

SPECIAL POINTS OF INTEREST:

Article by Samantha Lewis, Michelle Hutter, Stephen Fausti, Deb Wilmington, Dennis Bourdette, and Dave Lilly—Assessment and Management of Auditory Problems in Individuals with Multiple Sclerosis—
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NCRAR Newsletter

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Message from the Director: Stephen Fausti Ph.D.



The National Center for Rehabilitative Auditory Research (NCRAR) continually strives to strengthen and expand our mission to alleviate the communicative, social and economic problems that result from auditory system impairments by incorporating technology into all aspects of research, education and development. Technology continues to permeate every aspect of our daily lives and plays a central role in healthcare. Technological developments not only contribute to the diagnosis and treatment of patients, but also impact the delivery of healthcare. The NCRAR has successfully integrated technology in two ways: by developing techniques to diagnose and rehabilitate auditory dysfunction and by facilitating the delivery of these techniques so that they are implemented to improve the healthcare of veterans. One example of the NCRAR's technological innovation can be seen in the ototoxicity monitoring program. Nearly 200 medications used to treat infection and cancer are potentially ototoxic and can produce irreversible cochlear damage in up to 70% of patients. The impact of hearing loss caused by treatment with ototoxic medications may be minimized with early detection and serial monitoring of hearing thresholds. Despite this evidence, ototoxicity early identification and monitoring practices have not been implemented as a standard of care in medical centers due to time-consuming procedures and limitations in audiometric testing equipment. It also has yet to be introduced into community-based environments such as outpatient clinics and patients' homes. To attain widespread acceptance and implementation of ototoxicity monitoring, technology must enable audiometric testing to be more accessible to the patient. To address this clinical need, the NCRAR has developed the portable Ototoxicity Identification (Otoid) system, to optimize the

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Assessment and Management of Auditory Problems in Individuals with Multiple Sclerosis by Samantha Lewis, Michelle Hutter, Stephen Fausti, Deb Wilmington, Dennis Bourdette, and Dave Lilly

The NCRAR is conducting pioneering work to look at problems with hearing in individuals with multiple sclerosis (MS). Multiple sclerosis is a disease of the central nervous system (CNS) that causes damage to nerves and myelin, the fatty coating on nerve fibers that aids in the movement of signals and/or information throughout the CNS. This damage interrupts or slows the movement of these signals to and from the brain and spinal cord. Commonly, this interruption and/or slowing results in many of the symptoms typically associated with MS like problems with vision and walking. Since MS affects these neural pathways, it is assumed that the neural pathways responsible for hearing may be affected as well. Although there have been a few case studies of significant sudden hearing loss, only a small percentage of the MS population has any disease-related changes in hearing as measured by a conventional hearing test.

NCRAR Contact Information

General Information

NCRAR is located at:

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Debbie Halfman

“Still Running Strong”

A feature article on one of our study participants by Jane Gordon, M.S.

Conducting research at the NCRAR would not be possible without the generous participation from our wonderful veterans. When asked to participate in the Ototoxicity study “Investigation of Individualized Otoacoustic Emission Techniques for Early Detection of Ototoxicity”, Norman Grusy was more than happy to help even while undergoing chemotherapy for cancer and training to run the 26.2 mile Portland Marathon.

Mr. Grusy has exhibited a service mentality most of his life. Born and raised in Chenoa, Illinois, he helped his dad on the farm driving tractors and maintaining farm machinery. He served in the army in Korea from 1953 to 1955 as a surgical technician and later worked as scrub nurse for awhile when he returned to the United States. His faith led him to return to Korea to help serve the needs of the people from 1963-1968. He returned with his wife and two small children, taking one month by ship before finally settling in Incheon, Korea as a pioneer evangelist. To this day, when you call him you will hear a Korean greeting and a quotation from John 3:16 on his phone before you leave him a message.

At 74, Norman Grusy displays a strong “can do” attitude. He says his initiative and drive stems from past experiences in his life and his competitive spirit. In high school, he was track captain excelling in sprints and hurdles. He currently enjoys stock car and horse racing, drives a motorcycle and pilots his own plane. He recently flew to Santa Monica to see a badminton tournament, a



Photo Courtesy of Portland Marathon Flash Pro Photo

favorite sport he plays competitively. Another great passion of his is marathon competition. Last year he completed his sixth Portland Marathon even with his Penipherally Inserted Central Catheter (PICC) line in for chemotherapy treatment.

