



UPDATE

VOLUME 18 • ISSUE 3

The Newsletter of the Council for Accreditation in Occupational Hearing Conservation


National Data on Hearing in Adults

By Christa L. Themann, MA CCC-A, William J. Murphy, PhD,
Howard J. Hoffman, MA, and Mark R. Stephenson, PhD

Hearing conservation professionals recognize that good hearing is a key component of many daily living activities. As a result, hearing ability is strongly associated with quality of life (HHS, 2000; Dalton et al. 2003). It is not surprising, then, that the nation's health statistics agency includes audiometry as a component of its National Health and Nutrition Examination Survey (NHANES). This survey, conducted by the National Center for Health Statistics, is the gold standard for assessing the health and nutritional status of the civilian, non-institutionalized US population. NHANES was conducted periodically in the past and now collects data on a continuous basis. The survey includes a personal interview about medical history and health behaviors, as well as a physical examination. The data collected are used to determine the nation's public health needs, such as interventions to prevent hearing loss.

Recent NHANES data indicate that the hearing ability of American adults has remained fairly stable over the past thirty years. The data also confirm that hearing loss increases with age and that hearing difficulty is more prevalent among men than women: and among non-Hispanic whites compared to non-Hispanic blacks and Mexican-Americans.

During the survey cycle known as NHANES I, which ran from 1971-1975, audiometric testing was conducted on adults aged 25-74 years. Pure-tone air conduction audiometric thresholds were obtained in each ear at 500, 1000, 2000, and 4000 Hz. Although subsequent NHANES cycles conducted hearing testing in other age groups, the survey did not include audiometry in adults again until the 1999-2004 survey cycle. During this period, thresholds were obtained on adults aged 20-69. Testing included the same frequencies as in NHANES I, as well as 3000, 6000, and 8000 Hz. Hearing data from NHANES I were obtained from over 6900 survey participants; NHANES 1999-2004 tested over 5000 participants. Subjects were not screened for evidence of middle ear pathology, recent noise exposure, or other confounders which might have a temporary effect on audiometric thresholds in either survey.

Some preliminary analyses have been accomplished comparing the hearing data from NHANES I to the hearing

data from NHANES 1999-2004. In the 35 years between surveys, there was little change in the mean hearing levels of US adults. Hearing thresholds in both surveys showed the expected decline with age across all races and genders. The more recent data show a trend towards slightly poorer hearing in the low frequencies and slightly better hearing at high frequencies relative to the earlier data; however, most changes are not statistically significant. This shift towards poorer thresholds in the low frequencies is similar for both men and women; however, women show less improvement at high frequencies than men.

The NHANES 1999-2004 data were used to calculate the prevalence of hearing loss among US adults by age, gender, and race/ethnicity. Hearing loss was defined as an average threshold greater than 25 dB across the frequencies of 1000, 2000, 3000, and 4000 Hz in a given ear, according to the NIOSH definition of material hearing impairment (NIOSH, 1998). Sample prevalence is shown in Figure 1 (see page 4). It can be seen that even in early adulthood, males have a higher prevalence of hearing impairment than females and this difference becomes more marked with increasing age. However, the differences in hearing ability across various race/ethnic categories do not become evident until later in life. Further analysis of the data, and no doubt additional research, will be necessary to evaluate to what extent this might be due to aging versus noise or other etiological factors.

continued on page 4

CONTENT	PAGE
Hearing In America-Adults	1
Chair's Message	2
OHC Corner – Who/What are OHCs?	3
Spotlight on OHC – Theodore Mason	3
It's Time to Buy Quiet	5
Recreational Shooting & Hearing Loss	6
Professional Supervisor Courses	8
NHCA Conference	9
OHC Courses	10



Published by the Council for Accreditation in Occupational Hearing Conservation, a not-for-profit organization dedicated to the establishment and maintenance of training standards for those who safeguard hearing in the workplace.

Articles should be submitted with a black and white photograph of the author. The UPDATE is available to individuals not certified by CAOHC at an annual subscription rate of \$20.

Payment must accompany request:

555 E. Wells Street / Suite 1100

Milwaukee, WI 53202-3823

Phone (414) 276-5338

Fax (414) 276-2146

E-mail: info@caohc.org

- **Editor and Publications Committee Chair**
Elliott Berger, MS, INCE. Bd. Cert.

- **Contributing Editor Current Issue**
Mark Stephenson, PhD

- **Committee Members**
Paul Brownson, MD, FACOEM, FAFAP
Robert Bruce, PE, INCE. Bd. Cert. Diane
DeGaetano, RN BSN COHN-S COHC
Thomas Hutchison, MA MHA FAAA CCC-A
J. Adin Mann, III, PhD

- **Executive Director**
Barbara Lechner

- **Administrative Assistant**
Chris Whiting

- **Graphic Designer**
Kathryn Peterson

Opinions expressed in the UPDATE are those of the authors, and do not necessarily reflect official CAOHC policy. © CAOHC 2006



Opt-Out Option

If you wish to have your name removed from mail solicitations from vendors who have purchased the CAOHC database, please notify CAOHC staff via fax at 414/276-2146; or e-mail to info@caohc.org.

CAOHC Approved Courses

When you are registering for a recertification course (or if your fellow staff member registering for the first time at a certification course), please confirm with the registrar that "this is a CAOHC approved" course. Only certified Course Directors, who have received a course approval certificate from the CAOHC Executive Office, can conduct an occupational hearing conservation course that leads to CAOHC certification or recertification. Course Directors must display this certificate of approval in view of their students. If you don't see it, please ask your Course Director.

If you are uncertain whether the course you are planning to attend is certified by CAOHC, please contact Chris Whiting at the CAOHC office at 414/276-5338 or e-mail info@caohc.org



Chair's Message

By James D. Banach, MBA

In Sacramento, California there is a 14-year old young man by the name of Ben Underwood. Ben offers us, in the profession of hearing conservation, insight into the possibilities and wonder of hearing.

Ben's story was reported in People magazine, July 24, 2006. At age 3, Ben became totally blind from retinal cancer. His story is one of adaptation to reality. Over the years he has developed a finely tuned sense of hearing, and devised a system of vocal clicks so he can judge distance, substance and shape of objects around him. His use of echolocation rivals that of bats and dolphins. Most impressive is his drive. He applies his art to give him freedom, and is always ready and willing to go to new places that are unfamiliar. While Ben's eyesight may have failed him, his hearing, brain, courage and passion gave him resources to face new challenges.

Since CAOHC's inception we have accessed a foundation of varied experiences and backgrounds. The interdisciplinary approach to the Council, including audiologists, physicians, hygienists, nurses, safety and acoustical engineers, reflects the reality that effective hearing conservation is more than just turning the dials or pushing the start-button on an audiometer. It is more than just dispensing hearing protectors. While these are critical parts of the process, all the disciplines need attention, effort, understanding and development.

The curriculum for certified Occupational Hearing Conservationists (OHC) is structured to prepare graduates for their role. Note that the certification isn't for an "audiometric technician," or an "assistant to a Professional Supervisor," it is Occupational Hearing Conservationist. It calls for a broader background that prepares one for roles that might be unknown but come as expected with the interdisciplinary CAOHC certification. While today you may be working for a mobile service or clinic that only expects you to administer audiometric tests, should you move into a new position your CAOHC certification accompanies you and indicates you've been trained in a variety of topics ranging from: audiometric threshold test administration, to hearing protection, to regulations, to noise measurement and control along with motivation and communication. CAOHC needs to assure that no matter which Course Director presented the course and no matter where, that a minimum curriculum has been presented, learned, and can be applied. In some cases you may not use the material from a specific portion of the curriculum for months, but you do have the material available to draw upon when needed.

