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Update

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The Council for Accreditation in Occupational Hearing Conservation

Potential Contributions of Recreational Noise to Daily Noise Dose

By: Colleen G. Le Prell, PhD

Damaging sounds are most often associated with occupational noise sources, such as machinery or tools, or noise exposure associated with military duties. The occupational or military hearing conservationist likely has a reasonable understanding of individual noise risk based on dosimetry, noise mapping, or other records. However, noise exposure does not necessarily end with the end of the workday. Some individuals participate in activities such as listening to loud music (at concerts, clubs, or on devices), attending sporting events in loud stadiums, using power tools during home improvement projects or lawn care, using firearms during hunting or target practice, and so on. With the exception of unprotected firearm use, exposure to any one of these non-occupational sources is not likely to be immediately damaging as exposures are typically briefer and/or less frequent than the levels thought to cause acute permanent injury and hearing loss. None the less, understanding that a worker's total daily sound exposure may continue to increase after leaving the workplace is critical. The extent to which other ongoing sounds contribute to total daily exposure is an important educational concept to share with those enrolled in a hearing conservation program.

There is generally unanimous agreement that there is a dose-response relationship in which higher levels and longer durations of sound exposure are increasingly hazardous (OSHA, 1983; NIOSH, 1998). Given that general assumption, it should be clear that non-occupational noise has the potential to increase total exposure and thereby increase an individual's risk, particularly in cases where the recreational sound source is encountered frequently. The remainder of this article discusses sound levels at common recreational venues. In interpreting the potential risk of any single recreational event, readers are reminded of the cautionary note by Behar (2007), who notes that noise risk standards are to be applied over years, not hours. It is the repetition of noise dose exceeding 100% on a daily basis throughout a working career that is hazardous, not the single instance in which a noise dose exceeds 100% (although very high sound levels can induce acoustic trauma, including permanent hearing loss, after a single exposure). In other words, exposures at noise at periodic recreational events are not necessarily by themselves hazardous even if dose exceeds 100%, but these exposures would become hazardous with repetition. Moreover, they add to the total daily or weekly dose that a person might accrue during the work-day or work-week, and do thus increase a given worker's total risk of noise-induced hearing loss (NIHL).

Concerts. The two most common non-occupational mass noise exposures reported in a recent survey of New York City residents were concerts and sporting events, with an estimated annual duration of event attendance of approximately 50 hours per year (Neitzel et al., 2011). In an early report, Cabot et al. (1979) conducted sound level measurements at multiple establishments and reported average levels for live rock music were ~95 dBA across venues (ranging from 78-115 dBA). Opperman and colleagues (2006) more recently measured sound levels at a pop concert (360 min), a rock concert (210 min), and a rock-a-billy concert (195 min). The average sound levels reached or exceeded 95 dBA, regardless of music type, at every location measured within the venue hall. In some locations, average levels were as high as 102-107 dBA. Given event durations of 3-4 hours, exposures like these reach or exceed daily occupational noise exposure limits. A person's total daily noise exposure would depend on the noise levels experienced at work, time spent at an evening concert, and sound level at their location within the concert venue. If the concert were a weekend event, total weekly exposure would increase relative to 5-day per week assumptions.

Nighclubs/Discotheques. Cabot et al. (1979) reported average sound levels of ~85 dBA across venues (ranging from 71- 93 dBA). Sound levels were higher in a more recent study reporting levels in 10 nightclubs around the Sydney, Australia area. Average levels across the clubs were reported to be ~98 dB equivalent continuous A-weighted sound pressure level (LAeq), and individual clubs had measured levels ranging from ~91 to ~106 dB LAeq (Williams et al., 2010). Recent sound level measurements in a German discotheque revealed average sound levels of 102 dBA (Müller et al., 2010). Values are similar in

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Council for Accreditation in Occupational Hearing Conservation

Update

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Message from the Chair

By: D. Bruce Kirchner, MD MPH CPS/A

The past two years have been a gratifying experience for me serving as your Chair. CAOHC continues to take steps to expand its mission of "Advance best practice in occupational hearing conservation worldwide." In thinking about a subject for this message, I reflected on this mission and found it to be daunting in nature. Certainly the task of advancing best practices is a challenge, in that many of us probably have a different opinion on what is best. How can we ever establish a consensual, defensible position on best practice? Even more so advancing these practices worldwide? Taking on the world is not something most of us are willing to sign up for!