He says he is still considering running in the 2008 Marathon and is currently doing light training. Mr. Grusy says he is grateful the NCRAR sets up hearing studies and makes them available to veterans. He enjoyed the advantages of being able to take the ototoxicity study, participating in the tests and learning about his hearing. He states “Even with physical impairment, recent surgery and chemotherapy, you are still able to participate in hearing tests and do things you want to do, if you have the desire”. He credits the NCRAR with making study participation easily available and he thinks that research is very interesting.

I would say with all his service, great attitude and his training for the upcoming Marathon that he’s “still running strong”. Good luck, “Stormin Norman”.

Tinnitus Education Group at the VA National Center for Rehabilitative Auditory Research, Portland VA Medical Center

The Tinnitus Education Group has met at the Portland VA Medical Center since 1999. The group is sponsored by the VA National Center for Rehabilitative Auditory Research (NCRAR).

The purpose of the group is to provide up-to-date information about tinnitus. A presentation is given at each meeting, either by one of the NCRAR staff or by other tinnitus ex-

perts. This is not a clinic and it is not research. The group meets for information purposes only.

The group meets about eight times per year. The meetings are usually on the first Tuesday of the month, from 5:30 - 7:00 PM. The meeting times may change, so it is important to check with the contact person (listed below) before coming to any meeting.

Our next meetings are scheduled for October 7 and October 21: "Managing Your Tinnitus: What to Do and How to Do it" (Parts 1 and 2). Both meetings will start at 5:30 PM. These two sessions go together and it is important to attend both.

For further information, please contact Kim Owens at 503.220.8262 ext. 51936.

Assessment and Management of Auditory Problems in Individuals with Multiple Sclerosis (Continued from Page 1)

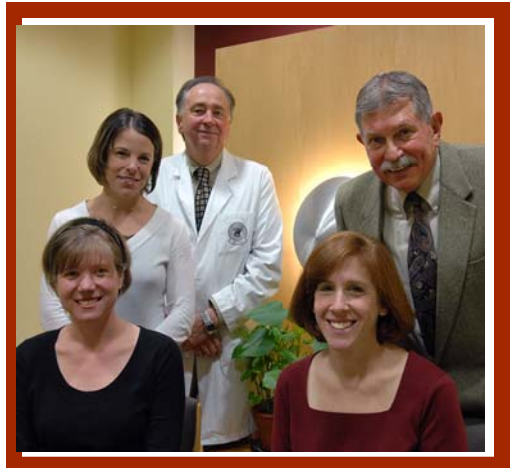
When a loss does occur, it generally is considered mild or temporary. Despite studies at the NCRAR and elsewhere that show most individuals with MS having hearing within normal limits (as measured by these conventional tests), many of these individuals still report difficulty hearing. This suggests that traditional hearing tests alone may not be sensitive enough to detect the problems that these individuals experience. Individuals with MS may experience deficits in central auditory function, or the transmission of auditory information from the ear to the brain.

The NCRAR research project entitled, *Effects of Training on Central Auditory Function in Multiple Sclerosis*, is evaluating a comprehensive test battery,

including tests of central auditory function, to fully characterize the auditory problems experienced by individuals with MS. Additionally, there is evidence that the central auditory system may be capable of change or improvement when auditory skills are practiced (auditory training). This kind of training has potential as a rehabilitative tool for individuals with problems with the transmission of signals within the central auditory system, from MS or other damage to the brain. The effectiveness of such training for individuals with MS also will be examined in this project.

This NCRAR research study was initiated in October 2007 and will continue through September 2010. It is anticipated that the results

from this study will have significant implications for the assessment and management of individuals with MS that experience central auditory deficits.



From left to right: Samantha Lewis, Michele Hutter, Stephen Fausti, Deb Wilmington and Dave Lilly

NCRAR Research funded between 4/08 & 7/08)

Chisolm & Wilson, Pls, Saunders CO-I. VA RR&D grant: Supplementing Hearing Aids with Computerized Auditory Training. 7/1/2008 to 6/30/2010.

Henry JA (PI) VA RR&D Tinnitus Management for TBI: Pilot Study. 7/1/08 to 3/31/10.

Henry JA & Folmer R (Pls). VA RR&D. Large equipment funding 7/1/08.

