NCRAR Newsletter

VOLUME VIII, ISSUE 2 APRIL 2008

SPECIAL POINTS OF INTEREST:

- Article by Marilyn Dille Ph.D.: Testing using objective measures for ototoxic changes
- Perspectives on the 2008 National Hearing Conservation Association (NHCA) Conference by Susan Griest M.P.H.

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www.ncrar.research.va.gov/

Message from the Director:

Stephen Fausti Ph.D.

On April 2, 2008 the annual meeting of the Association of VA Audiologists (AVAA) was held in Charlotte, NC where nearly one-hundred and seventy VA audiologists representing VA medical centers across the country met to discuss the latest advances and information in audiology. The NCRAR was represented at this meeting and reinforced our strong collaborations with the Department of Defense (DoD) in order to improve auditory health and care for veterans.

The focus of this year's conference was auditory and vestibular dysfunction associated with traumatic brain injury (TBI). Approximately 30% of casualties from the current military conflicts have mild, moderate, or severe TBI making the establishment of effective diagnostic, treatment, and rehabilitation techniques a priority. As the peripheral and central auditory systems are particularly vulnerable to blast or other mechanisms of brain injury, VA researchers and audiologists play a critical role in the care of these injuries. National Center for Rehabilitative Auditory Research (NCRAR) investigators Drs. Erick Gallun, Marjorie Leek, and I addressed the auditory issues associated with TBI in the presentation, "*Auditory Processing Dysfunction Related to Traumatic Brain Injury in the Veteran Population*". This presentation given by Dr. Gallun demonstrated the vulnerability of the structures of the auditory pathway to damage and emphasized that TBI can lead to impairments of both the peripheral (the cochlea) and central auditory systems (the auditory pathway from the cochlea to the cortex). While peripheral damage affects hearing sensitivity as (Continued on p3

Testing using objective measures for ototoxic hearing changes by Marilyn Dille Ph.D.

A few months ago, an article appeared in this newsletter reporting on the past 15 years of ototoxicity research at the NCRAR. We advocated that patients on medications that can potentially cause hearing loss (ototoxic medications) should have frequent hearing tests during the time they are taking these medications. Ototoxic medications include drugs such as cisplatin, carboplatin and oxaliplatin used for chemotherapy, and aminoglycoside antibiotics such as gentamicin, tobramycin and amikacin. Damage due to ototoxic medications begins at very high frequencies – between 9 kHz and 20 kHz; known as ultra-high frequencies. These frequencies are above those usually tested by audiologists in the clinic, and are not critical for hearing and understanding speech. However, as ototoxic damage continues, the damage spreads to lower frequencies, and eventually to frequencies that are critical for speech understanding — those between 500 Hz and 4 kHz.

In the past, patients taking ototoxic medications generally did not have repeated hearing tests to monitor for changes in hearing. As a result, the patient was often the first to notice a change in hearing when they had difficulty understanding family and friends, by which time hearing loss had reached frequencies important for speech

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Testing using objective measures for ototoxic hearing changes (continued from Page 1)

understanding.

Early studies at the NCRAR, led by Dr. Stephen Fausti and his team of investigators, focused on finding the frequencies at which ototoxic damage could first be seen and measured. They found that damage first occurs at the highest frequencies a person can hear – the ultra-high frequencies. The NCRAR therefore recommends that hearing testing to monitor for damage from ototoxic medications be focused on these ultra-high frequencies. By doing so, the audiologist will be able to detect changes in hearing at the earliest possible time; they can then inform the physician that is prescribing the ototoxic medication of the possibility of damaging accumulations of the drug in the inner ear. He or she can then adjust the medication protocol and thus prevent damage to hearing at frequencies that *are* important for hearing speech. Since some of these ototoxic medications are prescribed during treatment for cancer, it may not always be possible to make medication protocol adjustments; but by providing this information early, the possibility can at least be considered. In cases where adjustments can be made, the physician might be able to substitute one medication for another that is less toxic to the ear, change the medication schedule to lengthen the time between treatments, adjust the dosage given, or even stop the medication entirely.