Course Directors, who present this material, add their own wealth of knowledge and experience to this foundational curriculum. They can deal with the individual needs of their class attendees that can not be anticipated in the standardized parts of the required curriculum. It is a critical role that Course Directors serve that takes the course from a simple series of recited lectures or videotapes to an interactive and enriching experience. They too must hone their skills in presenting all aspects of the hearing conservation program and current trends in the industry. For the Professional Supervisor of the Audiometric Component of the Hearing Conservation Program who oversees the activities of the OHC, these same demands are present and more. They must be committed, active and present. For the Course Director and Supervisor, it is all about being professional.

The gift of hearing is far too precious to leave it to low-cost corner-cutting. Ben's life shows just how precious a gift hearing can be. Professionalism is necessary, for the Course Director, the Professional Supervisor and the OHC. It means that courses need to meet the minimum requirements and more, and the learning can not stop there. Professionalism does not stop at learning just enough, it is about having a rich depth of knowledge that allows flexibility when things change. As an OHC, you have been prepared to offer skills and talents that are transferable and need constant development. You've been trained to be a cut above the rest – a professional. After all, with CAOHC, there is no equal.

Who/What Are OHCs?

CAOHC's principal activities revolve around YOU – through your training and certification as an Occupational Hearing Conservationist (OHC). OHCs who successfully complete hearing conservation training course will have a credential that is important in the recognition of their work by workers, employers, and government personnel. Once certified, the OHC is permitted and encouraged by CAOHC to evidence his/her certification by including the acronym "COHC" (Certified Occupational Hearing Conservationist) after his/her name.

As you can see from the various profiles we've been printing in this newsletter titled "The OHC Spotlight" (see below for this issue's feature), the OHC is a key member of the hearing conservation team. In a large company there may be a full-time medical director and a staff of physicians, nurses, industrial hygienists, safety engineers, and possibly an industrial audiologist. In this case, the OHC's responsibilities may be limited to audiometric testing, coordinating the necessary follow-up, keeping the records, and fitting hearing protectors.

More likely, your team will be much smaller, or you could even be a team of one, reporting directly to a company official, and using outside consultants for professional supervision and to fill the other roles. OHCs work in a variety of settings. Many are employed by hearing conservation or occupational health service providers and find themselves traveling to a number of different companies in several counties or even across state lines. In addition to long hours on the road, these OHCs interact with a variety of company personnel and an assortment of different management styles. Other settings in which OHCs often work include occupational health clinics, government agencies, and, military installations.

In any case, the OHC's role as liaison between workers and other members of the team, or between workers and management, is a vital one. If, for example, one worker has an ear canal irritation and is unable to wear hearing protection,

or another has an idea about controlling the noise of his or her machine, the OHC may well be the first person to hear about it. The OHC then needs to see that these situations are communicated to the proper authorities, and, to the extent possible, followed up appropriately.

The OHC must have good communication skills since she or he will often be the one to identify the responsibilities of the different team members, define the roles of contractors, schedule meetings, and provide important links among hearing conservation professionals, management, and workers. The OHC must be prepared, on occasion, to spend extra time with workers to make sure that hearing conservation practices are adequately communicated and that workers' problems and constructive solutions are given the attention they deserve.

OHCs who complete the CAOHC training course can be, depending upon the program as established by the supervising professional, responsible for the following activities:

- Visually inspecting the ear to rule out any condition that might interfere with the test.
- Taking a medical history.
- Audiometric testing, including baseline, annual and in some cases retesting.
- Screening the audiograms and selecting problem audiograms for review by the professional supervisor (an audiologist or physician).
- Referring to the appropriate sources for further testing or medical treatment.
- Functional check of the audiometer before each use, and making sure that it gets calibrated at the appropriate times.
- Recordkeeping.
- Notifying employees of a standard threshold shift in a timely manner once those shifts have been identified by the supervising professional.
- Educating, training, and counseling employees.
- Selecting, fitting, and supervising the wearing of hearing protection devices.

continued on page 4



OHC Spotlight

In this edition of the UPDATE newsletter, the "OHC Spotlight" shines on Theodore Mason (pictured here). Theo has been involved with military occupational hearing conservation for over 30 years as both an active duty Army member and as a civilian. He has mentored scores of new Occupational Hearing Conservationists (OHCs), managed large programs as a Senior OHC Technician, and has become a recognized expert in the end-user system the military employs to manage tens of thousands of annual hearing tests under the military hearing conservation

program. Theo was recently selected to join the Hearing Conservation Team at the Navy Environmental Health Center (NEHC) in Portsmouth, Virginia, as the Information and Training Specialist for Navy's testing program.

As a self-described Air Force 'brat,' Theo grew up on the move, never living in one location for more than three years. He continued his globe-trotting by enlisting in the Army and serving in many locations — some hostile, some friendly — throughout his 28 years on active duty. He vividly recalls the early days when some soldiers used

continued on page 4

National Data on Hearing – continued from page 1

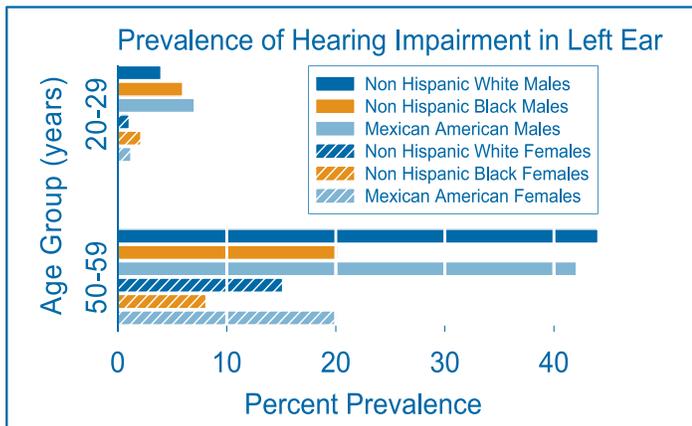


Figure 1: Prevalence of material hearing impairment (NIOSH, 1998) among 20-29 year olds and 50-59 year olds in the left ear by gender and race/ethnicity. Data from NHANES 1999-2004.

Although hearing loss can be caused by many factors, it is estimated that at least one third of the cases of hearing impairment stem from overexposure to noise. Estimates of noise exposure in the United States vary, but range from 5 to 30 million persons exposed in the workplace (Berger, 2003) and 16 to 66 million exposed recreationally (U.S. EPA, 1981). Effective prevention programs could therefore make a large impact in reducing the prevalence of hearing loss in the United States. National surveys such as NHANES are very useful in monitoring progress in prevention. While it is encouraging that hearing ability has not declined in the US, let us keep up our intervention efforts so that future survey cycles may show an improvement in average hearing level.

