



UPDATE

The Newsletter of the Council for Accreditation in Occupational Hearing Conservation

VOLUME 11 • ISSUE 1 • Spring 2000

Chair's Message

by Peter Weber, MD FACS

CAOHC Chair, Representative of the American Academy of Otolaryngology Head and Neck Surgery



Greetings!
It is with great pleasure that I would like to kick-off the first CAOHC UPDATE in the year 2000.

As we begin the new millennium, our first article starts off with the new regulations for the mining industry that have recently been approved. This article will update the changes that you need to be aware of and that will be enforced beginning September of 2000. Check this article out to see if it has any effect on your situation. On another note, the Mine Safety and Health Administration (MSHA) has also recognized CAOHC for OHC (Occupational Hearing Conservationist) certification as a requirement in order to meet MSHA hearing conservation guidelines. The value and knowledge

that CAOHC certification provides is indeed invaluable, and MSHA has recognized this as well. I continue to encourage our OHCs to keep up-to-date in their knowledge and to recertify as needed. Your encouragement of others in the field of hearing conservation to obtain the same level of expertise as yourself, and to become CAOHC-certified, is paramount.

I am also pleased to be announcing that a new portion of the OHC training course may now include a video produced by CAOHC Council members. This video curriculum package will enhance the educational process for OHCs.

As we all know, construction workers are subjected to significant amounts of noise throughout their careers. Unfortunately, the standards for hearing conservation programs in this industry is not as rigorous as those in the industrial arena. An excellent

article in our newsletter updates and discusses a new computer game that motivates construction workers to take steps to prevent their loss of hearing due to noise. It further emphasizes the need for hearing conservation in the construction business and highlights that this is a field OHCs may be able to monitor and make a difference in for hearing conservation.

Equally important is the "OHC Corner" which highlights some excellent points on how an OHC can express the importance of a hearing conservation program to upper-level management in their place of employment.

Finally, the Course Director Survey results are in, and they are discussed in great detail in this issue. I hope you find this UPDATE as informative and useful as I have, and should you have any questions, please do not hesitate to contact me.

Permissible Noise Levels in Audiometric Test Rooms

by Jennifer Tufts and Tom Frank

Department of Communication Disorders, Penn State University

All audiometric test rooms contain some background or ambient noise originating from the ventilation system, lighting, noise outside the test room, or other sources. Too much ambient noise in a test room may artificially elevate hearing thresholds, especially for normally hearing listeners. To minimize this problem, the American National Standards Institute (ANSI) has specified maximum permissible ambient noise levels (MPANLs) allowed in an audiometric test room to insure that hearing thresholds can be

obtained down to 0-dB HL. ANSI first specified MPANLs in 1960 which have been revised in 1977, 1991, and most recently in 1999. The 1999 standard is called ANSI S3.1-1999 and specifies MPANLs for several testing situations depending on whether or not hearing is tested with or without earphones and the frequency range over which hearing will be tested.

ANSI S3.1-1999 refers to hearing testing done with earphones as ears covered (EC) testing. An example would be during pure-tone audiometry when

each ear is covered by an earphone placed on top of the outer ear called a

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UPDATE

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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 \$15. Payment must accompany request:

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OHC Certification

CAOHC Certification is valid 5 years from the date of the original 20-hour course. Recertification through an 8-hour course must be made by the expiration date of your CAOHC issued certificate. Your application must be filed with the CAOHC office to be valid. Contact CAOHC staff to verify certification or to locate an approved CAOHC course by calling 414/276-5338...or locate courses at CAOHC's website: www.caohc.org.

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 414/276-3349; or e-mail to info@caohc.org.



Mine Safety & Health Administration Announces New Health Standard

By James D. Banach, MBA
Representative of the American Industrial Hygiene Association

The mining workplace has extensive challenges and hazards inherent to the work being done. Among the most difficult health hazard is exposure to excessive noise. Recently, the Mine Safety and Health Administration (MSHA) published a new health standard for occupational noise exposure. This new standard appeared in the Federal Register of September 13, 1999 in Volume 64, #176.

For twenty years, the mining industry has had two different standards for coal mines, and metal/non-metal mines. One of the primary reasons to update the regulation is to have one common regulation for all mining applications. Additionally, MSHA has recognized that its first rule has not satisfactorily controlled the occurrence of noise-induced hearing loss. In many ways, the new MSHA regulation mirrors OSHA's current noise and hearing conservation regulation, however, a few key differences do exist.

① MSHA is retaining the use of the 5 dB (decibels) exchange rate, and the 90 dBA time weighted average (TWA) Permissible Exposure Level (PEL). If the PEL is met or exceeded while measuring all noise between 90 and 140 dBA, then engineering or administrative controls must be applied. This is consistent with the original MSHA requirements. Additionally, under the new standard, should a time weighted average of 85 dBA occur, while measuring all noise between 80 and 130 dBA, then the Action Level is exceeded and a hearing conservation program must be applied.

② Noise measurement programs must establish a system to effectively determine a miner's exposure to noise. Few specifics are given; rather this is a performance-based concept. As long as the results work and are accurate, MSHA

will accept the method. In addition to the 85 and 90 dB landmarks, a separate limit of 115 dB is set that must not be exceeded. This is an "A" weighted, slow response value, not a peak. When noise measurements are to be performed, the miner must be given adequate prior notice to allow for observation by a representative of the miner.

③ Noise controls and administrative actions are to be the first line of defense. All economically and technically feasible controls are to be applied even if they won't be enough to reduce the exposure below the PEL. The exposure is to be reduced as close to the PEL as possible, and then hearing protection may be applied to close the remaining gap. A control will be deemed feasible if it reduces the exposure by 3 dB.

④ If the miner's exposure meets or exceeds the Action Level of an 85 dBA time weighted average, the miner is to be enrolled in a hearing conservation program. This program includes continued monitoring of exposure, continued controls and the use of hearing protection if needed, an audiometric program of training and record keeping.

⑤ The audiometric evaluation program:

1. begins with a baseline test within 6 months of first exposure. **Annual tests are performed and compared to this baseline.** The audiometric tests must be conducted with a scientifically validated procedure and include the frequencies of .5, 1, 2, 3, 4, and 6 kHz. *Existing tests taken prior to the implementation*

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MSHA

continued from page 2

of this regulation may be used for this purpose. Note: For those utilizing a mobile van service for audiometric testing, the time limit for the baseline is extended to one year; however, those miners waiting the additional six months are to wear hearing protection once the initial 6-month period is passed.