Fausti & Wilmington (VA RR&D. A portable audiometric monitoring device (the Otoid) 7/08 to 6/11.

Upcoming NCRAR Events



September 19 2008: NCRAR Seminar by Ray Hull Ph.D. Professor, Wichita State University. Title: TBA

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.

December 12 2008: NCRAR Seminar by Michele Molis Ph.D. NCRAR. Title: TBA

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

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

August 25 2008: NCRAR Seminar by Caroline Kendall Ph.D. Clinical Psychology Research Fellow, Yale University. Mental health service use and treatment among veterans with tinnitus

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

Save the Date

The 4th biennial NCRAR Conference titled "The Ear-Brain System: Approaches to the Study and Treatment of Hearing Loss" will take place in Portland, OR on October 8-10 2009

Invited speakers:

Robert Shannon Ph.D.,
Nina Kraus Ph.D.,
Robert Zatorre Ph.D.,
Steve Colburn Ph.D.,
William Noble Ph.D.,
Ervin Hafter Ph.D.,
Sridhar Kalluri Ph.D.,
Arthur Boothroyd Ph.D., and
Robert Sweetow Ph.D.

NCRAR Announcements

Welcome to:

- Debbie Halfman, our new Education Assistant and Office Assistant
- Megan Anders, Kristina Brady, Julie Fitzer and Bethany Stover our NIH T-52 Grant Au.D. awardees
- Mavie Betancourt and Margaret Packwood, our summer student research Assistants
- Josh Triska our summer Engineering Intern

Congratulations to:

- The MS Research Group who won an award for "Best Poster" at the CMSC conference in May

- Anna Diedesch who graduated from Wichita State University with her Au.D. and was awarded Outstanding Student of the Year by the Department of Communications, Sciences and Disorders
- Kimberly Owens who graduated from Portland State University with her M.P.H degree and won an Award of Excellence for academic achievement
- Keri O'Connell on her marriage
- Josh Triska on his marriage

Thank you to:

- Anna Diedesch and Keri O'Connell who volunteered at

the OEF/OIF "Welcome Home" event at Oaks Park (see page 7)

Other news:

- Mitch Turbin gave a presentation to American Sign Language students from Western Oregon University about issues specific to individuals with dual sensory loss.
- Samantha Lewis attended the June AudiologyNOW! 2009 Program Committee Meeting, Exhibitor Advisory Panel Meeting and Site Visit in Dallas, TX.

NCRAR Presentations & Publications – July, 2008

Publications:

Henry JA, Zaugg TL, Myers P, Schechter MA (2008). Progressive Audiologic Tinnitus Management. *The Asha Leader* 13(8):14-17.

Meikle MB, Stewart BJ, Griest SE, Martin WH, Henry JA, Abrams HB, McArdle R, Newman CW, Sandridge SA. Assessment of tinnitus: Measurement of treatment outcomes. In: *Tinnitus: Pathophysiology and Treatment*. Ed. B Langguth, G Hajak, T Kleinjung, A Cacace, A Møller. *Progress in Brain Research* 166: 511-521, 2007.

Saunders, GH. (2008) Prevention: The Best Form of Rehabilitation? Invited 'Point of View' editorial. *Advance for Audiologists* 10 (3):18.

Submitted Manuscripts

Henry JA, Zaugg TL, Myers PJ, Kendall CJ, Mitchel B, Turbin MB. Principles and Application of Counseling Used in Progressive Audiologic Tinnitus Management. *Noise and Health*. (in review).

Kidd, G. Jr., Richards, V., Mason, C.R., Gallun, F.J., and Huang, R. "Informational masking increases the costs of monitoring multiple channels" Submitted to *JASA Express Letters*.

Konrad-Martin D (2008). Advances in Hearing Conservation Practices: An Interview with Mark Stephenson. *ASHA Special Interest Division 6, Hearing and Hearing Disorders: Research and Diagnostics* (Submitted).

Molis, M.R. and Leek, M.R. Identification of ambiguous vowel stimuli by hearing-impaired listeners. Submitted to the *Journal of the Acoustical Society of America*.

Saunders, G.H., Lewis, M.S., Forsline, A. (in review).

Expectations, pre-fitting counseling and hearing-aid outcome. *Journal of the American Academy of Audiology*.