Who/What Are OHCs? – continued from page 3

CAOHC has been instructing and certifying OHCs since mid-1960. We don't have access to electronic statistics that far back, but we can tell you that there are over 21,000 currently certified OHCs – reflecting a growth of 9% over the past five years. That breaks down to about 5,000 new and recertifying OHCs every year. Sixty percent of that number represents new occupational hearing conservationists entering the field. The forty percent balance indicates that almost half of you are recertifying. We believe that stability is valuable as your experience and knowledge continue to prevent hearing loss.

Of the 21,000 certified OHCs, approximately half are medical professionals from the nursing field. And, not surprising perhaps, about half are employed in an industrial setting, while the rest are employed by a clinic.

Reference

Most of the information in this article has been adapted from the CAOHC Hearing Conservation Manual, 4th Ed. Alice Suter (2002)

References

- Berger, E. H. (2003). "Noise control and hearing conservation: Why do it?" in *The Noise Manual*, 5th Ed., E. H.
- Berger, L. H. Royster, J. D. Royster, D. P. Driscoll, and M. Layne (eds.), *American Industrial Hygiene Association*, Fairfax, VA.
- Dalton, D. S., Cruickshanks, K. J., Klein, B. E., Klein, R., Wiley T. L., and Nondahl, D. M. (2003). "The impact of hearing loss on quality of life in older adults," *Gerontologist* 43(5), 661-668.
- National Institute for Occupational Safety and Health (1998). "Criteria for a Recommended Standard: Occupational Noise Exposure," DHHS (NIOSH) Publication Number 98-126, Cincinnati, OH.
- U.S. Environmental Protection Agency (1981). *Noise in America: the extent of the noise problem*. Washington, DC: U.S. Environmental Protection Agency, EPA Report No. 550/9-81-101
- US Department of Health and Human Services (2000). *Healthy People 2010, 2nd Ed. with Understanding and Improving Health and Objectives for Improving Health, 2 vols.*, US Government Printing Office, Washington, DC
- Christa L Themann, MA, CCC-A is a Research Audiologist at the National Institute for Occupational Safety and Health, Division of Applied Research and Technology (Engineering and Physical Hazards Branch) Hearing Loss Prevention Team in Cincinnati, OH.*
- William J. Murphy, PhD, is a Senior Research Physicist at the National Institute for Occupational Safety and Health, Division of Applied Research and Technology (Engineering and Physical Hazards Branch), Hearing Loss Prevention Team, Cincinnati, OH.*
- Howard J. Hoffman, M.A., Division of Scientific Programs, National Institute on Deafness and Other Communication Disorders*
- Mark R. Stephenson, PhD, is a Research Audiologist at the Centers for Disease Control and Prevention's (CDC) National Institute for Occupational Safety and Health (NIOSH).*

OHC Spotlight – continued from page 3

cottonballs, small rocks, or shell casings for hearing protection. As a First Sergeant, he encountered the demands and responsibilities associated with large hearing conservation program resource coordination. As an advocate of learning as much as one can about any subject, he decided to jump in with both feet. He was initially certified by CAOHC in 1988 and since then has watched, guided and collaborated with many others associated with occupational hearing conservation.

After the Army, but prior to joining NEHC, Theo worked in Alaska with the Department of Defense Medical Command evaluating Military Entrance Process Station (MEPS) programs. Prior to Alaska, he was the Senior Audiometric Technician for the US Navy in the San Diego area where he was instrumental in streamlining the program. This resulted in a growth in productivity from the initial four shore-based sites to seven, plus testing responsibilities to transient incoming ships.

He has demonstrated that he is well-suited for his new responsibilities at NEHC and he practices what he preaches: "There is no substitute for quality training."



It's Time to Buy Quiet

By Robert D. Bruce, PE Bd. Cert. INCE

Occasionally, events conspire to give Occupational Hearing Conservationists (OHCs), and others who work in industry, a unique opportunity to create a great legacy. Such a time is now—a time to BUY QUIET!

For centuries, it has been known that excessive noise exposure causes hearing loss. It was in recognition of this fact that healthcare professionals and industrial hygienists in the mid-1960s worked together to create guidelines for evaluating and controlling the potential hazards of noise. In 1973, that committee of professionals changed its name to the Council for Accreditation in Occupational Hearing Conservation (CAOHC).

As you probably know, the original OSHA noise regulation (CFR 1910.95) required engineering controls or administrative controls, or if these were not feasible, a “continuing, effective hearing conservation program.” For the past 25 years, the United States has focused on using hearing protection or hearing conservation programs as the primary (and often the only) means of reducing the risk of noise-induced hearing loss for the nation’s workers.

One of the advantages of engineering and administrative controls was that they worked regardless of employee and employer diligence regarding hearing protection. It was anticipated that as companies tried to purchase quieter machines, this demand would create a supply of quieter machines. However, since there was significantly more existing equipment than new equipment, industry focused its resources on retrofit solutions. Unfortunately, too few retrofits were accomplished to substantially affect occupational noise exposure in the U.S.

Some companies did try to buy quieter equipment when expanding existing facilities and building new facilities. For example, when OSHA published early versions of 1910.95 noise limits in the 1970s, many individuals within companies tried to buy quieter equipment. Often the purchasing agents would include a noise limit such as:

The A-weighted sound level cannot be greater than 90 dBA at 3 feet from the pump and motor.

Frequently, the vendors could not supply the quieter equipment “off the shelf.” Standard equipment required the application of extensive and sometimes expensive engineering controls.

The early specifications did not always hit the mark. Sometimes, the purchasing agent would forget to mention operating speeds and loads on the equipment as part of the required noise measurements. Thus, the equipment might indeed meet the noise limit at the vendor’s shop but not

under actual operating conditions in the workplace.

When the Hearing Conservation Amendment finally became law in the early 1980s, some companies modified purchase orders to limit the noise to 85 dBA at 3 ft instead of 90 dBA at 3 ft.

One of the most important issues in the development of noise control for machinery has been the more stringent noise limits imposed by other countries on the purchase of equipment. Europe has led the way in requiring quieter equipment. In Norway, much effort has been focused on quieting machinery used in the onshore and offshore activities involving oil and gas. Some examples of such equipment are gas turbines for generating electrical power, transformers, compressors, pumps, and motors. Many of these items can now be purchased to meet an 85 dBA noise limit at one meter.

Recently, two major corporations that purchase about \$25 to \$30 billion US dollars worth of equipment each year have modified their noise limits. Although the exact details vary between the companies, basically they are requiring project equipment to meet an 80 dBA noise limit at one meter.

This action by these large corporations will create an economic incentive for vendors to develop quieter equipment. As a result, the availability of quieter products may increase, and make it easier for smaller businesses to purchase quieter equipment.

By investing in quieter products, consumers like you and me will encourage businesses to consider noise emissions in the design of their equipment. With these incentives, manufacturers will produce equipment that meets the noise limits without the need for an aftermarket upgrade—i.e., a retrofit-kit to make it quieter.

So how does this affect you, an OHC in the US? Whenever someone at your company asks your opinion about purchasing new equipment, here are three specific responses you can make to have a positive impact on lowering noise levels:

- Remind them that according to the NIOSH “hierarchy of noise controls,” the best way to protect workers is to eliminate the hazard.
- Suggest a stringent noise purchase specification, such as 80 dBA at 3 ft, and
- Educate the people by telling them what is happening in the field of noise control today.