The Council can agree on one point, our mission is definitely aspirational in nature. Through the Council's strategic planning process, we take time at each face-to-face meeting and try to come up with an approach to move our mission forward. We are currently putting together a committee to start discussing best practices in occupational hearing conservation. We are thinking of ways we can work through different organizations in countries outside the United States. I believe CAOHC is the best organization to take on the task of globally expanding our reputation in the training and certification of individuals involved in occupational hearing conservation.

One thing I did want to accomplish during my tenure was to work toward solidifying our structure. By that I mean insuring all our by-laws and policies are up-to-date and in line with our mission and certification program goals, and legally defensible. All non-profit organizations need to continually pay attention to these issues and I believe we have made good progress in this area which will help sustain us through the future.

I am handing off the chair position to a person I have worked with for many years, and who has dedicated her life to occupational hearing conservation, Dr Laurie Wells. Laurie is a proven leader, so I have no doubt that CAOHC is in excellent hands. Be looking for a Chair's Message from Laurie in the next *Update*.

Finally, I want to tell you what a great group of people CAOHC has for representing the professional organizations on the Council, as well as the strong management staff we enjoy. They are all dedicated people always willing to volunteer when needed. To the rest of you who are volunteers for CAOHC, we cannot thank you enough!

D. Bruce Kirchner, MD, MPH CPS/A; Occupational Physician. Dr. Kirchner is the Global Medical Leader for Procter & Gamble's Household Care business, with responsibilities in assuring the occupational health of 30,000 employees in manufacturing and research. Additionally, he is the system owner for hearing conservation across the company. He retired from the U.S. Army in 1995 after 21 years of service in which he was involved in hearing conservation in field units, as well as industrial operations. Dr. Kirchner has a B.A. in English from the Virginia Military Institute, an M.D. from the University Of Pittsburgh School Of Medicine, and an MPH from the University Of Pittsburgh School Of Public Health. He is board certified in Internal Medicine, Occupational Medicine, and Preventive Medicine & Public Health. Dr. Kirchner is a Member Delegate to the National Hearing Conservation Association Executive Council. He is also a Fellow of the American College of Occupational and Environmental Medicine and was recently appointed to the Council for Accreditation in Occupational Hearing Conservation as a Council Member representing ACOEM. You can contact Bruce Kirchner at: kirchner.db@pg.com

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studies originating in the United Kingdom (101 dBA; see Smith et al., 2000), and Argentina (104-112 dBA, see Serra et al., 2005). Müller et al. (2010) reported that 3 hours/week was a typical discotheque visit time, whereas Williams et al. (2010) reported typical visit times of 5 hours/week. These estimates are generally consistent with the 4.3 to 4.4 hour/week attendance estimates from other groups (Jokitulppo et al., 1997; Smith et al., 2000). Some nightclubs have live music and when sound levels were measured at 8 live-music nightclubs in New York City, the average sound levels during performances ranged from ~95 to 107 dBA (Gunderson et al., 1997). When periods of no live music were included in the calculations, average sound levels were lower, ranging from ~92 to ~100 dBA (Gunderson et al., 1997). Taken together, attendance time and sound levels are probably fairly comparable for concerts and nightclubs, the noise dose accrued at either venue likely falls within the same general range, and these exposures likely reach or exceed the daily noise limit.