Presentations

Henry JA, Meikle M, Griest S, Stewart B. "Development of a new questionnaire: the Tinnitus Functional Index." IXth International Tinnitus Seminars, Göteborg, Sweden, June 18, 2008. (*invited lecture—Henry*)

Henry JA, Zaugg TL, Myers PJ, Schechter MA. "Progressive Audiologic Tinnitus Management: Clinical Guidelines for Audiologists." Connecticut Academy of Audiology 3rd Annual Conference, Cromwell, CT, June 13, 2008. (*invited half-day workshop presented by Henry*).

Zaugg TL, Griest S, Schechter MA, Henry JA. "An exploration of the relationship between residual inhibition and the sound pressure level of the stimulus used to induce it." IXth International Tinnitus Seminars, Göteborg, Sweden, June 15-18, 2008 (*poster*).

Henry JA, Zaugg TL, Owens K, James K. "Pilot study toward development of a test for tinnitus malingering." IXth International Tinnitus Seminars, Göteborg, Sweden, June 15-18, 2008 (*poster*).

Henry JA, Zaugg TL, Myers PJ, Schechter MA. "Overview of Progressive Audiologic Tinnitus Management." IXth International Tinnitus Seminars, Göteborg, Sweden, June 15-18, 2008 (*poster*).

Henry JA, Zaugg TL, Myers PJ, Schechter MA. "Sound-based Methods of Tinnitus Management." IXth International Tinnitus Seminars, Göteborg, Sweden, June 15-18, 2008 (*poster*).

Jacobs, P., IEEE Engineering in Medicine and Biology local chapter meeting: "On Correlating Otoacoustic Emissions with Blood

Glucose", PSU, June 12.

Gallun, F.J. and Souza, P.S. "Hearing Aid Compression: Impacts on the Modulation Characteristics of Speech" Presented at the 2008 Oticon Scientific Advisory Board Meeting, May 27-28, 2008, Chevy Chase, MD.

Henry JA. "Use of Therapeutic Sound in the Management of Tinnitus." Beltone International Annual North American Convention, Monterey, CA, May 29, 2008. (*invited keynote presentation for international attendees*).

Lewis, MS, Hutter, M, Lilly, D, Fitzpatrick, M, Bourdette, D, Fausti, S. (2008, May). Pure-tone hearing sensitivity for individuals with multiple sclerosis. Poster presented at the Consortium of Multiple Sclerosis Centers meeting, Denver, CO.

Melamed S. (2008, May). Tinnitus Research: Then and Now, What We Have Learned. Portland VA Medical Center, NCRAR.

Saunders, GH, Folmer, R (2008). Prevention of hearing Loss: It is NEVER too late. National Center for Rehabilitative Auditory Research Community Seminar, Portland VA Medical Center, Portland OR, May 15th.

Zaugg, TL, Schechter MA, Kaelin C, Stewart B, Abrams H, Miller D, Loois C, Henry JA. "Multi-site randomized clinical trial to evaluate tinnitus masking and tinnitus retraining therapy." IXth International Tinnitus Seminars, Göteborg, Sweden, June 17, 2008. (*podium presentation—Zaugg*).

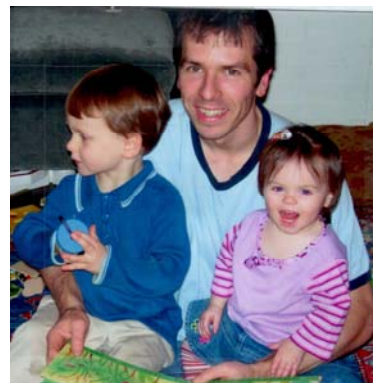
Meet Pete Jacobs, NCRAR Engineer and PI

I have been working at NCRAR for 3 ½ years. Prior to working here, I worked on satellite communications at Lockheed Martin, launched several start-up companies and ran my own engineering product development business for a few years.

My wife, Bess, and I moved to Portland in 2000 so that she could attend the OHSU residency program in family practice. Bess and I met while attending Swarthmore College in Philadelphia. We currently have two kids, Dylan (3.5) and Ingrid (1.5) who somehow manage to take up most of our free time.