Mr. Bruce is Principal Consultant at Collaboration in Science and Technology Inc., Houston, Texas, where he specializes in the solution of acoustical problems. He may be contacted at: bob@cstiacoustics.com



Recreational Shooting and Hearing Safety

By Theresa Y. Schulz, PhD

National Sporting Goods Association (NSGA) estimates that in 2005, 18 million people seven years or older in the United States hunted with firearms more than once a year, and 22 million participated in target shooting. The number of target shooters is estimated to have increased by 14% from 2003 (NSGA, 2005).

A new pamphlet is available from OSHA that provides information to help protect recreational firearms users from the hazards of impulse noise. An OSHA Alliance that includes NHCA/NIOSH/NASR (National Hearing Conservation Association, National Institutes of Occupational Safety and Health, National Association of Shooting Ranges) developed this informational pamphlet to address this significant public health issue. For information on how to obtain this pamphlet go to: www.hearingconservation.org.

The good news is that it's relatively easy to protect yourself from the noise of small arms fire. There are many varieties of hearing protectors available to address the issues of hunters and shooters. The most important point is to ALWAYS protect the ear. Exposure to gunfire in close proximity to the ear can cause serious permanent harm to a shooter's hearing, even with only a single shot.

Impulse noise, like gunfire, is very short but intense. Impulsive noise is characterized by a rapid rise to a high peak sound level followed by a rapid decay in sound level. The duration is typically less than one second, and in the case of gunshots only a few thousandths of a second.

The amount of auditory damage is dependent in a complex way on peak pressure, pulse duration, the waveform and the number of impulses, spectral content and the repetition rate (Laing, 1992, Price, 2006). There are several variables in recreational shooting that effect these parameters and thus the hazardous level of weapons fire.

Environment: Shooting indoors at a range, or in a blind, increases the hazard as the sound wave from the muzzle of the weapon reflects off hard surfaces back toward the shooter. Shooting outdoors allows the sound to dissipate more readily. Shooting at a range with many other shooters can increase the hazard by increasing the number of exposures.

Caliber and ammunition: Larger caliber weapons are typically more hazardous by producing higher intensity exposures. In general, the more gunpowder - the louder the exposure.

Weapon type and style: The source of the sound from firearms is the end of the barrel or muzzle. Shorter-barreled weapons are more hazardous since the muzzle is closer to the shooters ear. Rim fire pistols and rifles, such as a .22 caliber, produce approximately 134-140 dB (decibel peak). Center fire rifles and pistols (e.g., 357, 38, etc.) produce 156-164 dB. Shotguns can produce 159-168 dB. See Table 1 (page 7).

Additional distance between shooters at a range or in a hunting situation decreases the exposure level. Modifications such as muzzle ports or muzzle breaks increase the exposure by sending the sound wave back toward the shooter rather than out in front of the muzzle.

There are also individual differences in how our ears respond to hazardous noise. But there is no way to predict which individuals have tender ears and which have tough ears that are more resistant to noise-induced hearing loss. So it is vital to ALWAYS protect the ear from impulse noises.

Noise can damage hearing in two ways, through repetitive exposures where the cumulative dose of noise exceeds what the ear can tolerate, and through acoustic trauma where the structures of the inner ear are ripped and torn in one short, intense exposure. A single unprotected exposure to an impulse noise can cause permanent hearing loss. Weapons firing can add significantly to the overall dose of noise which can cause temporary or permanent hearing loss. Although it is difficult to measure the sound energy for impulse noise, Clark and Bohne state, "One bullet equals one week of hazardous occupational noise exposure. An avid target shooter can produce one year's worth of hazardous occupational noise exposure in just a few minutes on the target range." Of course this is dependent on all the factors we've discussed above. One .22 caliber round would not produce this level of damage unless it was fired very near the ear, but one .44 magnum round might.

Hearing protection can be effective in preventing noise-induced hearing loss especially from impulse noise. Proper use of hearing protection can protect the hearing of shooters with exposures up to about 180 dB.

Sounds louder than about 180 dB can create such severe pressure changes that they can physically damage soft tissue inside the body such as the lungs. (McKinley, 2003)

The best hearing protector is the one that is worn, and there are a wide variety of hearing protectors from which to choose that can meet the varied needs of hunters and shooters. Earplug types include,

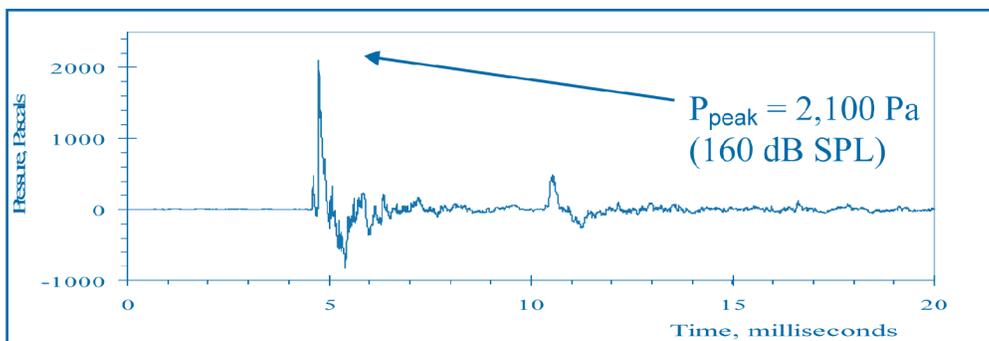


Figure 1: Impulse of an M9 9-mm pistol at a shooter's ear (from Sachs 2006).

continued on page 7

Recreational Shooting and Hearing Safety – continued from page 6

Table 1: Excerpted from Noise Navigator™ database. Berger. 2006.

PISTOLS			
Caliber	dBP	Caliber	dBP
.22 L.R.	152	.22 magnum	157
.25 ACP	155		
.32 ACP	154	.32 long	152
.380 auto	158		
.45 ACP	157	.45 Colt	155
.9 mm	160	9 mm, Model M9	157
REVOLVERS			
Caliber	dBP	Caliber	dBP
.357 magnum	164		
.38 special	158		
.41 magnum	163		
.44 magnum	164	.44 special	156
RIFLES			
Caliber	dBP	Caliber	dBP
.22 caliber	140-158	.22 L.R., rimfire	134
.223	155		
.243	156		
.25-06	159		
.30-06	159	with muzzle brake	169
.30-30	156		
.308	156		
.375 H&H Magnum	160	with muzzle brake	171
30 caliber	168-172		
5.56 mm, Model M16A2	157		
7-mm Magnum	160	with muzzle brake	170
M-1	161		
Model M3 Recoilless rifle	190		
SHOTGUNS			
Caliber	dBP	Caliber	dBP
12 gauge	156-173		
16 gauge	166-169		
20 gauge	153-168		
410 gauge	164-169	.410 bore	150

formable foam earplugs, premolded earplugs, electronic earplugs, electronic behind-the-ear custom earplugs. Earplugs can be level dependent. Earmuffs can be conventional, passive or electronic.

Target shooters often want maximum protection in order to decrease flinching and increase accuracy. Dual hearing protection (an earplug and an earmuff) can meet that need. The muff can easily be removed to make communication easier – such as hearing the range instructions.