2. The miner is not to be exposed to workplace noise for 14 hours prior to the baseline test. *Hearing protection may be used to achieve some of the quiet time.*

① A physician, audiologist, or a **qualified technician** under the direction or supervision of a physician or audiologist must perform these audiometric tests. MSHA as part of its definition of an audiologist includes a requirement for either ASHA certification, or state licensure. **The qualified technician is defined as “a technician who has been certified by the Council for Accreditation in Occupational Hearing Conservation (CAOHC), or by another organization offering equivalent certification.”**

- ① When comparing the annual test to the baseline:
1. if a change of an average of 10 dB occurs in either ear, at the frequencies of 2000, 3000, or 4000 hertz, then a Standard Threshold Shift (STS) has occurred.
 2. the application of presbycusis (age) adjustment is acceptable when making this determination.

- ① If an STS is detected, certain follow up procedures are needed:
1. issuing or evaluating existing hearing protection.
 2. checking that controls are in place and adequate.

① Should the shift at any of the frequencies mentioned above be an average of 25 dB or more, the shift becomes reportable to MSHA. Should any audiometric test be determined to be invalid, it must be re-done within 30 days. If either an STS or reportable shift is detected, a retest may be performed within 30 days.

① All audiometric results must be communicated to the miner in writing.

MSHA's Key Numbers	
85 dBA TWA	Action Level
90 dBA TWA	Permissible Exposure Limit
105 dBA TWA	Dual Hearing Protection Required
115 dBA Slow Response	Ceiling Limit
10 dB Average of 2, 3, & 4 kHz	Standard Threshold Shift
25 dB Average of 2, 3, & 4 kHz	Reportable Threshold Shift

① The miner may refuse audiograms, and no written waiver is required. MSHA does allow for the establishment of having audiometric exams as part of an employment policy.

- ① Hearing protection is to be provided to the miner when:
1. exposures equal or exceed the action level.
 2. the exposure exceeds the action level and an STS is detected, then the protection must be worn. Protection must also be worn if the PEL is exceeded and controls cannot adequately reduce the exposure.

① MSHA defines an adequate selection of hearing protection as a choice between two plugs, and two muffs. No cost is to be charged to the miner for the hearing protection. Training is required before the issuance of the protection, and no assessment is made as to NRR. In those cases where exposure exceeds 105 dB, dual protection, the wearing of plugs with a muff over them is required.

- ① Training needs to be provided to each miner within 30 days of program entry. This training is to include:
1. the effects of noise on hearing,
 2. need for hearing protection devices, pros and cons of each type, proper selection, fit, use, and care of the protection.
 3. additionally, the general requirements of the regulation, audiometric information, and proper noise control maintenance are to be included.

① Training is to be repeated on an annual basis.

① A written certificate including the date and time of training is to be maintained.

- ① Records that are to be kept include:
1. the written notice of the miner's exposure.
 2. audiometric test results, including evidence of valid procedure.
 3. miner's exposure.
 4. documentation of training provided.

This new standard is intended to better control the occurrence of noise-induced hearing loss in the mining industry. It takes effect one year from the date of publication (September 2000).

The preceding is an overview of the standard. Readers are encouraged to read the entire regulation and the support materials presented in its development. For details, the regulation, 30 CFR Part 62 is available on the web at:

<http://www.msha.gov>
(under “Statutory and Regulatory Information”)

and by mail request to:
Carol J. Jones, Acting Director
Office of Standards, Regulations, Variances
MSHA
4015 Wilson Blvd
Arlington, VA 22203-1984.

Editors Note: A future issue will contain a table comparing MSHA regulations discussed in this article to existing OSHA regulations and recent NIOSH recommendations.



CAOHC ANNOUNCES VIDEO CURRICULUM PACKAGE

CAOHC ANNOUNCES THE RELEASE OF: THE ANATOMY, PHYSIOLOGY AND DISEASES OF THE EAR VIDEO CURRICULUM PACKAGE

This video is narrated by Robert Dobie, MD while he was Professor and Chairman of the Department of Otolaryngology of the University of Texas Health Science Center. Dr. Dobie served on the CAOHC Council for ten years as the representative of the American Academy of Otolaryngology-Head and Neck Surgery. He is the author of the book Medical-Legal Evaluation of Hearing Loss. The Anatomy Video Curriculum includes a 22-minute video written and produced by CAOHC and supplemental materials that will help you involve your students, health staff, industrial workers, and others in the learning process.

This Anatomy Curriculum will:

- Provide audiometric technicians, industrial workers & CAOHC students with solid background information about the anatomy and physiology of the human ear.
- Instruct on the parts of the ear, how sound is processed, types of hearing loss and how they can be prevented.
- Increase knowledge about the effects of noise - encouraging workers to be more receptive to hearing conservation programs.
- Qualifies as an otolaryngologist in a 20-hour certification course. (If you are a CAOHC Course Director and using this video curriculum in a CAOHC approved OHC course, please consult the CD Handbook 2000 to meet course requirements.)

Curriculum package: \$ 300.00 + \$7.50 UPS shipping
Discount for CAOHC Course Directors: \$ 200.00 + \$7.50 UPS shipping

Quantity	Curriculum Price	+ UPS Shipping	Total
	\$	\$	\$

Name _____

Company Name _____

Address (No PO Boxes please) _____

City/State/Zip _____

Method of Payment MC VISA Check/Money Order/Cash

Card No. _____

Name on Card _____ Exp. Date _____

The OHC as a Business Liaison

Constance M. Tatman, MS RN CCM COHN-S

Representative of the American Association of Occupational Health Nurses

The Occupational Hearing Conservationist (OHC) is a pivotal person in the Hearing Conservation Program (HCP). The OHC may work onsite in a manufacturing setting, in an occupational health clinic or on a mobile van. He or she may have many responsibilities or be solely responsible for administering valid audiograms. No matter how many roles the OHC may have, the OHC is the liaison among the employee and employer (or health care provider).

The Occupational Hearing Conservationist (OHC) may have to "sell" the benefits of a hearing conservation program (HCP) to plant management or potential clients. While a primary focus of the OHC is the health and safety of the employees, it is important for the OHC to provide management with a link to the hearing conservation program and how it supports the business objectives of owners & managers. Before attempting to sell the hearing conservation program, ask yourself the following questions:

Who are the customers of your services?