Prior to moving to Portland, we were in Madison Wisconsin where Bess went to medical school and I received my Masters degree in electrical and computer engineering while also starting a web site called CyberCivic.com. The site would determine which geographic voting district a user was located in and then automatically email local elected officials messages and polling

results from people living in their district. I partnered with newspapers and television stations to incorporate these civic polls into their online news features and we ran several live television and radio town-hall meetings while getting geo-specific feedback from viewers over the Internet. While CyberCivic was a lot of fun and certainly exciting as it was one of the first blogging, polling, and petitioning web sites on the Internet, it wasn't financially successful and I eventually stopped doing it when we moved from Madison to Portland. Also while in Madison, I worked on an implantable glucose sensor used by diabetic patients to continuously monitor glucose levels in blood. The glucose sensor was implanted under the skin around the belly and would wirelessly transmit data out to a receiver that would notify the patient if their glucose levels are too low or too high. The technology eventually became a company (now called Dexcom and based out of San Diego) which I worked for after graduate school for a few years. My work on glucose sensors inspired my



current research here at NCRAR - using correlations between otoacoustic emissions and blood glucose to ultimately create a noninvasive blood glucose monitor. This research project is also my thesis as I am currently a PhD candidate in the Computer Science and Electrical Engineering Department at OGI School of Science & Engineering at OHSU.

Outside of work, I enjoy spending time with my family most of all, camping, hiking, playing music, and teaching my kids how to play soccer.



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

Welcome Home to our Veterans

By Keri O'Connell and Anna Diedesch

On May 31st, 2008, the Portland VA Medical Center hosted the 2nd Annual Welcome Home event at Oaks Amusement Park. The event honored the service of soldiers returning home from Operation Iraqi Freedom and Operation Enduring Freedom. In addition to these soldiers, Veterans from other eras and families were invited to attend the event. The volunteers, including two audiologists from the National Center for Rehabilitative Auditory Research, Keri O'Connell, Au.D. and Anna Diedesch, Au.D., welcomed over 1000 Veterans and their families.

The event was designed to show our appreciation and support for the Veterans who have served our country.

On arrival the Veterans and family members were greeted with smiles and gratitude as they were provided meal tickets, unlimited amusement ride wrist bands, a "Welcome Home" goody bag, for door prize entries and presented with a coin of appreciation. This original coin was specifically designed for the event. Dramatically displayed on one side was a bald eagle surmounting the American flag, with the inscription "Portland VA Medical Center Returning Veterans Program". On the reverse side was the depiction of the obverse view of three medals; the Afghanistan Campaign, the Iraq Campaign and the Global War on Terrorism, with the encircling inscription "Welcome home and thanks for you service in the global war on terrorism".

The event had a joyous atmosphere, with 2 bands playing on stage, distinguished guest speakers, face painting, children laughing and lively screams from the roller coaster. The sun was shining from behind parse clouds and the vendors, volunteers, Veterans and family members were able to enjoy the successful event.



Director's Message (continued from Page 1)

efficiency and cost-effectiveness of ototoxicity early identification practices. An effective and efficient monitoring system with the ability to transmit information to a centralized data repository and a trained audiologist would enable the translation of evidence-based ototoxicity monitoring into practice to benefit hospitalized patients, patients seeking healthcare at community-based and remote locations, and in their own homes. In addition, the technology developed by this NCRAR project can be expanded to detect and monitor hearing loss attributed to excessive noise exposure and blast trauma incurred as a result of military deployment.

Another successful development and use of technology at the NCRAR is a computer-automated device for tinnitus measurement (the Tinnitus Evaluation System (TES)). This system has been developed to quantify the perceptual attributes of tinnitus to help to standardize procedures for the clinical assessment of veterans with tinnitus. There currently is no objective method to validate the

claimed presence of tinnitus. It is essential to have a test that can authenticate legitimate claims of tinnitus for medical, insurance, and litigation purposes.

Technological advancements at the NCRAR, combined with telemedicine, the delivery of health services at a distance, will improve access, effectiveness, and efficiency of many aspects of hearing healthcare. Telemedicine not only enables healthcare delivery outside of centralized settings, but also allows minimally trained healthcare professionals or patients to monitor indicators of health, thus increasing patient access to healthcare. The 2005 technical report of the American Speech-Language-Hearing Association (ASHA) stressed the necessity to develop and validate telepractice clinical protocols in Audiology. Innovative treatment and rehabilitative techniques at the NCRAR that incorporate telemedicine technology help us to improve outreach to patients and optimize the diagnosis, rehabilitation, and prevention of hearing dysfunction.