Hunters on the other hand need to hear the prey and other environmental sounds, and some target shooters want to hear sounds around them as well. Communication may be vital for safety and enjoyment of both hunting and target shooting activities. Ninety-five percent or more of hunters report never wearing hearing protection when they hunt (Nondahl, et al., 2000; Taylor and Williams, 1966). There are varied solutions for this situation:

- 1) Filtered earplugs, called “level-dependent,” use acoustic friction to decrease the hazard of impulse noise with very little attenuation of speech and environmental sounds. Lindley, Palmer, Goldstein and Platt (1997), concluded that wearers of the level-dependent HPDs (hearing protection devices) in their study could maintain auditory awareness for sounds up to about 75 yards away. These types of earplugs take some adjustment since they don’t sound like traditional earplugs. They don’t ‘sound like’

they’re blocking much noise.

- 2) Electronic earplugs or muffs can include circuits that reduce sounds above a certain level. This not only allows the wearer to hear and the plug can even slightly amplify very quiet sounds, yet still provide protection from the hazardous impulse noise.

For hunting applications, the Noise Reduction Rating or NRR level on the package is not as critical as the other factors such as communication, fit, compatibility, and comfort. For target shooting, a higher NRR is better, but the other factors are more important.

The following symptoms may mean that gunfire noise is affecting your hearing:

- Tinnitus or ringing in the ears is a sign of potential damage. If you hear a ringing or rushing sound in your ears after leaving a noisy environment, it was probably too loud.
- Temporary reduced ability to hear speech and quiet sounds.
- Fullness in the ear after shooting.

Recreational shooting can be a fun activity. Shooters and hunters must always shoot with safety in mind and that includes hearing safety. For every shot to be safe, hearing protection is required for every shot.

References

Berger, E. H. (2006). The Noise Navigator™ database. Retrieved from: <http://www.e-a-r.com/pdf/hearingcons/NoiseNav.xls>, on September 22, 2006.

Clark, W. and Bohne, B.A. (1999). “Effects of Noise on Hearing.” *J. American Medical Association*, 281, 1658-1659.

Laing, Z. (1992). “Parametric relation between impulse noise and auditory damage,” in *Noise-Induced Hearing Loss*, edited by Dancer, A., Henderson, D., Salvi, R. J., and Hamernik, R. P., Mosby, St. Louis, 325-335.

Lindley, G. A. IV, Palmer, C. V., Goldstein, H., Pratt, S. (1997). “Environmental Awareness and Level-Dependent Hearing Protection Devices,” *Ear & Hearing*, 18(1), 73-82.

McKinley, R. (2003). “The Effects of High-Level Noise on Determining the Daily Noise Burden: Is the DRC Linear?” Presented at the Impulse Type Noise Best Practices Workshop, Cincinnati, OH., May 8-9, 2003. Retrieved from: http://www.cdc.gov/niosh/topics/noise/research/impulse_presentations.html, on September 23, 2006.

National Sporting Goods Association (2006). “2005 Sports Participation.” Available at: <http://www.nsga.org/public/pages/index.cfm?pageid=149>. Accessed on September 22, 2006.

Nondahl, D.M., Cruickshanks, K.J., Wiley, T.L., Klein, R., Klein, B.E.K., Tweed, T.S. (2000). “Recreational firearm use and hearing loss.” *Archives of Family Medicine*. 9(4) 352-357.

Price, G.R. (2006 in press). “Predicting Mechanical Damage to the Organ Of Corti.” *Hearing Research*, in press.

Sachs, F. (2006). Center for Health Promotion and Preventive Medicine. Retrieved from: chppm-www.apgea.army.mil/hcp/resources/Impulse_Noise_definition.ppt, on September 22, 2006.

Taylor, G.D., Williams, E. (1966). “Acoustic trauma in the sports hunter.” *Laryngoscope*. 76,863-879.

Certification Workshop for Course Directors

The Council will conduct a Course Director Workshop on Tuesday, April 17, 2007 at the Hyatt Regency Denver at Colorado Convention Center, Denver, Colorado.

This workshop will be prior to the American Academy of Audiology convention – Audiology NOW!

The Course Director (CD) is the individual responsible for planning and conducting training courses for OHCs. The Director is responsible for ensuring that specific CAOHC guidelines are followed and for determining the qualifications and competence of participating faculty members. Course Director certification and recertification is granted for a five-year period, provided that the CD complies with CAOHC requirements and continuously possesses appropriate credentials/licensure as specified in CAOHC's policy.

This workshop is a requirement for certification of new and recertifying Course Directors. Attendees are to submit an application and fee for approval by the CAOHC Screening Committee prior to the workshop. An additional workshop registration application fee is applicable.

A second CD workshop will be held in early November, 2007 in the Chicago area. All questions may be directed to Barbara Lechner, Executive Director, at 414/276-5338. Application and registration is available on-line at: www.caohc.org.



New ASHA representative joins Council

Ted K. Madison, MA CCC-A, was recently appointed by the American Speech-Language-Hearing Association as a second representative on the CAOHC Council, replacing Donald Henderson.

Mr. Madison is a Senior Technical Service Representative for the 3M Occupational Health and Environmental Safety Division in St. Paul, MN, and a CAOHC-certified Course Director at the Midwest Center for Occupational Health and Safety at the University of Minnesota. He was awarded a Master of Arts, Audiology by the University of Iowa in 1984. He served as President of the National Hearing Conservation Association (NHCA) in 2004-2005.

Professional Supervisor Course and Audiology NOW!

Audiologists and physicians who take on supervision of audiometric testing in hearing conservation programs should be competent in "best practices" of hearing conservation. The CAOHC Council will present a course titled: "The Professional Supervisor of the Audiometric Monitoring Component of Hearing Conservation Programs" on Wednesday, April 18, 2007 at the Hyatt Regency Denver at Colorado Convention Center, Denver, Colorado.

This course will be held as a Learning Lab, sponsored by the American Academy of Audiology (AAA) – AudiologyNOW! Registration is made through AAA and will be available on-line at <http://www.audiology.org/>

New federal recordkeeping and reporting requirements will stimulate interest in hearing conservation programs (HCPs) and will increase roles of audiologists and physicians as "Professional Supervisors" of HCPs. This skills-based training will provide a comprehensive tutorial on:

- Roles and responsibilities of the Professional Supervisor
- Elements and organization of successful hearing conservation programs
- Surviving new OSHA and MSHA recordkeeping regulations
- Latest tools to identify and prevent noise-induced hearing loss
- Guidelines for audiometric baseline revision and medical referral
- Managing "problem audiograms"
- Work relatedness and workers compensation

Attendees will receive continuing education credits, a copy of the CAOHC Hearing Conservation Manual 4th Edition, and unique training materials. This course leads to certification as a Professional Supervisor of the Audiometric Component. For registration and further information about certification go to: www.caohc.org/professional.html

Two additional Professional Supervisor courses will be held in 2007. One at the American Occupational Health Conference in the Spring in New Orleans, Louisiana. A second course will be held in early November 2007 in the Chicago area. For information on these additional courses, access the CAOHC website later this year.



National Hearing Conservation Association to Conduct 32nd Annual Hearing Conservation Conference

Like the beautiful city of Savannah, the 2007 conference being held February 15-17, 2007 at the Hyatt Regency in Savannah, Georgia, will be a fine blend of past, present and future. In addition to the array of podium and poster sessions that have made the NHCA conference the pinnacle of hearing loss prevention education and training in the United States, the keynote and luncheon presentations will pique your interest.