- Internal customers include the employees exposed to high occupational noise levels, line managers and upper management.
- External customers can include regulatory agencies, insurers and healthcare providers.

What are the needs of your customers?

- Employees working in a safe environment.
- An effective program that prevents hearing loss.
- Bottom line cost effectiveness for management.

The OHC should be prepared to present management with the immediate and long term benefits of the hearing conservation program.

What core competencies are needed to provide a high quality hearing conservation program? We suggest you:

- Become familiar with your client's business.
- Identify two or three of your client's main objectives.
- Identify the client's expectations before offering your services.
- Link your program to support their business needs.

A high quality HCP includes knowledge of and compliance with the requirements of federal regulation CFR1910.95 and the ability to communicate this to others in the HCP. An occupational hearing conservationist certified by CAOHC increases the surety that valid audiometric testing will be conducted and that hearing protection training and recordkeeping will be done according to federal requirements.

If the OHC works onsite, it is important to be highly visible in championing the program and in obtaining and maintaining management support. When OHCs work in an offsite clinical setting they also are a vital team member - even though they may interact with the employee only once a year.

Does the Hearing Conservation Program go beyond fulfilling regulatory requirements?

Employees need the OHC to be their advocates. Meeting regulatory requirements assures that you are meeting the minimum standards. It is important to consider ways in which you can provide a value-added program. This can be accomplished by stressing hearing loss prevention in all aspects of the employee's life whether at work or at home. The OHC may want to provide educational resources to the entire family.

How do we assure the quality of your program?

- Prepare a tool to insure quality assurance.
- Decide what your goals are.
- Develop objectives to meet your goals and measure the program against those goals.
- Evaluate your program at regular intervals.
- Identify your strengths and weaknesses.
- Make appropriate modifications to your program.

Editor's Note: For further information on obtaining management support for hearing conservation programs, see UPDATE newsletter, Fall 1997, Vol.8, Issue 3, "Getting Management Support for Hearing Conservation Programs." (This article is available on the CAOHC website under the heading UPDATE Articles.)

CERTIFICATION & RECERTIFICATION FEES FOR OHCs

Due to an increase in printing and mailing costs of this quarterly newsletter and in order to maintain prompt and accurate processing of applications for certification, the Council voted at their November 1999 meeting to increase fees for OHC certification and recertification. Fees for certification upon completion of a 20-hour OHC course have not been increased since 1986 and recertification fees were last increased in 1993.

Fees for any course completed on or after June 1, 2000:

- \$60.00: Initial Certification upon completion of a 20-hour course
- \$25.00: Recertification upon completion of an 8-hour course

Permissible Noise

continued from page 1



Jennifer Tufts



Tom Frank

supra-aural earphone or when the foam eartip of an insert earphone is inserted into each ear canal. ANSI does not endorse the use of earphones contained in a noise-reducing plastic enclosure that fit around the outer ear similar to an earmuff hearing protection device. Hearing testing done without earphones is referred to as ears not covered (ENC) testing and typically occurs when a listener responds to sound from a loudspeaker. Since earphones act to reduce or attenuate ambient noise, higher levels of ambient noise are allowed in a test room for EC compared with ENC testing. This is especially true for insert earphones since they produce more attenuation than supra-aural earphones.

ANSI S3.1-1999 defines three test frequency ranges for either EC or ENC testing. The three test frequency ranges are 125 to 8000 Hz, 250 to 8000 Hz, and 500 to 8000 Hz. Typically, the test frequency ranges 125 to 8000 Hz and 250 to 8000 Hz are used in clinical audiometry while the test frequency range 500 to 8000 Hz is used in occupational testing. The MPANLs for each test frequency range are slightly different. This occurs because more low frequency ambient noise can be present in a test room if hearing is tested from 500 to 8000 Hz compared with testing from 125 to 8000 Hz. It

is important to note that ANSI requires that the ambient noise levels in the test room *must be measured from 125 to 8000 Hz* regardless of the test condition or the test frequency range to be employed in the test room. Stated another way, if hearing will only be tested from 500 to 8000 Hz, the ambient noise levels at 125 and 250 Hz must still be measured since high levels of low frequency ambient noise can artificially elevate hearing thresholds for higher-frequency pure tones.

A two-step approach can be used to determine if the ambient noise levels in an audiometric test room are in compliance with the ANSI MPANLs. The first step is to measure the ambient noise levels with a Type 1 sound level meter (SLM) in either octave or one-third octave band intervals. Octave band measurements *must be conducted* at 125, 250, 500, 1000, 2000, 4000, and 8000 Hz while one-third octave band measurements *must be conducted* at 125, 250, 500, 800, 1000, 1600, 2000, 3150, 4000, 6300, and 8000 Hz. During the measurements, the SLM microphone should be placed at all locations in the test room normally occupied by a listener's head and all possible sources of noise should be operating. This would include the ventilation system, lights, and any instrumentation or machines inside or outside the test room. The second step is to compare the measured ambient levels with the MPANLs specified in ANSI S3.1-1999 for the test condition (EC using a supra-aural earphone or EC using an insert earphone or ENC) and the test frequency range (125 to 8000 Hz, 250 to 8000 Hz, or 500 to 8000 Hz) that will be used in the test room. If the measured ambient noise levels are equal to or less than the

ANSI MPANLs, the test room is acceptable for testing down to 0-dB HL. If one or more of the measured ambient noise levels is higher than the ANSI MPANLs, the test room is not acceptable and measures should be taken to reduce the ambient noise level in the test room as reported in Annex F of ANSI S3.1-1999.

Since occupational testing uses the EC test condition and the 500 to 8000 Hz test frequency range, Table 1 shows the ANSI octave band MPANLs for testing with a supra-aural and insert earphone from 500 to 8000 Hz as well as the MPANLs specified by OSHA in 1983. The OSHA MPANLs allow more ambient noise in a test room compared with the ANSI MPANLs and do not require measuring ambient noise levels at 125 and 500 Hz. This occurs because OSHA has not revised their MPANLs since 1983, and because the OSHA MPANLs are based on the those specified by ANSI in 1960 which in turn were based upon reference thresholds specified in a 1951 standard that were about 10 dB less sensitive than the current reference threshold levels. Several research studies have clearly demonstrated that hearing thresholds obtained with supra-aural earphones cannot be obtained down to 0-dB HL in a test room having ambient noise levels equal to the OSHA MPANLs. Therefore, it is strongly recommended that testing be done only in audiometric test rooms that meet the stricter ANSI MPANLs. This will ensure accurate measurement of hearing thresholds for both baseline and annual audiograms.