In addition to the work described above, the NCRAR has a number of other ongoing ototoxicty studies. One of which, to be described here, is being lead by Drs. Stephen Fausti and Marilyn Dille. Its purpose is to find out whether there are objective hearing tests that can be used to monitor for ototoxic damage. An objective test is one that, unlike a usual hearing test, does not require the patient to actively respond during testing. This is important when dealing with patients that may be too ill to take a hearing test reliably, or who want to spend their non-treatment time with their family. In addition to not needing the patient to respond, objective tests can be done at the bedside or during treatment. Measures that are being looked at in our study that could substitute for a traditional hearing test include measuring the auditory brainstem responses (ABR) and measuring distortion product otoacoustic emissions (DPOAE). These tests are commonly used for screening the hearing of newborn infants. A potential downside to these objective tests is that they have inherent variability between test sessions because ABRs vary depending on how relaxed the patient is and the DPOAE test is highly dependent on how physically quiet the patient can be. These constraints can be problematic when dealing with patients who are sick and uncomfortable. Successful ototoxicity monitoring requires detecting changes in hearing test results from consecutive sessions. Therefore, the one purpose of this study is to see whether either of these objective measures give results that are consistent enough to show ototoxic changes over time. For the study, each participant has a routine hearing test and is tested using the ABR and DPOAE tests many times: (a) before treatment begins, (b) at the time of each treatment, (c) at the cessation of treatment, and (d) one month after cessation of treatment. Another purpose of the study is to determine which objective measure relates best to results of the routine hearing test. This project will take another two years to complete, although early findings may be available in the next year. We are fortunate at the Portland VA Medical Center to have veterans and their families willing to contribute their time to our research.

Marilyn Dille Ph.D. is an Investigator at the NCRAR who currently conducts ototoxicity research

NCRAR Announcements

NCRAR COMMUNITY SEMINAR SERIES PRESENTS

Hearing Loss Prevention: It is NEVER too late

By Gabrielle Saunders Ph.D. of the NCRAR

Thursday May 15th 2008 from 7.00 to 8.30 pm

in the Portland VAMC auditorium

This presentation is aimed at veterans and other members of the community.

DVD recording will be available. If you would like a copy contact Gaby Saunders at Gabrielle.saunders@va.gov

DVD sets available

The NCRAR has sets of DVDs available from the 2005 and 2007 conferences that can be borrowed for viewing.

2005 conference: The Aging Auditory System: Considerations for Rehabilitation

2007 conference: Hearing Therapies for the Future

If interested please contact Gaby Saunders at Gabrielle.saunders@va.gov

NCRAR Research funded between 1/08 & 4/08)

Michelle Molis, Ph.D. received funding from VA RR&D for a CDA-2 award titled 'Improving Vowel Perception by Hearing-Impaired Listeners.'

Diana Pope, Ph.D. PI and Erick Gallun, Ph.D. Co-I received funding from HSR&D for a study titled 'Speech intelligibility and cognition: Are patients impaired by noise?'

James Henry, Ph.D. PI, and Mitch Turbin, Ph.D., Joe Istvan, Ph.D Co-Is received NIH (R03) funding for two years for a grant titled 'Ecological Momentary Assessment in Hearing.'

Theresa Chisolm, Ph.D., Richard Wilson, Ph.D. PIs, and Gabrielle Saunders, Ph.D. Co-I received a fundable score from VA RR&D for a study titled 'Supplementing Hearing Aids with Computerized Auditory' Training'.

Stephen Fausti, Ph.D. & Debra Wilmington, Ph.D. PIs received a fundable score from RR&D for a 3-year study titled 'A Portable Audiometric Monitoring Device (the OtoID).'