The keynote presentation will be made by Dr. Richard Price, who will discuss some of the issues surrounding the measurement and assessment of hearing hazard from impulse noises. Dr. Price is one of the lead developers of the Auditory Hazard Assessment Algorithm (AHAH), which is being considered for adoption as a standard method for impulse noise. Dr. Price will share insights for evaluating the hazards associated with common impulse noise sources in military, occupational, and recreational contexts.



An opening reception will be held on Thursday and there will be several opportunities throughout the conference to visit the commercial and public service exhibits.

The Friday luncheon presentation will be made by Dr. Charles Ross, Dean of the College of Arts and Sciences at Longwood College. Dr. Ross is the author of Civil War

Acoustic Shadows. Dr. Ross will discuss how an understanding of acoustic phenomena influenced command decisions in the Civil War. On Friday evening, a trolley and “low Country Boil” will be accompanied by live music.

Plan now to attend the 2007 NHCA Hearing Conservation Conference in Savannah! Watch the NHCA website, www.hearingconservation.org, for more information or call the NHCA office at 303.224.9022.

hearingconservation.org, for more information or call the NHCA office at 303.224.9022.

CAOHC Executive Committee to Meet in Denver

Since the CAOHC Council (synonymous with Board of Directors) decided to conduct one annual face-to-face meeting in the fall of each year, the Council Executive Committee, which includes the Chair, Vice Chair, Secretary-Treasurer, and Immediate Past-Chair, will meet Monday, April 16, 2007 in Denver, Colorado at the Hyatt Regency Denver at Colorado Convention Center.

The committee provides leadership to the Council and guides strategic planning.

OHC Spotlight and YOU!

We hope you enjoyed reading about Theo Mason in the “OHC Spotlight” on page 3 of this Fall issue. We think it’s interesting to read how OHCs, like you, are applying their knowledge and skills in diverse workplaces.

If you would like to be considered by the editorial staff for a future “OHC Spotlight” feature, please contact Barbara Lechner at the CAOHC office by e-mail: info@caohc.org or by phoning 414/276-5338.

UPCOMING OHC CERTIFICATION AND RECERTIFICATION COURSES* 2006 & 2007

*The listed dates indicate day one of the scheduled classes; certification courses are 20 hours in length; recertification classes are 8 hours.

Current as of October 2006 (for a complete list of courses visit our website at www.caohc.org);
for the most current list of courses contact the CAOHC office at 414/276-5338.

