“Development of an Automated Test to Assess the Presence of Tinnitus”

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Objectives. Veterans can claim tinnitus (ringing in the ears) as a service-connected disability, which is occurring with alarming frequency. Although over 50,000 tinnitus-disability claims are approved annually, Veterans do not undergo any formal testing to document the actual existence of their tinnitus. We have developed computer-automated methodology (Tinnitus Evaluations System—TES) to conduct a battery of clinical tests to quantify various psychoacoustic aspects of tinnitus. We have used the TES to test individuals who do not have tinnitus to determine how they respond to these tests. Results have shown characteristic differences between people who do have tinnitus versus those who do not. These preliminary data suggest that a more formalized test can be developed to test for the existence of tinnitus. The primary objective of this project is to develop a fully documented test for identifying the presence/absence of tinnitus. The test is referred to as the Tinnitus Perception Test (TPT).

Research Plan. A preliminary project will be conducted to assess two procedures that are expected to improve the effectiveness of the TPT: (1) Bekesy audiometry (automated audiometry that has been used to detect hearing-loss malingering); and (2) the forced-choice double staircase (FCDS) procedure (the only test that has been shown to obtain reliable measures of tinnitus pitch). During the study period, the TES will be beta-tested at four VA Audiology clinics so that system modifications can be made to optimize clinical testing performance.

Methods. Project 1 will require software and hardware engineering to incorporate Bekesy and FCDS capabilities into the TES. Forty subjects with tinnitus and 40 without tinnitus will each be tested with these procedures over two sessions. Project 2 will involve development of the TPT and evaluation of the prediction model with 320 subjects (160 with tinnitus and 160 without). For Project 3 (all sites), four VA Audiology clinics will beta-test the system with 300 Veteran patients. Based on feedback from the audiologists, system refinements will be made and incorporated at each site on an ongoing basis.

Findings to Date. Software and hardware engineering was completed to perform the Bekesy and FCDS tests with the TES. Subject testing has begun. No data are available to report at this time.

Relevance to VA Mission. Completion of this project will result in testing methodology that will enable a more accurate diagnosis of tinnitus in Veterans. In addition, the TES provides standardized methodogy to evaluate psychoacoustic parameters of tinnitus, which are important for clinical description of the symptoms, and potentially can assist in making treatment recommendations.