained etiology).

### What warrants a referral to VAMHCS Department of Neuropsychology?

1. The patient shows significant signs of psychological disturbance (i.e. depression, anxiety, panic attacks, etc.)
2. An expression of suicidal ideation (displayed by a score of 1 or greater on question 24 of TRQ).
3. A score of  $\geq 70$  on the TRQ.
4. No previous history of a condition that would warrant a neuropsychological work-up.

### VAMHCS Tinnitus and Hyperacusis Program Acceptance Criteria

- OEF/OIF Veterans
- Service Connections 10% or more for hearing impairment and/or tinnitus
- Meets Neuromonics Specialized Criteria

## Chronology of Appointments

### The VAMHCS Tinnitus and Hyperacusis Treatment Program

#### Audiological Assessment (90 min):

Detailed case history, comprehensive audiological examination .25-12.5 kHz, tinnitus outcome measures, assessments, counseling, determination of suitability, referrals generated if deemed necessary.

#### Preparation of Customized Neuromonics Processor:

Patient's tinnitus/hearing profile sent to the manufacturer for development of a customized tinnitus treatment processor

#### Initial fitting of device (90 min):

Instruction on use of the processor (treatment/maintenance), set device to minimal volume level, input client information, initiate data logging, counseling regarding lifestyle integration and treatment milestones

#### Preconditioning Stage (~ 8 wks):

2-3 hours of listening/day, interaction with the tinnitus stimulus with an imbedded broadband masking stimulus

#### Progressive Reviews (Three- 60 min clinic appointments):

Review of data log, discussion of progress vs. goals, and transition to Active Treatment Stage.

#### Active Treatment Stage (~16 weeks):

2-3 hours of listening/day, removal of broadband masking to enable intermittent interaction with tinnitus

#### Ongoing support and counseling (as needed)

Overall "face time" with patient: 4.5-7.5 per patient

## Advantages of the VAMHCS Tinnitus Treatment Program

1. All necessary audiological services provided in one centralized location
2. Coordination of interdisciplinary services within the VAMHCS as needed
3. Promotes the continuity of care
4. Cost-effective/reduction in overall cost of service in relation to private medical facilities
5. Collection of outcome measures to determine the viability of this program with the VA population
6. Promotes the expansion of knowledge to audiologists and students; which leads to continued professional development

## Conclusion

Today, audiologists can explore new innovative theory-based technologies for tinnitus, review their rationale, and use outcome measures to determine their efficacy in the VA population. The Neuromonics treatment protocol follows the neurophysiological model of Jasterboff and Hazell (1993), similarly to other tinnitus modalities that have been proven beneficial to many tinnitus sufferers. It is not our goal to overlook other methods of treatment, but to determine if this specific protocol will provide another appropriate treatment option for our veterans.