Sporting Events. Time spent at sporting events was reported to range from 68 hours per year among transit users to 186 hours per year among subjects that do not routinely use mass transit, for a New York City population (Neitzel et al., 2011). There is not extensive literature on sound levels at sporting events, however the available data are reviewed here. **Football.** Engard et al. (2010) sampled sound levels at three stadiums in Northern Colorado, including a "large-sized college football stadium," a "medium-sized college football stadium," and a "National Football League (NFL) stadium." Average sound levels that fans were exposed to in the stadiums were ~91 dBA (medium and large college stadiums) to ~95 dBA (NFL stadium). After accounting for the duration of the exposures, the 8-hr TWA calculated using OSHA guidelines was 85-86 dBA (62% to 66% daily dose), whereas the ACGIH 8-hr TWA was 90-92 dBA (420-806% daily dose) (Engard et al., 2010). **Hockey.** When sound levels were measured during three Stanley Cup hockey play-off games, the average levels ranged from ~101 dBA to ~104 dBA, with occasional peaks exceeding 120 dBA (Hodgetts & Liu, 2006). Game durations were approximately 3 hours, and temporary changes in threshold sensitivity were measured in the two attendees tested. **Golf.** A single case report describes a patient with a permanent audiometric notch, consistent with NIHL, after a reported exposure in the form of golfing with a titanium club that produced a sound "like a gun going off" upon impact with the ball (Buchanan et al., 2008). Buchanon et al. (2008) measured peak sound levels on impact for a variety of steel and titanium golf clubs, and reported levels of 120-130 dB peak SPL.

Music Players and Hearing. It has been widely suggested that modern digital audio players are potentially more dangerous than the personal stereos of previous generations due to their smaller size, convenience, larger storage capacity, longer battery life, and the capability of producing high level sounds. Selected listening level and duration of use per day are critical, as are duration of time over which the behavior is repeated and exposure to other noise sources. All of these factors interact to determine the potential for changes in hearing over time (for excellent recent reviews, see Levey et al., 2011; Portnuff et al., 2011). It is beyond the scope of this brief review to identify all of the excellent work in this area. Therefore it will simply be noted that listening levels measured in a variety of adolescent and adult populations have typically averaged around 70-75 dBA in-ear level in quiet settings, and around 90 dBA in-ear level when measured in noise backgrounds. Across studies, a small subset of any given population typically prefers higher music levels (100-120 dBA in-ear level).

Summary and Conclusions

NIHL continues to be a problem for workers in a variety of industries as well as military personnel despite the required use of HPDs. Correct fitting and use of HPDs are of course a challenge, but the role of non-occupational noise may need additional attention during discussions of worker hearing loss prevention. While many non-occupational noises are not likely to be encountered at a high-enough level or for a long enough duration on such a frequently repeated basis that they would be considered hazardous by the occupational hazard definition, they do add to total daily and weekly exposure. For a worker who experiences loud sound at work, the additional impact of the non-occupational noise may be much more significant than the same non-occupational noise insult would be for another individual not exposed to chronic work-related noise. Workers should be counselled that non-occupational noise that may not be hazardous on its own has the potential to increase the overall risk of NIHL over time.

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Dr. Le Prell is currently a professor at the University of Texas at Dallas, and one of the leading researchers in the area of hearing loss prevention. Her work has emphasized the identification of cell death pathways activated by noise, and assessment of therapeutic agents that prevent cell death and hearing loss. Before joining UT Dallas, Dr. Le Prell served as interim chair of the Department of Speech, Language and Hearing Sciences at the University of Florida. - UT Dallas School of Behavioral and Brain Sciences

The Importance of Detecting Temporary Threshold Shifts

By Matthew Williams, AuD

The primary goal of a hearing conservation program is to prevent noise-induced hearing loss. The principal method to accomplish this is by controlling the noise at its source by utilizing engineering controls to reduce the noise level. Secondary to noise source management, reducing the risk of noise-induced hearing loss involves the use of hearing protection by workers. To ensure compliance with personal protective equipment use, signs are placed in hazardous noise areas to remind workers to wear earplugs or earmuffs; workers are educated and trained on when, why, and how to wear hearing protection. Administrative action may even be used for non-compliant workers. Yet, there are still a vast number of permanent threshold shifts with workers exposed to noise. Through appropriate timing of the annual test and follow-up monitoring of hearing levels after a significant threshold shift is detected, temporary changes in hearing can be identified to support the existing preventative measures.