Director's Message (continued from P 1)

determined by an audiogram, central auditory processing damage may also impair the ability to process the sounds that are heard. Dr. Gallun noted that anecdotal evidence from VA audiologists suggests that a significant number of those who have been exposed to blasts during combat have normal hearing sensitivity, yet still report difficulties hearing speech, especially in background noise. This is the type of deficit you would expect to see with a central auditory processing disorder (CAPD). Damage to the central auditory pathway can result in reduced speech intelligibility, impaired auditory-spatial perception, and decreased accuracy on tasks performed by the ear-brain system.

The currently mandated TBI screening for returning veterans is only a questionnaire without the use of electrophysiological or behavioral tests to accurately assess auditory dysfunction. Dr. Gallun stressed the need for research to establish the relationship between TBI and the incidence of central auditory processing disorders in order to improve diagnosis and treatment. There is a pressing need for research to guide clinical practice in the diagnosis and rehabilitation of auditory processing dysfunction in blast exposed veterans. The NCRAR is a leader in this effort by our continued research collaboration with the DoD and the dissemination of information in meetings such as the AVAA.

Perspectives on the 33rd Annual Conference of the National Hearing Conservation Association (NHCA) by Susan Griest

A record breaking 310 national and international professionals dedicated to hearing conservation attended the 33rd Annual Conference of the NHCA, held Feb. 21-23 in Portland, Oregon. The theme, "Oregon or Bust: the Trail to Better Hearing," included diverse topics ranging from basic to applied research, addressing issues related to both occupational and non-occupational exposures. Workshops, platform sessions, posters and concurrent sessions addressed contemporary issues in hearing conservation.

Susan Griest (NCRAR/OHSU) was this year's NHCA program chair. Several members of the NCRAR attended this conference for the first time. The NCRAR, an affiliate NHCA member, also exhibited at the convention along with 23 other affiliates and sponsors.

Seven workshops were offered on Thursday, including "Hearing Loss Prevention: the Basics" and "Noise Induced Hearing Loss in Kids and Young Adults". Jim Henry and Tara Zaugg of the NCRAR, along with Mary Meikle of Oregon Hearing Research Center presented two, well-attended, half-day workshops titled, "Tinnitus: Prevent it If You Can, Manage It If You Can't".

On

Friday, keynote speaker, Sharon Kujawa from the Massachusetts Eye & Ear Infirmary and Havard Medical School, caused us to rethink our notions about the long-term consequences of noise exposure and where the damage to the cochlea actually occurs.

The invited luncheon speaker, Ioan Allen, Senior Vice President of Dolby Laboratories shed light on the movie industry's efforts to "tone down" those "just too loud" movie trailers and commercials. Using an innovative method for measuring the loudness of trailers and commercials, the film industry has set standards and regulations for just how loud these materials can be.

On Saturday, we learned about revised standards for hearing protector regulations (NRRs), new and exciting all-in-one hearing protection and hearing enhancement devices for our military personnel, and whether fit-test methods for hearing protectors are effective and beneficial to the hearing conservation program.

Gaby Saunders (NCRAR) gave an excellent presentation on the VA's interest in preventing hearing loss among former and current military service members. She gave an overview of hearing loss in veterans and the need for hearing loss prevention programs, including a demonstration of a prototype multimedia hearing loss prevention program specifically aimed at veterans. Collaborative hearing loss prevention efforts between the Veterans Administration and the Department of Defense were also described.

Jane Gordon (NCRAR) was one of twenty poster presenters. Her poster, titled "Evaluation of Audiometric Criteria for Ototoxicity Detection", described criteria that resulted in the best overall test performance for identifying ototoxic hearing loss.

The 2009 NHCA conference will be held Feb. 12-14 in Atlanta, Georgia. More information is available at www.hearingconservation.org.