Begin Date	State	City	Course Director	Phone	Begin Date	State	City	Course Director	Phone
12/1/2006	MO	St Louis	Mary Aubuchon	314-747-5800	4/24/2007	PA	Bethlehem	James Robertson	610-868-8606
12/4/2006	OR	Portland	Michael Fairchild	503-259-2686	4/25/2007	PA	Bethlehem	James Robertson	610-868-8606
12/5/2006	MA	Auburn	Steven Fournier	508-832-8484	5/2/2007	MO	St Louis	James Jerome	317-652-6788
12/5/2006	HI	Honolulu	Dennis Sekine	808-487-9443	5/3/2007	MO	St Louis	James Jerome	317-652-6788
12/6/2006	AL	Birmingham	Georgia Holmes	205-934-7178	5/15/2007	MA	Auburn	Steven Fournier	508-832-8484
12/6/2006	OH	Columbus	James Jerome	317-841-9829	5/16/2007	IL	Chicago/Oak Park	Robert Beiter	708-445-7171
12/6/2006	OH	Cincinnati	Timothy Swisher	412-367-8690	5/16/2007	NC	Morrisville	Thomas Cameron	919-657-7500
12/6/2006	GA	Atlanta	Melette Meloy	678-363-9897	5/17/2007	IL	Chicago/Oak Park	Robert Beiter	708-445-7171
12/6/2006	TX	Houston	John Elmore	800-357-5759	5/17/2007	NC	Morrisville	Thomas Cameron	919-657-7500
12/6/2006	IL	Chicago/Schaumburg	Thomas Thunder	847-359-1068	5/22/2007	MI	Detroit	Thomas Simpson	313-333-2492
12/6/2006	NC	Morrisville	Thomas Cameron	919-657-7500	5/23/2007	MI	Detroit	Thomas Simpson	313-333-2492
12/7/2006	AL	Birmingham	Georgia Holmes	205-934-7178	6/5/2007	WA	Bellevue	Mary McDaniel	206-706-7352
12/7/2006	OH	Columbus	James Jerome	317-841-9829	6/6/2007	OH	Columbus	James Jerome	317-652-6788
12/7/2006	NC	Nancy Greensboro	George Cook	336-834-8775	6/6/2007	WA	Bellevue	Mary McDaniel	206-706-7352
12/7/2006	OH	Cincinnati	Timothy Swisher	412-367-8690	6/7/2007	OH	Columbus	James Jerome	317-652-6788
12/7/2006	GA	Atlanta	Melette Meloy	678-363-9897	6/7/2007	PA	Pittsburgh	Roger Angelelli	412-831-0430
12/7/2006	TX	Houston	John Elmore	800-357-5759	6/8/2007	PA	Pittsburgh	Roger Angelelli	412-831-0430
12/8/2006	IL	Bloomington	Deanna Ginder	309-826-0595	6/12/2007	MA	Auburn	Steven Fournier	508-832-8484
12/11/2006	FL	West Palm Beach	Herbert Greenberg	678-352-0312	6/15/2007	NC	Morrisville	Thomas Cameron	919-657-7500
12/12/2006	FL	West Palm Beach	Herbert Greenberg	678-352-0312	6/19/2007	IL	Chicago/Schaumburg	Thomas Thunder	847-359-1067
12/13/2006	TX	San Antonio	John Elmore	800-357-5759	6/20/2007	IL	Chicago/Schaumburg	Thomas Thunder	847-359-1067
12/14/2006	TX	San Antonio	John Elmore	800-357-5759	7/1/2007	IN	Indianapolis	James Jerome	317-652-6788
12/14/2006	MA	Marlboro	Pamela Gordon	860-526-8686	7/11/2007	NC	Morrisville	Thomas Cameron	919-657-7500
12/18/2006	HI	Honolulu	Dennis Sekine	808-487-9443	7/11/2007	WI	Brookfield	Edward Korabic	262-547-2227
12/20/2006	WI	Middleton	Frieda Calk Price	803-547-1435	7/12/2007	IN	Indianapolis	James Jerome	317-652-6788
1/3/2007	IL	Rockford	Charles Russell	815-964-5445	7/12/2007	WI	Brookfield	Edward Korabic	262-547-2227
1/4/2007	IL	Rockford	Charles Russell	815-964-5445	7/18/2007	IL	Rockford	Charles Russell	815-964-5445
1/5/2007	NC	Morrisville	Thomas Cameron	919-657-7500	7/19/2007	IL	Rockford	Charles Russell	815-964-5445
1/9/2007	MA	Auburn	Steven Fournier	508-832-8484	7/24/2007	PA	Bethlehem	James Robertson	610-868-8606
1/10/2007	IN	Indianapolis	James Jerome	317-652-6788	7/25/2007	PA	Bethlehem	James Robertson	610-868-8606
1/11/2007	IN	Indianapolis	James Jerome	317-652-6788	8/1/2007	IA	Davenport	James Jerome	317-652-6788
1/17/2007	CA	Fairfield	Charles Fankhauser	707-746-6334	8/2/2007	IA	Davenport	James Jerome	317-652-6788
1/17/2007	IL	Chicago/Oak Park	Robert Beiter	708-445-7171	8/6/2007	MS	Hattiesburg	Robert Rhodes	601-264-3545
1/17/2007	HI	Honolulu	Dennis Sekine	808-487-9443	8/7/2007	MS	Hattiesburg	Robert Rhodes	601-264-3545
1/17/2007	WI	Brookfield	Edward Korabic	262-547-2227	8/8/2007	FL	Jacksonville	Nancy Green	904-880-1710
1/18/2007	CA	Fairfield	Charles Fankhauser	707-746-6334	8/9/2007	FL	Jacksonville	Nancy Green	904-880-1710
1/18/2007	IL	Chicago/Oak Park	Robert Beiter	708-445-7171	8/17/2007	NC	Morrisville	Thomas Cameron	919-657-7500
1/18/2007	WI	Brookfield	Edward Korabic	262-547-2227	8/22/2007	MA	Auburn	Steven Fournier	508-832-8484
1/23/2007	CA	San Diego	Kirsten McCall	425-254-3833	8/22/2007	IL	Chicago/Schaumburg	Thomas Thunder	847-359-1068
1/24/2007	CA	San Diego	Kirsten McCall	425-254-3833	8/27/2007	WA	Bellevue	Mary McDaniel	206-706-7352
1/29/2007	FL	St Pete Beach	Thomas Cameron	919-657-7500	8/28/2007	WA	Bellevue	Mary McDaniel	206-706-7352
1/30/2007	PA	Bethlehem	James Robertson	610-868-8606	9/5/2007	KY	Louisville	James Jerome	317-652-6788
1/30/2007	FL	St Pete Beach	Thomas Cameron	919-657-7500	9/6/2007	KY	Louisville	James Jerome	317-652-6788
1/31/2007	PA	Bethlehem	James Robertson	610-868-8606	9/11/2007	MA	Auburn	Steven Fournier	508-832-8484
2/6/2007	MA	Auburn	Steven Fournier	508-832-8484	9/12/2007	UT	Salt Lake City	Pamela Cronin	801-566-8304
2/7/2007	OH	Toledo	James Jerome	317-652-6788	9/13/2007	PA	Pittsburgh	Roger Angelelli	412-831-0430
2/7/2007	NC	Morrisville	Thomas Cameron	919-657-7500	9/13/2007	UT	Salt Lake City	Pamela Cronin	801-566-8304
2/8/2007	OH	Toledo	James Jerome	317-652-6788	9/14/2007	PA	Pittsburgh	Roger Angelelli	412-831-0430
2/14/2007	UT	Salt Lake City	Pamela Cronin	801-566-8304	9/18/2007	CA	Fremont	Kirsten McCall	425-254-3833
2/14/2007	FL	Jacksonville	Nancy Green	904-880-1710	9/19/2007	CA	Fremont	Kirsten McCall	425-254-3833
2/15/2007	UT	Salt Lake City	Pamela Cronin	801-566-8304	9/19/2007	IL	Chicago/Oak Park	Erica Wenner	708-445-7171
2/15/2007	FL	Jacksonville	Nancy Green	904-880-1710	9/19/2007	WI	Brookfield	Edward Korabic	262-547-2227
2/20/2007	IL	Chicago/Schaumburg	Thomas Thunder	847-359-1068	9/20/2007	IL	Chicago/Oak Park	Erica Wenner	708-445-7171
2/21/2007	IL	Chicago/Schaumburg	Thomas Thunder	847-359-1068	9/20/2007	WI	Brookfield	Edward Korabic	262-547-2227
2/27/2007	WA	Bellevue	Mary McDaniel	206-706-7352	9/26/2007	NC	Morrisville	Thomas Cameron	919-657-7500
2/28/2007	WA	Bellevue	Mary McDaniel	206-706-7352	9/27/2007	NC	Morrisville	Thomas Cameron	919-657-7500
3/6/2007	MA	Auburn	Steven Fournier	508-832-8484	10/9/2007	MA	Auburn	Steven Fournier	508-832-8484
3/7/2007	KY	Louisville	James Jerome	317-652-6788	10/10/2007	WI	Madison	James Jerome	317-652-6788
3/8/2007	KY	Louisville	James Jerome	317-652-6788	10/11/2007	WI	Madison	James Jerome	317-652-6788
3/9/2007	NC	Morrisville	Thomas Cameron	919-657-7500	10/16/2007	MI	Detroit	Thomas Simpson	313-333-2492
3/12/2007	MS	Hattiesburg	Robert Rhodes	601-264-3545	10/16/2007	CA	Irvine	Kirsten McCall	425-254-3833
3/13/2007	MS	Hattiesburg	Robert Rhodes	601-264-3545	10/16/2007	IL	Chicago/Schaumburg	Thomas Thunder	847-359-1068
3/20/2007	MI	Detroit	Thomas Simpson	313-333-2492	10/17/2007	MI	Detroit	Thomas Simpson	313-333-2492
3/20/2007	CA	Sacramento	Kirsten McCall	425-254-3833	10/17/2007	CA	Irvine	Kirsten McCall	425-254-3833
3/21/2007	MI	Detroit	Thomas Simpson	313-333-2492	10/17/2007	IL	Chicago/Schaumburg	Thomas Thunder	847-359-1068
3/21/2007	CA	Sacramento	Kirsten McCall	425-254-3833	10/17/2007	VA	Glen Allen	Thomas Cameron	919-657-7500
3/21/2007	IL	Chicago/Oak Park	Erica Wenner	708-445-7171	10/18/2007	VA	Glen Allen	Thomas Cameron	919-657-7500
3/22/2007	IL	Chicago/Oak Park	Erica Wenner	708-445-7171	10/30/2007	PA	Bethlehem	James Robertson	610-868-8606
3/28/2007	WI	Brookfield	Edward Korabic	262-547-2227	10/31/2007	PA	Bethlehem	James Robertson	610-868-8606
3/29/2007	PA	Pittsburgh	Roger Angelelli	412-831-0430	11/7/2007	MO	St Louis	James Jerome	317-652-6788
3/29/2007	WI	Brookfield	Edward Korabic	262-547-2227	11/7/2007	MA	Auburn	Steven Fournier	508-832-8484
3/30/2007	PA	Pittsburgh	Roger Angelelli	412-831-0430	11/8/2007	MO	St Louis	James Jerome	317-652-6788
4/3/2007	MA	Auburn	Steven Fournier	508-832-8484	11/15/2007	PA	Pittsburgh	Roger Angelelli	412-831-0430
4/4/2007	IN	Ft Wayne	James Jerome	317-652-6788	11/16/2007	PA	Pittsburgh	Roger Angelelli	412-831-0430
4/5/2007	IN	Ft Wayne	James Jerome	317-652-6788	11/16/2007	NC	Morrisville	Thomas Cameron	919-657-7500
4/11/2007	CT	Shelton	Phyllis Sochrin	203-735-4327	11/28/2007	IL	Chicago/Oak Park	Robert Beiter	708-445-7171
4/12/2007	CT	Shelton	Phyllis Sochrin	203-735-4327	11/29/2007	IL	Chicago/Oak Park	Robert Beiter	708-445-7171
4/17/2007	CA	Ontario	Kirsten McCall	425-254-3833	12/4/2007	MA	Auburn	Steven Fournier	508-832-8484
4/18/2007	CA	Ontario	Kirsten McCall	425-254-3833	12/5/2007	OH	Columbus	James Jerome	317-652-6788
4/18/2007	IL	Chicago/Schaumburg	Thomas Thunder	847-359-1068	12/5/2007	IL	Chicago/Schaumburg	Thomas Thunder	847-359-1068
4/18/2007	IL	Chicago/Schaumburg	Thomas Thunder	847-359-1068	12/6/2007	OH	Columbus	James Jerome	317-652-6788
4/18/2007	VA	Glen Allen	Thomas Cameron	919-657-7500	12/12/2007	NC	Morrisville	Thomas Cameron	919-657-7500
4/19/2007	VA	Glen Allen	Thomas Cameron	919-657-7500					