Author's note: Jennifer Tufts is a Ph.D. student in the Department of Communication Disorders at Penn State. Tom Frank is a Professor of Communication Disorders at Penn State and was the chair of the ANSI working group responsible for ANSI S3.1-1999. ANSI S3.1-1999 can be obtained from: The Standards Secretariat, Acoustical Society of America, 120 Wall Street, 32nd Floor, New York, NY 10005-3993, Phone: (212) 248-0373, E-mail: asastds@aip.org.

Table 1. ANSI S3.1-1999 octave band MPANLs allowed in an audiometric test room using a supra-aural or insert earphone and the OSHA 1983 MPANLs for a supra-aural earphone for testing from 500 to 8000 Hz.

	Octave Band Interval						
	125	250	500	1000	2000	4000	8000
ANSI, Supra-aural Earphone	49	35	21	26	34	37	37
ANSI, Insert Earphone	78	64	50	47	49	50	56
OSHA, Supra-aural Earphone	—	—	40	40	47	57	62

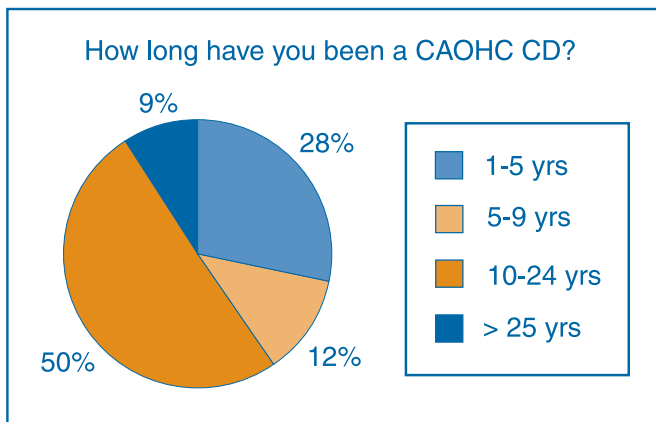
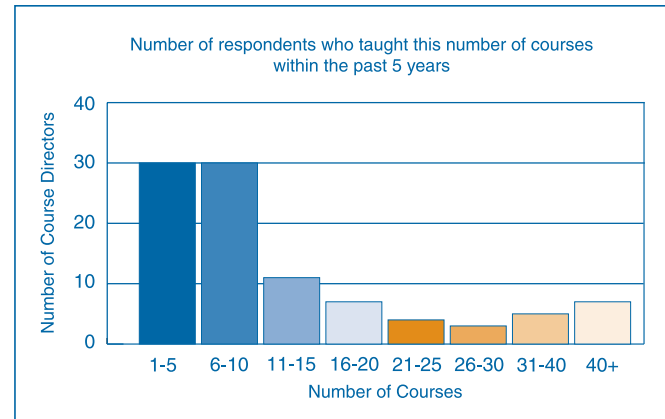
CD Survey Results

By Theresa Y. Schulz, USAF, PhD CCC-A

Representative to the CAOHC Council for the Military Audiology Association



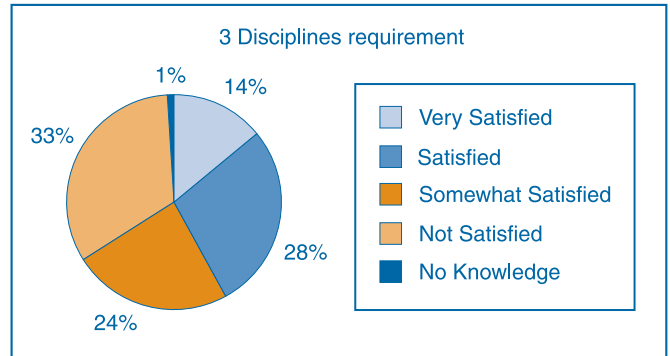
As promised here are some of the results from the 1999 CAOHC Course Director (CD) survey. Thanks to those of you who completed the survey. We received 140 responses, a 37% return rate, which we're pretty happy with. Based on CDs requesting course approval, a little over 40% of the registered CDs taught courses in 1999, so we think we heard from most of the active CDs. Below is a summary of the demographics of the respondents.



The survey covered several topics: Occupational Hearing Conservationists (OHCs) Course & Certification process; Course Director Certification process; satisfaction with Council leadership; satisfaction with Executive Office Staff and the Long Range of CAOHC. All pie charts report percentages of responses; the bar chart above reports number of respondents.

Overall, Course Directors are satisfied with the approval form (95%); approval process (95%); 30 day advance course approval (85%); CD packet materials (87%).

The CAOHC Council has been aware that the requirement for instructors from 3 disciplines is somewhat unpopular and has developed an *Anatomy and Physiology Curriculum Package* to substitute for an otolaryngologist.



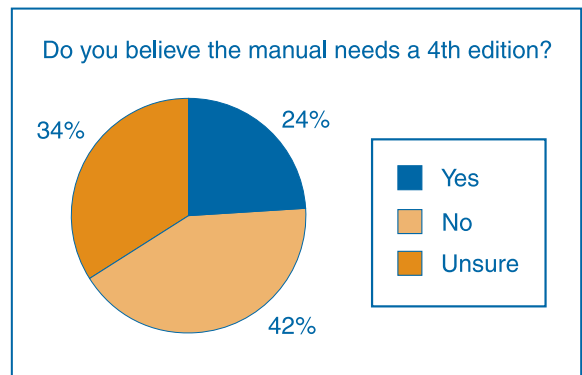
The recent change to allow CDs to consolidate applications and fees is fairly popular (87%).

The minimum hours for instruction was judged "About Right" by 77% of CDs for the 20 hours of initial certification and by 80% of CDs for the 8 hours of re-certification.

There is some support (23%) for shorter certification and recertification periods with the most common suggestion for a change was 3 years. However, no changes in certification periods are planned at this time.