Noise-exposed workers receive a baseline hearing test and periodic hearing tests, at least annually thereafter, in order to detect any change in hearing. The goal is the early identification of noise damage to prevent any permanent hearing loss. However, all too often the annual hearing test is simply used as a tracking tool to document hearing loss over time for individuals or groups of people for record keeping and trend analysis. Unfortunately, the purpose of hearing testing is often to check the box and meet the testing requirements with little regard to investigation of why an individual's hearing has changed. Investigation and prevention need to come before a permanent shift occurs.

Noise-induced hearing loss is preventable if the worker wears hearing protective devices when and how they are supposed to be wearing them. If a permanent threshold shift exists, it is probably not from just one exposure to loud noise, with exception to blasts and explosions. It is most likely due to repeated improper use of hearing protection in noisy situations. Auditory fatigue is bound to occur after being in the noisy workplace without proper protection. Therefore, the best time to detect this temporary shift in hearing would be near the end of a work cycle.

The Occupational Health and Safety Administration (OSHA) requires a 14-hour noise-free period before the baseline hearing test is performed, but it does not give specifications for noise exposure before the annual test.[1] However, the National Institute for Occupational Safety and Health (NIOSH) recommends the annual test be completed during or at the end of a work shift (after noise exposure) to detect any signs of auditory fatigue.[2] If no shift in hearing thresholds is noted after working in the noisy environment, it can be assumed that the worker is properly protected in that workplace. However, if there is a shift in hearing thresholds during this annual test, it is unknown at this point if it is a temporary shift due to auditory fatigue or if it is permanent. Another hearing test should be administered to the worker after a period of auditory rest. NIOSH recommends at least 12 hours of quiet prior to the follow-up test.[2] If the threshold shift on this "follow-up" hearing test is no longer present, the examiner assumes it was a temporary hearing loss, most likely due to improper protection while working in noise.

Department of Defense hearing conservation programs require a follow-up test after any significant shift in hearing[3], but most hearing conservation programs in an industrial setting do not include retesting because OSHA does not require it.[1] In these cases the professional supervisor must either assume the shift in hearing is already permanent and reset the baseline, or refer the worker for additional testing with an audiologist. In some cases, a prompt follow-up test would have eliminated the need for an audiology or professional supervisor referral after identifying the temporary shifts.

According to a 2014 United States Air Force report, 3.25% of all workers on the hearing conservation program had a temporary threshold shift in 2013.[4] Although the percentage seems low, it was over 4,000 workers who experienced a temporary shift in hearing, potentially due to auditory fatigue after improperly protecting their hearing while exposed to hazardous noise. That's 4,000 people being retrained on the proper use of hearing protection to prevent the shift in hearing from becoming a permanent hearing loss!

So the question remains, are OHCs performing annual hearing tests because it is required by OSHA, or performing the test as a tool for prevention? If the goal truly is prevention, then OHCs should be looking for those temporary shifts in hearing thresholds. Hearing conservationists should perform the annual hearing test toward the end of the workday after the worker has been exposed to noise, performing a follow-up test on any worker who shows a significant shift in hearing.

During an informal inquiry with OHCs during CAOHC recertification courses, I learned that several of the recertifying OHCs were being told by their professional supervisor to require a noise-free period prior to all tests to cut down on the number of repeat tests they are doing. While this may save a little time with the handful of follow-up audiograms, they are missing the opportunity to intervene with workers who may not be adequately protected. The result might result in an increase in permanent threshold shifts in the future, which might also increase the time and money spent on new, permanent, work-related hearing losses. Is the purpose of monitoring audiometry hearing loss prevention or merely an exercise in record-keeping?

