



## INTRODUCTION

# VA Hearing, Tinnitus, and Balance Research that Leads to Better Patient Outcomes and Care

This special issue consists of eight articles from leading auditory and vestibular researchers based in U.S. Department of Veterans Affairs (VA) medical centers across the country. The VA is one of the nation's leaders in health research, conducting thousands of research studies in a given year.<sup>1</sup> VA researchers and the VA Office of Research & Development support the health-related priorities of Veterans and the VA as set out in the VA Secretary's strategic plan.<sup>2</sup> In this plan, Strategic Objective 2.4: (Innovative Care) dictates, "VA will improve understanding of Veterans specific illnesses and injuries to develop and adopt innovative new treatments that prevent future illness and enhance Veteran Outcomes." Tinnitus and hearing loss deemed to be likely caused, at least in part, by otopathologic exposures experienced during military training and service, are the number 1 and number 3 most prevalent service-connected disabilities of all compensated injuries, at 2,500,850 and 1,377,713 recipients, respectively.<sup>3</sup> To support the healthcare needs of Veterans, VA promotes

audiological services as a direct schedule service. An important component of research conducted at the VA has been a focus on rehabilitative aspects of care that can optimize function and quality of life. The purpose of this Special Issue is to highlight VA's continued commitment to research on hearing, tinnitus, and balance problems that afflict the Veteran population in large numbers. The articles are organized into two broad topics that reflect current trends in VA healthcare: (1) changing needs of the Veteran patient population base and (2) innovations in diagnostics and rehabilitation.

To increase understanding of the changing auditory healthcare needs of Veterans, the special issue opens with an overview of tinnitus research conducted at the Rehabilitation Research and Development (RR&D) Service-funded, National Center for Rehabilitative Auditory Research (NCRAR)<sup>4</sup> since conception of NCRAR in 1997. In this review, James Henry, Robert Folmer, Tara Zaugg, Sarah Theodoroff, Candice Quinn, Kelly Reavis, Emily Thielman, and Kathleen Carlson outline rehabilitative tinnitus

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VA Rehabilitation Research for Hearing and Balance Disorders; Guest Editors, Dawn Konrad-Martin, Ph.D. and Michelle E. Hungerford, Au.D.

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research findings spanning the past 25 years. This article describes the research conducted in tinnitus assessment and intervention, epidemiology and survey studies, clinical trials, pilot studies, and narrative publications that highlight NCRAR's commitment to the development of tinnitus clinical management. This article ends with a description of an ongoing multisite study in Veterans who served in the most recent conflicts (Operation Enduring Freedom, OEF; Operation Iraqi Freedom, OIF; and Operation New Dawn, OND). This population is unique in that it is composed of an all-volunteer force, with many of those serving or conducting multiple deployments.<sup>5</sup>

In "Rehabilitation Service Needs and Preferences among Veterans with Tinnitus: A Qualitative Study," authors Khaya Clark, Tara Zaugg, Susan DeFrancesco, Christine Kaelin, James Henry, and Kathleen Carlson explore tinnitus rehabilitation by assessing barriers for Veterans seeking this service within the VA. These insights have implications for creating more effective and valued tinnitus healthcare service delivery models by better understanding Veteran preferences. Next, Laura Coco, Elizabeth Hooker, Tess Gilbert, Graham Harker, Khaya Clark, Kelly Reavis, James Henry, Tara Zaugg, and Kathleen Carlson provide insights into tinnitus assessment with measures of tinnitus impact on work function. Their article "The Impact of Tinnitus Severity on Work Functioning among U.S. Military Veterans with Tinnitus" outlines a national survey of Veterans that resulted in novel associations between tinnitus severity and tinnitus-related impairment in work functioning, allowing healthcare providers to better understand struggles faced by Veterans with tinnitus in the work environment.

The second theme is "innovations in diagnostics and rehabilitation." The lead-off article for this theme investigates methods currently used by VA audiologists to assess their patients' speech-in-noise understanding. In their article, "Speech-in-noise testing: an introduction for audiologists," Curtis Billings, Tessa Olsen, Lauren Charney, Brandon Madsen, and Corrie Holmes provide a resource for audiologists to gain a deeper understanding of the utility of these testing measures and guide

them in their clinical decision-making. In the second article, "Clinical gaps-in-noise measures in blast-exposed Veterans: associations with electrophysiological and behavioral responses" written by Melissa Papesh and Tess Koerner, the authors examine mechanisms of auditory processing impairment following blast exposure and brain injury. They summarize their findings of underlying sensory and/or cognitive performance gained by performing both behavioral and neural measures. This is followed by an article outlining innovative technology being used for structural and functional evaluations of the ear. In this article, "Imaging the ear anatomy and function using optical coherence tomography vibrometry," authors Wei Dong and Sebastiaan Meenderink explain the exciting possibilities of using optical coherence tomography vibrometry for noninvasive audiologic and otologic evaluation of middle and inner ear structures. Next, the effect of aging on multisensory integration is explored by Alexander Malone, Michelle Hungerford, Spencer Smith, Nai-Yuan N. Chang, Rosalie Uchanski, Yong-Hee Oh, Richard Lewis, and Timothy Hullar in "Age-related changes in temporal binding involving auditory and vestibular inputs." By utilizing testing measures that quantify the ability to perceive time-differences in sensory signals, these authors highlight the importance of multisensory integration in relation to overall balance function and outline changes observed during the aging process. The last article for this theme is a pilot study from Candice Quinn, Jay Vachhani, Emily Thielman, Devon Kulinski, Annika Sonstroem, James Henry, and Sherri Smith, "A pilot study to evaluate a residual inhibition technique in hearing aids for suppression of tinnitus," which introduces a new avenue for tinnitus rehabilitation by exploring the effects of individualized acoustic stimuli on residual inhibition. This research is a foundational step in the development of an evidenced-based approach to the use of residual inhibition as sound therapy.

We are excited to introduce this special issue to the *Seminars in Hearing* readership. We hope this information will lead to improved

assessment and treatment of hearing, tinnitus, and balance disorders in Veterans and others, as trailblazing research in these areas continues to develop, with a focus on quality of life and person-centered care. This issue is dedicated to U.S. military Veterans, their families, and the VA employees who conduct research to mitigate hearing, tinnitus, and balance problems for Veterans and VA.

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#### CONFLICT OF INTEREST

None declared.

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