The CAOHC video rental program was not used by 86% of CDs and review of the history of loans shows very little use. Therefore, this difficult-to-manage service has been terminated since it has little value to CDs.

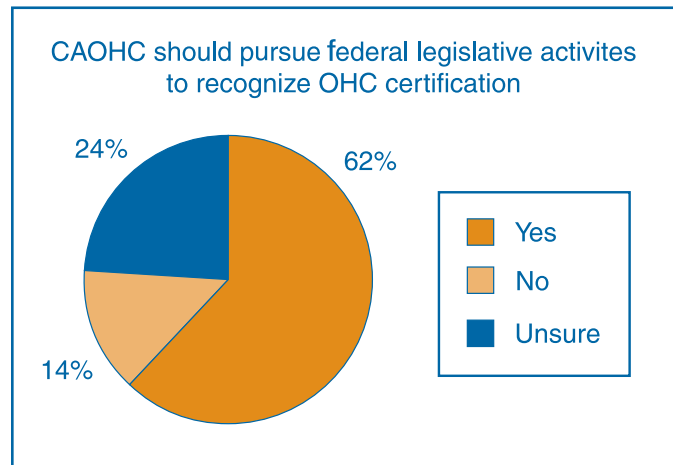
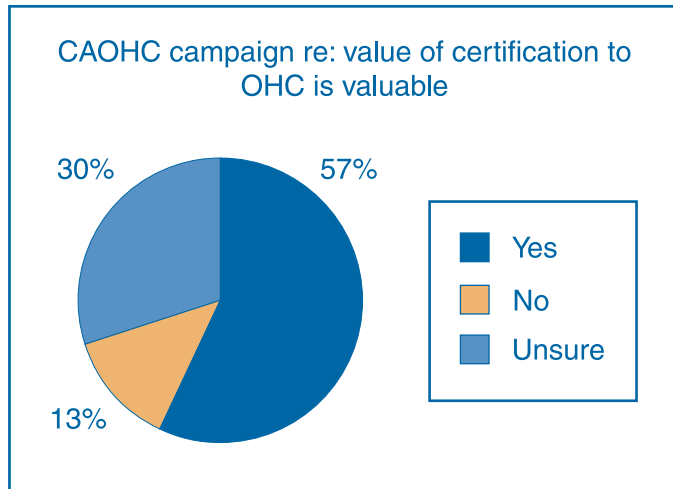
The current CAOHC Manual received a 75% approval rating for format and appearance and only 24% called for a new edition. There were some excellent suggestions as to what to include in a future revision.



CD Survey Results

continued from page 7

Respondents thought there might be some value in a CAOHC campaign to market the value of certification for OHCs to industry. The video portion of the *Anatomy and Physiology Curriculum Package* includes information about the value of CAOHC and can be used for this purpose. Respondents also favored pursuit of legislative activities to recognize OHC certification.



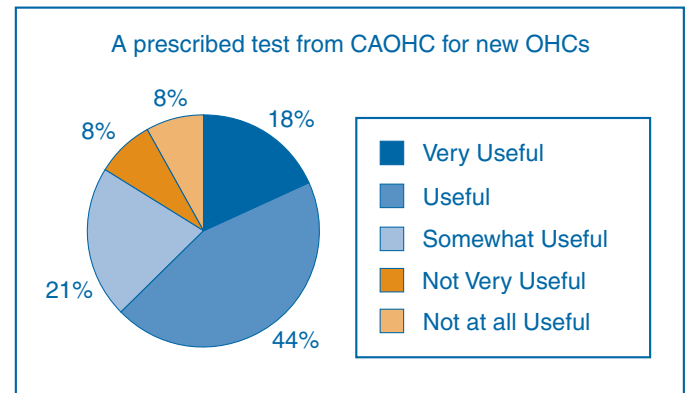
RECERTIFICATION DATE FOR OHCs

If you are unclear when your recertification date is due, there are several ways to locate this date: check above your mailing address on this newsletter; review the certificate from your last course; contact the CAOHC office. As a reminder, we also mail a 6-month reminder card that is time for you to recertify. Remember to keep us informed of any address change through e-mail, fax, phone or mail.

Your certification date is the date you took the 20-hour initial course. Any subsequent recertifications are dated from the date of the recertification course.

The most useful future benefits from CAOHC were judged to be Powerpoint (computer generated) teaching materials (76% of respondents thought these useful or very useful); requesting information on-line (72% thought this useful); and materials to introduce CAOHC at OHC courses (70% thought this useful). Some Powerpoint teaching materials as well as materials to introduce CAOHC at OHC courses is included in the *Anatomy and Physiology Curriculum Package*.

The idea of a prescribed test from CAOHC for new OHCs was widely accepted and is being seriously considered as CAOHC moves forward.



If you'd like a copy of the complete CD Survey Summary (minus individual comments), contact CAOHC at 414/276-5338 or info@caohc.org. The CD Survey results were a big part of our long range planning session and were referred to frequently. Thanks again for helping the CAOHC Council continue to move in a positive direction.

CORRECTION FROM THE EDITORS:

In the article titled "Eye Contact: linking eye color and hearing loss" by Julia Doswell Royster, PhD and Larry H. Royster, PhD in the Winter 1999-2000 UPDATE newsletter, paragraph 5 should have read:

"The cochlea also contains melanocytes, and it appears that they play an important role in cochlear function. Albino people (whose melanocytes fail to produce melanin) can hear normally. However, individuals who have no melanocytes (due to genetic mutations) are hearing-impaired. After exposure to noise, cochlear melanocytes produce more melanin."

We apologize for any inconvenience.

Reference UPDATE, Winter 1999-2000, Volume 10, Issue 4.

Can a computer game prevent hearing loss? - Nurse-researcher is finding out



by Margaret Kaeter, Contributing Writer NETWORK Magazine

As Jim watches his grandchildren play in the front yard of his rural Minnesota home, he laments that he can't hear their voices and laughter. It's the result of an unfortunate occupational legacy. "We just never really paid much attention to the noise. It was just an annoyance you put up with as part of the job," says this retired construction worker. "Now when I look back on it I know my partial hearing loss is a result of that."

"An estimated 30 million workers in the U.S. are exposed to hazardous noise; in one study, half of all construction workers reported some hearing loss," says Madeleine Kerr, an assistant professor at the University of Minnesota. "The Occupational Safety and Health Administration Noise Standard for construction workers just isn't as stringent as the one for industrial workers."