The views expressed are those of the author and do not necessarily reflect the official policy or position of the Air Force, the Department of Defense, or the U.S. Government.

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Matt Williams has been a CAOHC Course Director since 2008. Dr. Williams has served in the Air Force as an Audiologist for ten years and has certified hundreds of public health technicians as hearing conservationists. He has been instrumental in the improvement of the AF Hearing Conservation Program during his time at the AF School of Aerospace Medicine. Dr. Williams is currently a Pediatric Audiologist and devotes much of his time to hearing conservation in children and teens.

The Effect of Education on the Decision to Wear Ear Plugs

By Elizabeth Marler, Purdue University

From a young age, children learn to brush their teeth every day and to sit through regular eye examinations. Unfortunately, the same kind of lifelong education is lacking for auditory health. We use Q-tips regularly and attend concerts without protection — habits that unknowingly leave us susceptible to auditory damage. What if information about general ear health were provided? Would awareness catalyze action to prevent damage to hearing? How does access to resources change health behavior?

College students are a population at high risk for noise-induced hearing loss due to noise exposure at bars, concerts, workout classes, and sporting events. Beyond a general risk, over half of college students voluntarily expose themselves to harmful levels of music and noise.[1] The reality of college students elevated risk to hearing damage raises the following important research questions: Are college students taking preventative action to protect their hearing? What would motivate them to do so? My three-part study evaluated the decisions of college students to wear or not wear hearing protective devices when attending on-campus music concerts.

The first part of the study took place at a concert at a private Midwestern university. An exit survey, completed by 149 students, gauged how much students knew about auditory health, the dangers of loud music, and their decisions to wear or not wear ear plugs. The students attending the concert were not given any information about the risk of entering without hearing protection nor were they provided with ear plugs. The results were unsurprising. Only five percent of students reported wearing hearing protection during the concert.

Part two of the study was conducted at the following campus-wide concert. A group of 36 students attended a voluntary session before the concert on noise-induced hearing loss and the harmful effects of attending the concert without protection. The students were provided with ear plugs. After the concert, the students took a survey which asked whether they wore the ear plugs that were provided and if there were any noticeable changes in their hearing abilities as a result of the concert. The results from the second part of the study showed that, with face-to-face education and the provision of free ear plugs, over half (55.6%) of the students reported wearing hearing protection at the concert. Education and resources together catalyzed preventative action in a high-risk population.

Figure 1
Students who wore ear plugs to the concert

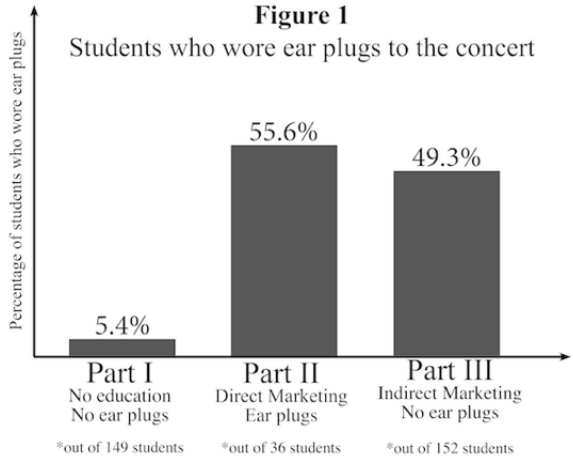

Figure 2 *Motivations for Wearing Hearing Protection or Not*

Wore ear plugs:
36.8% The ear plugs were free, why not?
28.9% Concerts are too loud for me and I wanted to muffle the noise
13.2% I learned about the dangers of noise-induced hearing loss today and wanted to protect my ears
7.24% I always wear ear plugs when in noise because I'm concerned about developing hearing loss