CAOHC Announces — The 4TH Edition Hearing Conservation Manual

About the Manual . . .

The Hearing Conservation Manual 4th edition is here! If you're a member of a hearing conservation team in industry, military or mining – including occupational hearing conservationists, audiologists, physicians, industrial hygienists, acoustical engineers, safety engineers, and others – this manual will assist you in the front-line defense against hearing loss in your workers.

The 4th edition contains invaluable information & significant revisions including:

- How to set-up & maintain a hearing conservation program
- How the hearing conservation team works to prevent hearing loss
- Updated and expanded regulatory information from OSHA & MSHA
- Quick reference table comparing OSHA/MSHA/NIOSH
- OSHA and MSHA program compliance checklists
- 3 American National Standard Institute (ANSI) documents
- NHCA guidelines for revision of baseline audiograms
- A current survey of workers' compensation regulations in North America
- Expanded information on audiometric equipment & procedures; noise measuring instrumentation; and hearing protectors Reprints of valuable articles on hard to test workers, tips for fitting hearing protectors, and on noise controls
- Updated photos and graphs
- references to valuable website and useful documents in print

About the Author . . .

Alice H. Suter, PhD served as a Senior Bioacoustical Scientist in the U.S. EPA's Office of Noise Abatement and Control. As Manager of the Noise Standard at the U.S. Department of Labor's Occupational Safety and Health Administration (OSHA), she was the chief author of the Hearing Conservation amendment to the noise standard (29 CFR 1910.95). Dr. Suter joined the National Institute for Occupational Safety and Health (NIOSH) in 1988 as a Visiting Scientist and Research Audiologist. She is presently a private consultant in industrial audiology and community noise abatement.

About the Editor . . .

Elliott H. Berger, MS, is the Senior Scientist for Auditory Research at E·A·R / Aearo Company, where for over 25 years he has studied noise and hearing conservation, with an emphasis on hearing protection. He chairs the ANSI working group on hearing protectors, has been lead editor for two highly-regarded texts in noise and hearing conservation, and has also presented his research in over 60 articles and other text book chapters.

How to Order . . .

SHIP 1 COPY please @ \$55.00 US

Buy a manual for everyone on your team — DISCOUNTS ON VOLUME PURCHASES

Please ship	Volume Discount	Selling Price	TOTAL
	2-9 manuals	\$50.00 US	\$
	10-19 manuals	\$45.00 US	\$
	20-49 manuals	\$40.00 US	\$
	50 + over manuals	\$30.00 US	\$

Pricing includes handling & shipping. Rush shipments charges to be quoted.

Company Name (if applicable): _____

Name of Recipient: _____

Shipping Address: _____

Billing Address (if different than above): _____

City/State/Zip: _____

Daytime Phone: _____ Fax: _____ E-Mail: _____

Payment Information . . .

Payment Type (online orders are payable by credit card only) Check American Express MasterCard Visa

Name on Card _____

Credit Card Number _____ Expiration Date (MM/YY) _____

CAOHC Council Members and The Organizations They Represent

Chair

James D. Banach, MBA
American Industrial Hygiene Association
Quest Technologies & Metrasonics, Inc.
Oconomowoc, WI

Vice Chair

Mary M. McDaniel, MS CCC-A
American Speech-Language-Hearing Association
Pacific Hearing Conservation, Inc.
Seattle, WA

Secretary/Treasurer

Paul J. Brownson, MD FACOEM FAAFP
American College of Occupational & Environmental Medicine
The Dow Chemical Company
Indianapolis, IN

Immediate Past Chair

Richard W. Danielson, PhD
American Academy of Audiology
Baylor College of Medicine and National Space
Biomedical Research Institute (NSBRI)
NASA Johnson Space Center
Houston TX

Elliott H. Berger, MS INCE. Bd.Cert.
American Industrial Hygiene Association
E•A•R/Aeero Technologies
Indianapolis, IN

Robert D. Bruce, PE INCE. Bd.Cert.
Institute of Noise Control Engineering, Inc.
Collaboration in Science and Technology, Inc.
Houston, TX

Diane S. DeGaetano, RN, BSN, COHN-S, COHC
American Association of Occupational Health Nurses
Merial, Ltd.
Duluth, GA

Thomas L. Hutchison, MHA FAAA CCC-A
Military Audiology Association
Navy Environmental Health Center
Portsmouth, VA

Madeleine J. Kerr, PhD, RN
American Association of Occupational Health Nurses
Univ. of MN/School of Nursing
Minneapolis, MN

David D. Lee, MIS CIH CSP
American Society of Safety Engineers
University of Nevada, Reno
Environmental Health & Safety
Reno, NV

Ted K. Madison, MA CCC-A
American Speech-Language-Hearing Association
3M Occupational Health and Environmental
Safety Div.
St. Paul MN

J. Adin Mann, III, PhD
Institute of Noise Control Engineering
Iowa State University
Ames, IA

Peter M. Rabinowitz, MD MPH
American College of Occupational & Environmental Medicine
Yale Occupational & Environmental Medicine
New Haven, CT

Ronald D. Schaible, CIH CSP PE(Mass)
American Society of Safety Engineers
Robson Lapina, Inc.
Lancaster, PA

Mark R. Stephenson, PhD
American Academy of Audiology
CDC/NIOSH
Cincinnati, OH

Robert Thayer Sataloff, MD DMA FACS
American Academy of Otolaryngology - Head & Neck Surgery
Philadelphia Ear, Nose & Throat Assoc.
Philadelphia, PA

Vickie L. Tuten, AuD CCC-A
Military Audiology Association
US Army Preventive Medicine
Fort Bragg, NC

Stephen J. Wetmore, MD, MBA
American Academy of Otolaryngology - Head & Neck Surgery
R.C. Byrd Health Science/WVA Univ.
Morgantown, WV

79-1006-001

Fall 2006



Council for Accreditation in
Occupational Hearing Conservation
555 East Wells Street / Suite 1100
Milwaukee, WI 53202-3823

Address Service Requested



www.caohc.org
or e-mail our office
at info@caohc.org

PRSR STD
U.S. POSTAGE
PAID
MILWAUKEE, WI
PERMIT NO. 5438