Fun and prevention merge

In lieu of OSHA's iron hand, Kerr's research group has turned to innovative health communications woven with fun and games in an effort to motivate construction workers to wear hearing protection. They have developed a computer program based on an espionage theme — complete with narration by "Mission Impossible"'s Peter Graves — that takes workers through virtual tours of the ear and lets them play games to minimize "Dr. Noise." At the same time, they are learning vital facts about just how loud their jobs are and how they can prevent hearing loss.

"This is a very complex, sophisticated product. It's not superficial," says Cathy Croghan, an undergraduate nursing student member of the research team. "There is a depth to the espionage story."

"Our multimedia developers stretched to make this an excellent product," adds Kerr. "So many people are used to getting information from

computers and playing games on them that we knew we had to do this well to keep their attention. This is such a powerful way to reach large groups of people."

The entire program takes about 40 minutes and is divided into five segments. At the aluminum level, users answer questions about their jobs and their use of hearing protection and their thoughts about earplugs and muffs. They answer questions with a "thumbs up" or "thumbs down." At the copper level, they receive all the information OSHA requires in the more stringent industrial noise standard. Users "fly" through the human ear and watch animated hair cells react to noise. They can hear the actual sounds from their jobs and compare them to other construction jobs.

At the bronze and silver levels, each participant is introduced to different types of hearing protection and given the opportunity to practice wearing the one he or she feels will work best. At this point, the information becomes highly tailored for the test group. For example, if the worker is a carpenter who identifies barriers to using hearing protection, she or he sees videos of carpentry tasks and hears messages about overcoming barriers to wearing earplugs or muffs. The universal finale is "Congratulations, gold agent," as participants complete the program.

Working partners

Team members are confident their program will work because they've had input from many construction workers along the way. "They really keep us on track so we could make this challenging and fun but not juvenile," says Christian Calaguas, a graduate student member of the research team and the focus group facilitator. "For example, they told us they wanted statistics that show why they need hearing protection. They also wanted to know how loud their jobs were."

While pilot programs this spring will determine how effective the new program really is, the research team is already looking to the future.

"Some of the things that excite me are the possibility of putting it on line and creating a Spanish version," says Calvin Greet, a graduate nursing student member of the research team. "This has such broad applications that can put added life into this project."

Reprinted with permission NETWORK magazine, Spring/Summer 1999, Vol.1, No.1 (School of Nursing, University of Minnesota)

Since this article was published, the research team has completed pilot studies and has implemented the computer game intervention with over 600 construction workers. While outcome evaluation awaits completion of post-intervention data collection in Spring 2001, the team has gathered some process evaluation data summarized here. Participants (n=662) agreed with the following characteristics of the program:

Able to understand the content	98%
Computers easy to use	95%
Learned something new	92%
Would like more programs like this	92%
Program was fun	84%
Program kept my interest	82%

The research team will use this valuable feedback in making revisions for the next version of the software. For more information, visit the project's webpage at <http://www.umn.edu/hps> or send e-mail to Dr. Kerr at kerrx010@tc.umn.edu. You may also send correspondence to:

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Assistant Professor
University of Minnesota
School of Nursing,
6-101 Weaver-Densford Hall,
308 Harvard Street SE,
Minneapolis, MN 55455.

Letter to the Editor

The UPDATE Editor received the following letter from CAOHC Course Director Gary Harris, PhD from West Virginia in response to an article printed in the Fall 1999 titled "Audiometric Testing-Review the Basics."

Dear Editor: The pure tone air conduction audiogram is a keystone criterion measure for our hearing loss prevention programs. The audiogram is not only used to determine if significant threshold shifts, standard threshold shifts, and recordable threshold shifts have occurred, it can be used as evidence in workers' compensation claims and the like. We must ensure that our audiograms are accurate and reliable. This article discusses the 1000 Hz test/retest reliability check.

The Council for Accreditation in Occupational Hearing Conservation (CAOHC) *Hearing Conservation Manual, 3rd edition* by Alice Suter, provides instruction about the 1000 test/retest reliability check. On page 53 it reads: "If the retest of 1000 Hz shows a difference of more than 5 dB,

the lower threshold may be accepted and at least one other test frequency should be retested. If the difference at 1000 Hz is significant (more than 10 dB), the entire audiogram should be repeated."

By this criterion, a difference in the 1000 Hz test/retest thresholds is not significant until it is 15 dB: a 10 dB difference between the two tests at 1000 Hz is ok as long as one other test frequency is retested. In this manner, if the first test 1000 Hz threshold measured at 10 dB, and then the retest 1000 Hz threshold measured at 20 dB, the audiogram would be acceptable as long as one other test frequency was retest. If the other frequency retest were acceptable, what would the accepted 1000 Hz threshold be: 20 dB or 10 dB?

A difference of 10 dB in the 1000 Hz test/retest reliability check is too large to be acceptable by any standard. A difference *greater than only 5 dB* should prompt earphone removal, re-instruct, and initiation of a new test. As far back as 1959⁽¹⁾; we have accepted that moment-to-moment fluctuations in auditory sensitivity are encompassed within a range that is less than 5 dB.

Recent investigation⁽²⁾ has shown that those who are presenting with pseudohypacusis show test/retest threshold differences of 10 dB or greater, while those who are presenting with a reliable test have differences of only 0 or 5 dB.

I have surveyed all microprocessor audiometers, but the recent 3 models that I have evaluated stop the test procedure if the test/retest difference exceeds 5 dB.

CAOHC's Hearing Conservation Manual should be changed to indicate that a difference in the 1000 Hz test/retest thresholds greater than 5 dB is unacceptable. It is what I have been teaching occupational hearing conservationists for years. **Dear Dr. Harris: Your recommendation has been forwarded to the CAOHC Manual Review Committee. Course Directors may forward comments or suggestions to the CAOHC Executive Office.**

¹ Carhart R, Jerger J: Preferred method for Clinical Determination of Pure-Tone Thresholds. *JSHR* 1959; p 330.

² Woodford C. Et al: A Screening Test or Pseudohypacusis. *The Hearing Review* Nov 1997; p 23.