Upcoming NCRAR Events

May 15 2008: NCRAR Community lecture 7.00-8.30pm by Gabrielle Saunders Ph.D. Investigator, NCRAR, Portland VAMC, Portland OR. Hearing Loss Prevention: It is NEVER too late. PVAMC Auditorium

May 21 2008: NCRAR Seminar by Kris English Ph.D. Scientist, Martinez VA, CA. Audiology and Counseling or 'Listening with the Third Ear.' **

June 20 2008: NCRAR Seminar by Sam Trychin Ph.D. Psychologist, Educator. Living With Hearing Loss: Psychosocial issues that need to be addressed.

August 25 2008: NCRAR Seminar by Caroline Kendall Ph.D. Clinical Psychology Research Fellow, Yale University Title: TBA

September 11 and 12 2008: Annual conference of the Academy of Rehabilitative Audiology to be held in Portland, OR. For more details see www.audrehab.org/events.htm

October 10 2008: NCRAR Seminar by Gus Mueller Ph.D. Professor, Vanderbilt University and Senior Audiology Consultant, Siemens Hearing Instruments . Open Canal Fittings: Some important clinical considerations.

Most NCRAR seminars are broadcast live via v-tel to other VA facilities. Contact Gabrielle.saunders@va.gov for information.

Seminars take place from 12 to 1 pm in PVAMC Building 101 Room 109, unless otherwise noted.

*****NOTE: Time change***

Save the Date

The 4th biennial NCRAR Conference will take place in Portland, OR on ***October 8-10 2009***

Conference speakers will address auditory rehabilitation from multidisciplinary perspectives, including:

- Cognition
- Vision
- Computer science
- Engineering
- Neuroscience

NCRAR News

Welcome to:

- **Carol Wolfe** is back to work as an engineer for the NCRAR.

Congratulations to:

- **Wendy Helt** who received her pin for 15 years of VA service.
- **Kim Owens** on completing her M.P.H.

Thank you to:

- **Drs. Faye Horak, Douglas Keefe**, and **Brenda Lonsbury-Martin**, for their presentations in the NCRAR Seminar Series.
- **Sarah Melamed** of the NCRAR for her excellent Community Seminar.

Other News

- **Serena Dann, Gaby Saunders** & **Bob Folmer** represented the NCRAR at the Exhibit Hall of the National Hearing Conservation Association meeting in Portland.
- **Dan McDermott, Stephen Fausti, Jim Henry** and **Samantha Lewis** represented the NCRAR at the American Academy of Audiology Convention in Charlotte NC.
- **Bob Folmer, Marc Caldwell** and **Serena Dann** participated at the VA Employee Safety Fair , at the Portland VAMC in March. They demonstrated the video otoscope, handed out hearing protection to staff, and handed out brochures about hearing loss.
- **Mitch Turbin** hosted a meeting with PVAMC HR and EEO programs to develop better procedures for hiring people with targeted disabilities, and veterans with disabilities.

NCRAR Presentations & Publications 1/08 - 3/08

PUBLICATIONS:

Lewis MS, Wilmington D, Hutter M, Lilly D, Bourdette D, Fausti S. (2008). Auditory function in individuals with multiple sclerosis. MS Focus, 12-15.

SUBMITTED MANUSCRIPTS:

Fausti SA, Wilmington DJ, Gallun FJ, Meyers PJ, Henry JA. Auditory dysfunction associated with traumatic brain injury. Submitted for Special VA State of the Art conference Issue of Journal of Rehabilitation Research and Development.

Gallun FJ, Durlach NI, Colburn HS, Shinn-Cunningham B, Best V, Mason CR, Kidd G Jr. The extent to which a position-based explanation accounts for binaural release from informational masking. Resubmitted to Journal of the Acoustical Society of America.

Gallun FJ, Souza P. Exploring the role of the modulation spectrum in phoneme recognition. Resubmitted to Ear and Hearing.

Henry JA, Istvan J. An independent review of Neuromonics Tinnitus Treatment. Submitted to Ear and Hearing.