Did not wear ear plugs:
26.3% Music sounds distorted when I wear ear plugs
24.3% Uncomfortable to wear
7.9% Unattractive cosmetic appeal
3.9% Did not know ear plugs were available

However, would the strategy be as effective without a face-to-face presentation on noise-induced loss? The last part of the study, conducted at the succeeding concert, employed a different educational strategy. Signs and handbills displayed noise-induced hearing loss facts as well as risks of attending the concert without protection. Over 2,000 students walked by the signs and picked up the handbills, three-fourths of those picking up a pair of ear plugs on their way into the concert venue. Volunteers were available to demonstrate or assist on how to properly insert the ear plugs. As attendees exited the venue, a survey evaluated whether the attendee wore the ear plugs, why or why not, and if there were any noticeable changes in hearing abilities as a result of the concert. Of the 152 students surveyed, almost 50% reported to have worn ear plugs at the concert (see Figure 1).

Why did students choose to wear or not wear free ear plugs provided on-site? The majority of college students reported their motivation to wear ear plugs came from the availability of resources and the loud concert environment. A smaller percentage chose not to wear hearing protection because ear plugs distorted the quality of the music and made it difficult to converse with friends. Overall, the top two concerns that students identified as reasons to *not* wear ear plugs ("Music sounds distorted…" and "Uncomfortable to wear") could be addressed by the use of musician's ear plugs. Unlike the standard (and highly affordable) plugs used in the present study, musician's ear plugs, which fit comfortably in the canal, would allow for sound to be attenuated without appreciable reduction in sound quality.

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As audiologists attempt to broaden awareness of the field while encouraging preventative health behaviors, it is important to evaluate whether national educational campaigns could have a significant impact on changing attitudes and actions towards auditory health. The results of the study suggest that, at least in the setting of campus concerts, providing education and resources has an impact on an individual's decision to take preventative action for their auditory health. Face-to-face education, such as an in-person presentation, showed to be more effective in motivating students to wear ear plugs than indirect educational strategies, such as pamphlets. The availability and allocation of resources is another important factor to consider for audiologists interested in promoting public health. Beyond education strategies, the present study suggests that, if resources to promote hearing health are made available, individuals are likely to take advantage of them. Evidence for the impact of education and resource allocation gives promise to audiologists' efforts to promote positive health behavior. Perhaps it will be a hearing test that finally joins the ranks of other annual doctor's appointments.

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Elizabeth Marler is a first year graduate student in the AuD program at Purdue University in West Lafayette, IN. She is a graduate of Truman State University in Kirksville, Missouri, where she conducted her research. Elizabeth has presented this research at the 2015 Missouri Speech-Language-Hearing Association annual conference, the 2015 American Speech-Language-Hearing Association annual conference and will present at the American Academy of Audiology Conference in April. emarler@purdue.edu

UPDATE Call for Articles

CAOHC Wants to *HEAR* from you!

CAOHC is currently accepting articles for 2016 *UPDATE*, our publication offered at no charge to the entire hearing conservation community. Each edition is posted on our new website, reaching over 22,000 occupational hearing conservationists. Writing for *UPDATE* is your chance to reach thousands of colleagues within the hearing conservation industry who are committed to occupational Hearing Conservation, just like you!

Articles that will be selected must complement CAOHC's mission and goals, as well as be relevant. We are interested in hearing about innovative hearing loss prevention programs, new innovations in training employees to be hearing conservation compliant, your challenges and your successes.

In addition, *UPDATE* places the "spotlight" on an outstanding Occupational Hearing Conservationist, Course Director, or Professional Supervisor. If you know of someone in your company deserves the "spotlight" for their commitment to hearing conservation, please craft a brief testimonial (approximately 75-100 words or less) and include that person's name, your company name and a recent head-shot photo. Your "spotlight" candidate will be added to our next issue, as well as, posted to the CAOHC website.