Course Director Workshop Scheduled for Fall 2000

The Fall Course Director Workshop will be held in Rosemont (Chicago), IL on Monday, October 2, 2000 at the Sheraton Gateway Suites O'Hare. If you are interested in becoming a Course Director and meet the qualifications described in the "Course Director Certification and Recertification Requirements" brochure and have your application approved by the Screening Committee, you must then complete a one-day Course Director workshop.

You may contact Barbara Lechner at the CAOHC office at 414/276-5338 for more information, or access the CAOHC webpage at <http://www.caohc.org>

Course Directors presently certified who wish to recertify via the workshop method may also attend.

Ten Most Active CAOHC Course Directors for 1999 Announced

The CAOHC Council is pleased to announce the ten most active Course Directors for 1999. These ten Course Directors taught 1500 students who were then certified as Occupational Hearing Conservationists by CAOHC. This represents 40% of all students who certified or recertified in 1999. Congratulations to these hard-working professionals!

Timothy A. Swisher, MA CCC-A
Hearing Safety
Pittsburgh, PA

John H. Elmore, MA MBA
Precision Hearing Conservation
Houston, TX

William K. Wolfe, MA
Environmental Technology Corp
Atlanta, GA

Melette L. Meloy, MS CCC-A
Sound Solutions
Dallas, GA

Thomas D. Thunder, MA FAAA INCE
Acoustic Associates, Ltd.
Palatine, IL

Kathryn M. Deppensmith, MS CCC-A
Occupational Marketing, Inc.
Houston, TX

Pamela J. Gordon, MS CCC-A
Gordon Hearing Conservation, Inc
Danvers, MA

Mary M. McDaniel, MS CCC-A
Pacific Hearing Conservation
Seattle, WA

Robert C. Rhodes, PhD
Occupational Marketing, Inc.
Houston, TX

Roger M. Angelelli, PhD
Audiometric Baseline Consulting
Bethel Park, PA

Upcoming OHC Certification and Recertification Courses*

Approved as of March 2000 (for a complete list of courses visit our website at www.caohc.org)