Henry JA, Zaugg TL, Myers P, Schechter MA. Using sound to manage tinnitus. Submitted to Trends in Amplification.

Henry JA, Zaugg TL, Myers P, Schechter MA. Audiologic evaluation of the tinnitus patient. Submitted to Trends in Amplification.

Henry JA, Zaugg TL, Myers P, Schechter MA (2008). Progressive Audiologic Tinnitus Management. Invited article for The ASHA Leader. In Press

Myers PJ, Gallun FJ, Wilmington DJ, Henry JA. Hearing impairment and traumatic brain injury among soldiers: Special considerations for the audiologist. Submitted for special issue of Seminars In Hearing.

Myers PJ, Wilmington DJ, Gallun FJ, Henry JA. Hearing Impairment and Traumatic Brain Injury Among Soldiers: Special Considerations for the Audiologist. Submitted to the Hearing Journal.

Reavis KM, Phillips DS, Fausti SA, Gordon JS, Helt WJ, Wilmington D, Bratt GW, Konrad-Martin D. Factors affecting sensitivity of distortion-product otoacoustic emissions to ototoxic hearing loss. Submitted to Ear and Hearing.

Saunders GH. A Multimedia Hearing Loss Prevention Program for older adults: Theoretical Basis and Development. Submitted to Journal of the Academy of Rehabilitative Audiology

Saunders GH. Prevention is the best form of rehabilitation? Invited 'Point of View' in Advance for Audiologists . In Press.

PRESENTATIONS:

Diedesch AC, Molis MR, Leek MR. Identification of harmonic complexes based on component amplitude and phase. Student poster presented at the American Auditory Society Annual meeting, March 2008, Scottsdale, AZ.

Gallun FJ, Melamed S, Molis M, Leek MR, Summers WV, Makashay M. Towards the clinical applicability of temporal masking procedures. Presented at the Midwinter Meeting of the Association for Research in Otolaryngology in Phoenix, AZ February 2008.

Gallun F, Souza, P. A model of consonant confusions based on envelope modulation similarity. Presentation at the American Auditory Society Annual meeting, March 2008, Scottsdale, AZ.

Gordon JS, Konrad-Martin D, Reavis KM, Fausti SA. Evaluation of audiometric criteria for ototoxicity detection. Poster at the National Hearing Conservation Association Annual Conference, Portland OR February 21 – 23.

Henry JA. Progressive Audiologic Tinnitus Management. Invited presentation at Illinois Academy of Audiology 15th Annual Convention, Chicago, IL, January 24, 2008.

Henry JA, Zaugg TL. Progressive Audiologic Tinnitus Management: Short Course. Military Association of Audiologists Annual Convention, Portland, OR, February 20, 2008.

Henry JA, Zaugg TL. Tinnitus: Prevent it if you Can, Manage it if you Can't. National Hearing Conservation Association Annual Convention, Portland, OR, February 21, 2008. (invited presentation).

Hoover E, Gallun F, Souza P. Evaluating Strobed Temporal Integration as a model of temporal processing using spectrally reduced speech. Student poster presented at the American Auditory Society Annual meeting, March 2008, Scottsdale, AZ.

Howell J, Saunders GH. Directional Microphones: Are they functioning properly when issued? Student poster presented at the American Auditory Society Annual meeting, March 2008, Scottsdale, AZ.

Leek MR, Melamed S, Molis MR. Perception of filtered iterated rippled noise (IRN) by normal-hearing and hearing-impaired listeners. Presented at the Midwinter Meeting of the Association for Research in Otolaryngology in Phoenix, AZ February 2008.

Lewis MS, Hutter M, McGuiness A. Spousal expectations of and satisfaction with hearing aids. Presented at AudiologyNOW! 2008, Charlotte, NC.