Submit your article or your "spotlight" testimonial along with your contact information to Kim Stanton at kstanton@caohc.org, or our *UPDATE* Editor, Dr. Antony Joseph, at earsafety@yahoo.com. Also, please let us know what you would be interested in reading in future issues of *UPDATE*. You may send your comments or questions to the CAOHC Administrative Office at info@caohc.org. Thank you again for your interest in *UPDATE*!

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The Council for Accreditation in Occupational Hearing Conservation

By Don Garvey, CSP, CIH; 3M Company; Personal Safety Division - Applications Engineering; St. Paul, MN

Noise-induced hearing loss (NIHL) is one of the most pervasive occupational health illnesses in the manufacturing industry. Per Bureau of Labor Statistics, occupational hearing loss accounts for 1 in 9 recordable illnesses in the industry. One method to reduce NIHL is obviously to eliminate the noise exposure. However, this is not always feasible. In this case, a high quality, effective hearing conservation program (HCP) can be a significant factor in minimizing NIHL in the workforce.

The question then becomes how to ensure a high quality HCP? The Council for Accreditation in Occupational Hearing Conservation (CAOHC) is a professional organization dedicated to providing consumer safety and protection by offering credentialing to those working to prevent noise-induced hearing loss. CAOHC does this by providing credentialing in 3 areas of occupational hearing conservation. The qualifications and requirements for credentialing listed below are only an overview:

- Certified Occupational Hearing Conservationist (COHC) – the front line person who meets with the worker, performs pre-audiometry ear inspections, provides audiometric testing, does initial screening for problem audiograms, conducts training in regard to audiometric testing and the adverse effects of noise, use/fitting/care of hearing protection, and may be involved in maintaining equipment and recordkeeping. The COHC is not expected to interpret audiograms, diagnose hearing disorders, conduct noise surveys or design noise controls.
  In a manufacturing facility, this may be the company nurse, safety director or other person directly involved with audiometric testing. Certification requires attending a CAOHC-approved 20-hour course and passing a standardized examination.
- Professional Supervisor of the Audiometric Monitoring Program (PS) – The PS establishes and oversees the audiometric testing program ensuring proper equipment, testing, training and recordkeeping protocols are developed and implemented. The PS oversees the OHC's work, reviews audiograms, makes required baseline comparisons, and determines if any confirmed threshold shift or hearing loss is work-related. If so, the PS sees that proper worker notification, follow-up and entries into databases such as the OSHA 300 log occur.
  In a manufacturing facility, this may be the staff physician or an audiologist or otolaryngologist that is retained by the employer. Certification requires the candidate currently hold a license in the practice of medicine or audiology, recommended completion of a CAOHC-approved professional supervisor course and successful completion of an examination.
- Course Directors (CD) – CAOHC-approved courses are conducted by CAOHC trained Course Directors. CDs must have adequate professional and educational backgrounds and be certified by one of several different professional organizations (e.g. ABIH, BCSP, licensed physician, nurse or audiologist). They must also demonstrate a minimum of 1000 hours devoted to occupational hearing conservation during the previous five years and complete an 8-hour CAOHC CD workshop or equivalent. CAOHC provides CDs with training resources and professional support to assist in ensuring high quality training for OHCs.

The Hearing Conservation Manual, 5th Edition, is a common reference for hearing conservationists, and is published by CAOHC. This manual contains information on all aspects of occupational hearing conservation – from anatomy of the ear to understanding audiograms to worker training. The manual includes reference documents on industry specific noise requirements such as the Mine Safety and Health Administration 30 CFR Part 62. The *Hearing Conservation Study Guide* is designed to supplement the COHC course. CAOHC also publishes a free on-line newsletter with short articles on occupational hearing conservation.

If your facility has a hearing conservation program that includes audiometric testing, certification by CAOHC may be something to investigate.