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

Date	City	State	Course Director	Phone	Date	City	State	Course Director	Phone
4/17	New Brunswick	NJ	Kelly, Ellen	732/238-1664	6/13	Los Angeles	CA	McCall, Kirsten	310/314-9957
4/18	Atlanta	GA	Moore, Gregg	336/665-1818	6/14	Salt Lake City	UT	Cronin, Pamela	801/566-8304
4/18	Indianapolis	IN	Jerome, James	317/841-1065	6/14	Atlanta	GA	Vaughn, Cecelia	770/632-9007
4/19	Brighton	MA	Peterson, Nancy	617/254-7300	6/14	Cleveland	OH	Wolfe, William	770/475-2055
4/23	Paladio	VA	Cook, George	336/992-0034	6/15	Brooks AFB	TX	Edris, Maj Robert	(Air Force)
4/24	Kalamazoo	MI	Gallighugh, Nancy	616/343-2601	6/17	Chicago	IL	Elmore, John	800/357-5759
4/24	Garden City	KS	Shipley, Rhonda	316/277-2614	6/19	Napa	CA	Deppensmith, Kathryn	713/869-6664
4/25	Oakbrook Terrace	IL	Thunder, Thomas	847/359-1068	6/19	Brooks AFB	TX	Edris, Maj. Robert	(Air Force)
4/26	Tampa	FL	Abrams, Harvey	727/398-9395	6/20	Indianapolis	IN	Jerome, James	317/841-1065
4/26	Worcester	MA	Hengen, Garth	508/832-8484	6/21	Birmingham	AL	Meloy, Melette	678/363-9897
4/26	Indianapolis	IN	Lyon, Melissa	765/662-1702	6/21	Amherst	NY	Nelson, David	716/633-7210
4/26	Seattle	WA	Meloy, Melette	678/363-9897	6/21	Charlotte	NC	Newman, Valerie	336/665-1818
4/26	Oakbrook Terrace	IL	Thunder, Thomas	847/359-1068	6/21	Little Rock	AR	Rimmer, Thomas	501/663-4742
5/2	Atlanta	GA	Russell, Charles	610/667-1711	6/26	Bloomington	IL	Thompson, Tamara	309/888-8888
5/2	St.Louis	MO	Thiele, Natalie	314/968-4710	6/30	Ft.Hood	TX	Johnson, Maj Jennifer	(Army)
5/3	Concord	NH	Hengen, Garth	508/832-8484	7/11	Greensboro	NC	Juarez, Omar	336/665-1818
5/3	Birmingham	AL	Meloy, Melette	678/363-9897	7/11	Seattle	WA	McCall, Kirsten	310/314-9957
5/3	Houston	TX	Rhodes, Robert	713/869-6664	7/12	Ft.Lauderdale	FL	Elmore, John	800/357-5759
5/4	Waterville	ME	Giroux, Anne	207/873-7434	7/12	Brookfield	WI	Hase, Meredy	262/547-2227
5/5	St.Louis	MO	Bellamy, McKenna	314/968-4710	7/12	Houston	TX	Meloy, Melette	678/363-9897
5/5	Brighton	MA	Peterson, Nancy	617/254-7300	7/17	Houston	TX	Deppensmith, Kathryn	713/869-6664
5/8	Pago Pago	Samoa	Cook, George	336/992-0034	7/18	Atlanta	GA	Moore, Gregg	336/665-1818
5/8	Atlanta	GA	Vaughn, Cecelia	770/632-9007	7/18	Liberty	MO	Ratliff-Hober, Linda	816/781-9268
5/8	Liberty	MO	Ratliff-Hober, Linda	816/781-9268	7/18	Kansas City	MO	Bloyer, Cindy	816/471-3900
5/8	Ft.Sam Houston	TX	Bryne, Col.Clyde	(Army)	7/19	San Antonio	TX	Elmore, John	800/357-5759
5/10	Baltimore	MD	Elmore, John	800/357-5759	7/19	Portland	OR	Fairchild, Michael	503/232-1646
5/10	Waterloo	IA	Garrett, Barbara	319/369-7569	7/19	Dallas	TX	Harris, Dean	970/586-0702
5/10	Dallas	TX	Harris, Dean	970/586-0702	7/19	New Brunswick	NJ	Kelly, Ellen	732/238-1664
5/10	Greenville	SC	Panhorst Lassiter Barbara	864/250-8461	7/19	Birmingham	AL	Meloy, Melette	678/363-9897
5/12	Bala Cynwyd	PA	Chiarello, Joseph	610/667-1711	7/19	Albany	NY	Swisher, Timothy	412/367-8690
5/12	Brooks AFB	TX	Edris, Maj Robert	(Air Force)	7/19	Cleveland	OH	Synderwine, Carol	216/491-6104
5/13	Bloomfield	CT	Cofer, Steve	815/964-5445	7/21	Brooks AFB	TX	Edris, Maj. Robert	(Air Force)
5/13	Philadelphia	PA	Elmore, John	800/357-5759	7/25	Charlotte	NC	Russell, Charles	610/667-1711
5/15	Hattiesburg	MS	Oshrin, Stephen	601/266-5216	7/27	Kittanning	PA	Callen, Douglas	724/543-7068
5/15	Hillside	IL	Stukas, Natalie	630/241-0990	7/27	New Orleans	LA	Elmore, John	800/357-5759
5/15	Bremerton	WA	Johnson, C.S.	(Navy)	7/31	Chicago	IL	Rhodes, Robert	713/869-6664
5/16	Detroit	MI	Simpson, Thomas	313/577-6754	8/2	Williamsburg	VA	Elmore, John	800/357-5759
5/16	Greensboro	NC	Juarez, Omar	336/665-1818	8/2	Greeley	CO	Kastner-Wells, Laurie	970/454-1110
5/16	Los Angeles	CA	McCall, Kirsten	310/314-9957	8/2	Chapel Hill	NC	Stewart, Andy	919/493-4471
5/16	Atlanta	GA	Moore, A. Gregg	770/933-9236	8/3	Brooks AFB	TX	Edris, Maj Robert	(Air Force)
5/17	Portland	OR	Fairchild, Michael	503/232-1646	8/3	Montgomery	AL	Smith, Curtis	334/887-6302
5/17	Albuquerque	NM	Harlan, William	505/275-1415	8/7	Portland	OR	Atack, Rodney	503/614-8465
5/17	Normal	IL	Pollock, Gail	309/266-9949	8/8	St.Louis	MO	Bellamy, McKenna	314/968-4710
5/17	Pittsburgh	PA	Swisher, Timothy	412/367-8690	8/8	Anchorage	AK	Deppensmith, Kathryn	713/869-6664
5/17	Atlanta	GA	Wolfe, William	770/475-2055	8/8	Brooks AFB	TX	Edris, Maj Robert	(Air Force)
5/23	Paladio	VA	Cook, George	336/992-0034	8/9	Jacksonville	FL	Green, Nancy	904/399-3370
5/23	Worthington	OH	Rink, Timothy	614/885-2997	8/9	Birmingham	AL	Meloy, Melette	678/363-9897
5/23	Kansas City	MO	Bloyer, Cindy	816/471-3900	8/9	Greenville	SC	Panhorst Lassiter Barbara	864/250-8461
5/24	San Antonio	TX	Elmore, John	800/357-5759	8/11	St.Louis	MO	Thiele, Natalie	314/968-4710
5/24	Chapel Hill	NC	Stewart, Andy	919/493-4471	8/11	Knoxville	TN	Ferrell, Charles	423/974-5453
5/31	Baltimore	MD	Doyle, Mary Lynette	410/955-4082	8/14	Oakbrook Terrace	IL	Thunder, Thomas	847/359-1068
6/5	Portland	OR	Atack, Rodney	503/614-8465	8/14	Hattiesburg	MS	Oshrin, Stephen	601/266-5216
6/5	Cleveland	OH	Deppensmith, Kathryn	713/869-6664	8/15	Los Angeles	CA	McCall, Kirsten	310/314-9957
6/5	Omaha	NE	Norris, Thomas	402/391-3982	8/16	Boca Raton	FL	Greenberg, Herbert	561/750-2100
6/6	Oakbrook Terrace	IL	Thunder, Thomas	847/359-1068	8/16	Shreveport	LA	Rhodes, Robert	713/869-6664
6/7	Houston	TX	Elmore, John	800/357-5759	8/16	Oakbrook Terrace	IL	Thunder, Thomas	847/359-1068
6/7	Des Moines	IA	Garrett, Barbara	319/369-7569	8/21	Cincinnati	OH	Elmore, John	800/357-5759
6/7	Boca Raton	FL	Greenberg, Herbert	561/750-2100	8/22	Detroit	MI	Meloy, Melette	678/363-9897
6/7	Rochester	NY	Hengen, Garth	508/832-8484	8/22	Atlanta	GA	Moore, A.Gregg	770/933-9236
6/7	Bellevue	WA	McDaniel, Mary	206/706-7352	8/24	Albuquerque	NM	Deppensmith, Kathryn	713/869-6664
6/7	Philadelphia	PA	Meloy, Melette	678/363-9897	8/24	Louisville	KY	Elmore, John	800/357-5759
6/7	Harrisburg	PA	Swisher, Timothy	412/367-8690	8/28	Knoxville	TN	Elmore, John	800/357-5759
6/8	Pittsburgh	PA	Angelelli, Roger	412/831-0430	8/29	Bellevue	WA	McDaniel, Mary	206/706-7352
6/8	Fayetteville	AR	Rhodes, Robert	713/869-6664	9/6	Brooks AFB	TX	Edris, Maj Robert	(Air Force)
6/12	San Antonio	TX	Rhodes, Robert	713/869-6664	9/11	Lexington	KY	Green, William	606/323-5840
6/13	Greenville	SC	Carroll, Tara	864/235-9689	9/11	Liberty	MO	Ratliff-Hober, Linda	816/781-9268
6/13	Bala Cynwyd	PA	Chiarello, Joseph	610/667-1711	9/12	Birmingham	AL	Meloy, Melette	678/363-9897

Please contact the CAOHC office at 414/276-5338 for additional course availability. Publication dates may have precluded some course dates.

For your convenience, you may now update your mailing name, address, company name, phone number, fax number, etc. via CAOHC's website address at www.caohc.org. Click on the button titled "ADDRESS UPDATE". Your mailing changes will be forwarded directly to our office e-mail system.

For those of you without internet access, please see page 2 for CAOHC's address, phone, or fax number when forwarding address changes to the CAOHC office.

<http://www.caohc.org> or e-mail our office at info@caohc.org



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