Lewis MS, Hutter M, Musiek F, Lilly D, Bourdette D, Fausti S. Temporal resolution and speech perception in

Meet Tara Zaugg, NCRAR Research Audiologist

I was born in Iowa and lived there for the first 25 years of my life. As a native Iowan I've been within 50 feet of a tornado, I've been remunerated for "walking beans", and I understand the customs surrounding cream cheese mints—a Midwest sweet treat reserved for certain special occasions. During my annual trips to Iowa I continue to enjoy the fireflies and thunderstorms from my Midwest childhood, but I'm always ready to return to Oregon.

I first came to Portland nearly eight years ago to do an internship here at the NCRAR. During my internship I was welcomed by a warm and creative group of people who took an interest in providing me with a meaningful research experience. These experiences, along with Portland's mild weather and abundant opportunities for outdoor activities, led me to quickly feel at home in the Pacific Northwest. Several months after the internship, I packed my car with all it could hold and drove 2000 miles to my new home in Oregon.

Since moving to Portland I've been working as a research audiologist here at the NCRAR. I consider myself to be very fortunate to have a meaningful career that I enjoy. Someone once jokingly asked me "When you were a little girl did you dream of becoming an audiologist someday?" I, of course, did not. As a child, I rather enjoyed imagining life as an astronaut - but the question I was asked wasn't about my childhood musings but about how I became interested in the niche of healthcare known as audiology. The answer is simple: audiology is a very good fit for my personality. Audiology isn't particularly rich fodder for childhood daydreams, but it is a combination of science, healthcare, and technology, all strong interests of mine.

Outside of work my primary interest is in outdoor activities, and traveling. My fiancé Matt shares my love of outdoor adventure. We have two very exciting adventures planned for this year. At the end of April we will climb Macchu Pichu in Peru, and in September we will marry in Central Park in New York City in the company of a small much-loved group of friends and family.

When I'm not traveling I share my home with a black lab and two orange tabby cats. My lab, Rudy, is an enthusiastic and faithful hiking partner, tennis ball retriever, and people-food monitor. The cats, Sam and Sid, aren't particularly enthusiastic about anything, although they do show appreciation for a nice back rub now and then. Matt shares my love of dogs, and has an energetic chocolate lab named Leia. Matt and I look forward to sharing a household with our respective pets, though we aren't sure the cats feel the same way.

Publications and Presentations (continued from Page 6)

MS patients. Presented at AudiologyNOW! 2008, Charlotte, NC.

Meikle M, Henry JA, Abrams H, Frederick E, Martin W, McArdle R, Myers P, Newman C, Sandridge S, Stewart B, Creedon T, Griest S, Turk D. Development of the Tinnitus Functional Index (TFI): Part 1. Assembling and testing a preliminary prototype. Association for Research in Otolaryngology 31st Annual Meeting, Phoenix, AZ, February 2008.

Meikle M, Stewart B, Griest S, Henry JA, Abrams H, Martin W, McArdle R, Myers P, Newman C, Sandridge S, Folmer R, Turk D. Development of the Tinnitus Functional Index (TFI): Part 2. Final dimensions, reliability and validity in a new clinical sample. Association for Research in Otolaryngology 31st Annual Meeting, Phoenix, AZ, February 2008.

Melamed, S. Audiological Assessment: Making sense of your test results. NCRAR Community Lecture Series, January 31 2008.

Melamed S, Jeng P. Acoustic Power Reflectance: Assessment of Middle Ear Function. Mimosa Acoustics, Inc., Invited presentation at Audiology & Speech Pathology Element, Wilford Hall Medical Center, Lackland AFB, TX.

Saunders GH, Griest, S. Hearing Loss in Veterans and the Need for Hearing Loss Prevention Programs. Presentation at the National Hearing Conservation Association Annual Conference, Portland OR February 21 – 23.

Watts K, Hutter M, Lewis MS, Lilly, D. Distortion product otoacoustic emission findings in multiple sclerosis: Preliminary findings. Poster presented at the American Auditory Society Annual meeting, March 2008, Scottsdale, AZ.