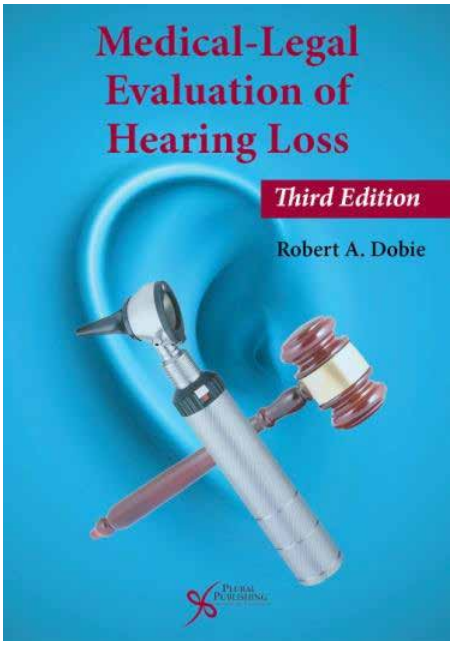
References

NIOSH Occupationally Induced Hearing Loss DHHS (NIOSH) Publication No. 2010-136

CAOHC website www.caohc.org

Suggested Reading

Submitted by Antony Joseph, Editor, CAOHC Update e-Newsletter



In August 2015, Plural Publishing released *Medical-Legal Evaluation of Hearing Loss*, Third Edition, authored by Robert A. Dobie MD. For many years, this text has served as a comprehensive medical-legal resource for attorneys, physicians, and audiologists. When the first edition of his book was released, Dr. Dobie was a representative on CAOHC's Council for the American Academy of Otolaryngology - Head and Neck Surgery. He is currently a clinical professor of otolaryngology at both the University of Texas Health Science Center at San Antonio (UTHSCSA) and the University of California, Davis, as well as a partner in Dobie Associates providing consultation in hearing, balance, hearing conservation, and ear disorders.

This exceptional book includes the most accurate and current developments in the field with more than 250 new references. A comprehensive guide on hearing loss and the law, *Medical-Legal Evaluation of Hearing Loss* examines claims, court cases, and the evolution of hearing conservation. It extensively addresses age-related hearing loss, genetics of hearing loss, and noise-induced hearing loss (NIHL) with a newly revised international standard (ISO-1999, 2013) that presents a comprehensive predictive model for NIHL, critical in medical-legal evaluation. Also examined is hearing loss due to toxins, trauma, and disease as well as the effects of cardiovascular risk factors, race, and socioeconomic status. Dr. Dobie has included tutorial discussions of acoustics, hearing, and hearing testing - a valuable resource for attorneys, paraprofessionals, and other non-clinicians.

New or expanded topics include: (1) the relationship of hearing loss to brain disorders, (2) job fitness, (3) accommodations under the Americans with Disabilities Act, (4) blast injury, (5) recreational music and hearing loss, (6) hypothesis of progressive NIHL after noise cessation, (7) solvent ototoxicity, (8) appropriate exchange rate for predicting noise hazard, and (9) the American Medical Associations method of measurement of hearing disability. The new edition of *Medical-Legal Evaluation of Hearing Loss* provides practical guidance for expert witnesses and legal practitioners, and is essential for otolaryngologists, audiologists, occupational physicians, attorneys handling hearing loss claims, and claims management professionals.

Reference information:

Medical-Legal Evaluation of Hearing Loss, Third Edition | Author: Robert A. Dobie, MD | Published: 07/15/2015 | ISBN: 978-1-59756-714-5 | http://www.pluralpublishing.com/publication_mlehl3e.htm

Leadership

The CAOHC leadership otherwise known as the Council consists of two representatives from each of the following Component Professional Organizations (CPO).

- **American Association of Occupational Health Nurses (AAOHN)**
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  Bryan Topp, RN MPH COHN-S COHC
- **American Academy of Audiology (AAA)**
  Laurie Wells, AuD FAAA CPS/A
  Council Chair
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- **American Academy of Otolaryngology - Head & Neck Surgery (AAO-HNS)**
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