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Fit or Fiction:

Why and How Every Audiologist Can Incorporate Hearing Protector Fit Testing in Their Practice

Christa L. Themann, MA, CCC-A

Wei Gong, MS, CIH

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Christa Themann, MA CCC-A

Christa Themann has been working as a Research Audiologist at the National Institute for Occupational Safety and Health (NIOSH) for over 30 years. Her experience includes evaluating hearing protector attenuation, developing effective hearing loss prevention strategies, and managing audiometric testing in epidemiologic surveys. During her tenure at NIOSH, Christa helped develop the 1998 criteria document on occupational exposure to noise as well as the 2025 update to the criteria document recommending hearing protector fit testing. Christa has also worked as a temporary Strategic Content Developer at AudiologyOnline and as an adjunct instructor at the University of Pittsburgh. Trained in audiology, epidemiology, and public health, Christa enjoys bringing together the wide range of data and perspectives to develop policies, programs, and materials that will help people hear well and enjoy sound throughout their lifetime.

Wei Gong, MS, CIH

Wei Gong is a Certified Industrial Hygienist (CIH) and a Certified Occupational Hearing Conservationist (COHC) with the National Institute for Occupational Safety and Health (NIOSH). She has 20 years of experience in industrial hygiene, with an emphasis on the hazards of noise exposure and effective hearing conservation strategies. Her research interests include evaluating the effectiveness of hearing protection devices using fit-testing methods, assessing the auditory effects of co-exposure to noise and ototoxicants in the workplace, and understanding the risks to hearing from complex noise exposures. Wei was instrumental in developing the 2025 recommendation hearing protector fit testing published by the National Institute for Occupational Safety and Health.

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Disclosures

- **Presenter Disclosure**: Financial: Christa Themann is an employee of NIOSH. In lieu of an honorarium, AudiologyOnline made a donation to a non-profit organization. Non-financial: Christa Themann has no non-financial disclosures. Financial: Wei Gong is an employee of NIOSH. In lieu of an honorarium, AudiologyOnline made a donation to a non-profit organization. Non-financial: Wei Gong has no non-financial disclosures.
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- It is the responsibility of course participants to critically evaluate the evidence from multiple sources to guide professional practice.

Learning Outcomes

After this course, participants will be able to:

- List three reasons prevention is a key component of every audiologist's practice.
- Differentiate between a hearing protector's labeled Noise Reduction Rating (NRR) and an individual's Personal Attenuation Rating (PAR).
- Identify two approaches to hearing protector fit testing that can be done using equipment readily available in most audiology practices.

Outline

- Prevention as a key component of audiology practice
- Hearing protector fit testing as a key component of prevention
    - Approaches to evaluating hearing protection
    - Evidence base for fit testing
- Approaches to hearing protector fit testing
- Considerations for incorporating fit testing in clinical practice
- Summary and questions

Poll 1

What is the most common cause of preventable adult-onset hearing loss?

a) Noise
b) Disease
c) Traumatic injury
d) Ototoxicity

We have a problem…

Noise exposure is a major cause of adult hearing loss

- 22 million US workers are exposed to noise annually
- 58% of self-reported hearing difficulty among workers can be attributed to workplace noise.
- Hearing risks exist in all industries

Photo by John Messina via Wikimedia Commons

Photo by Andrea Piacquadio via pexels.com

Kerns et al., 2018; Carroll et al., 2017

The problem isn't getting any better

Among noise-exposed, tested workers, overall prevalence decreased less than 1% over 30 years.

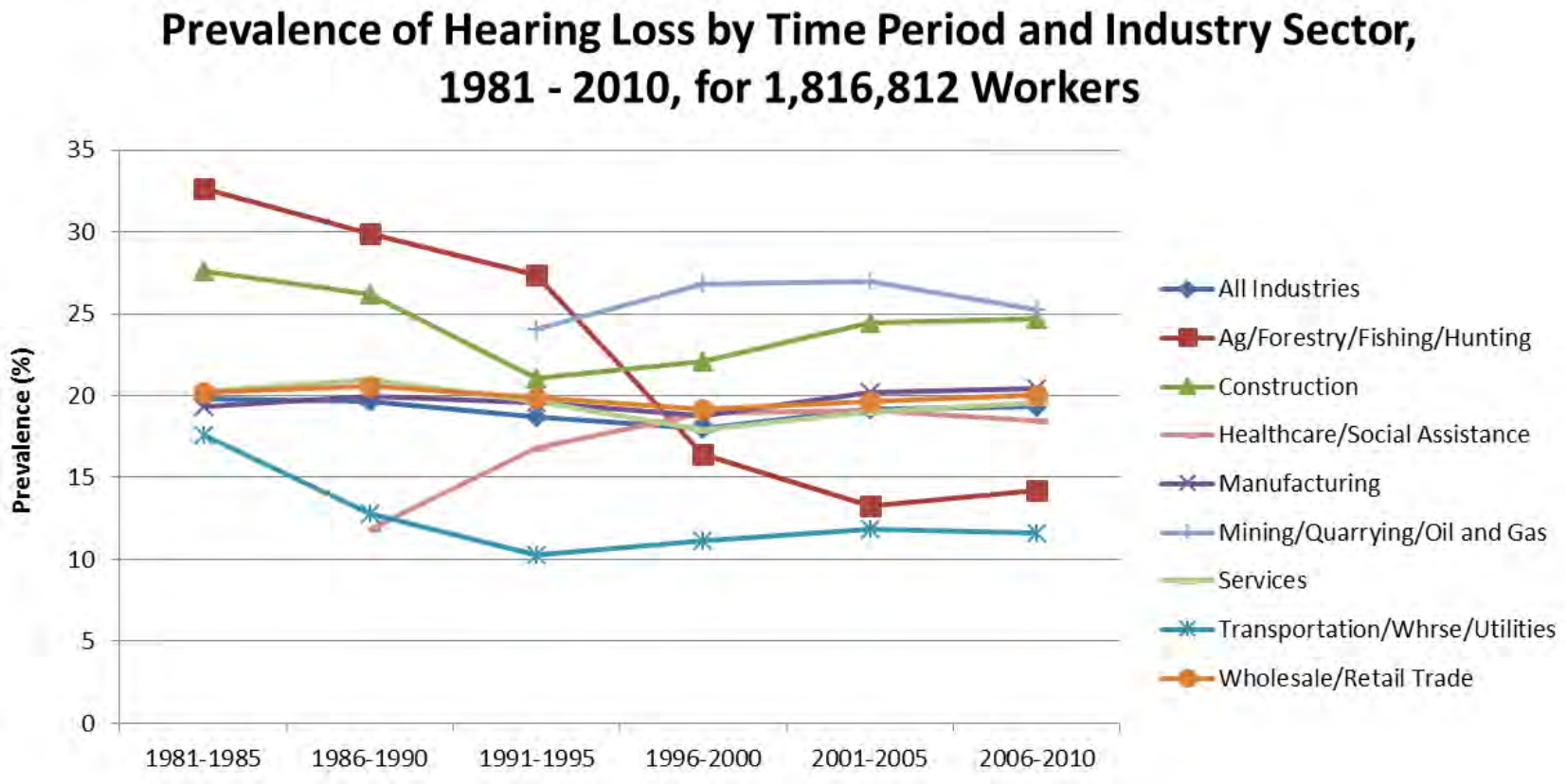


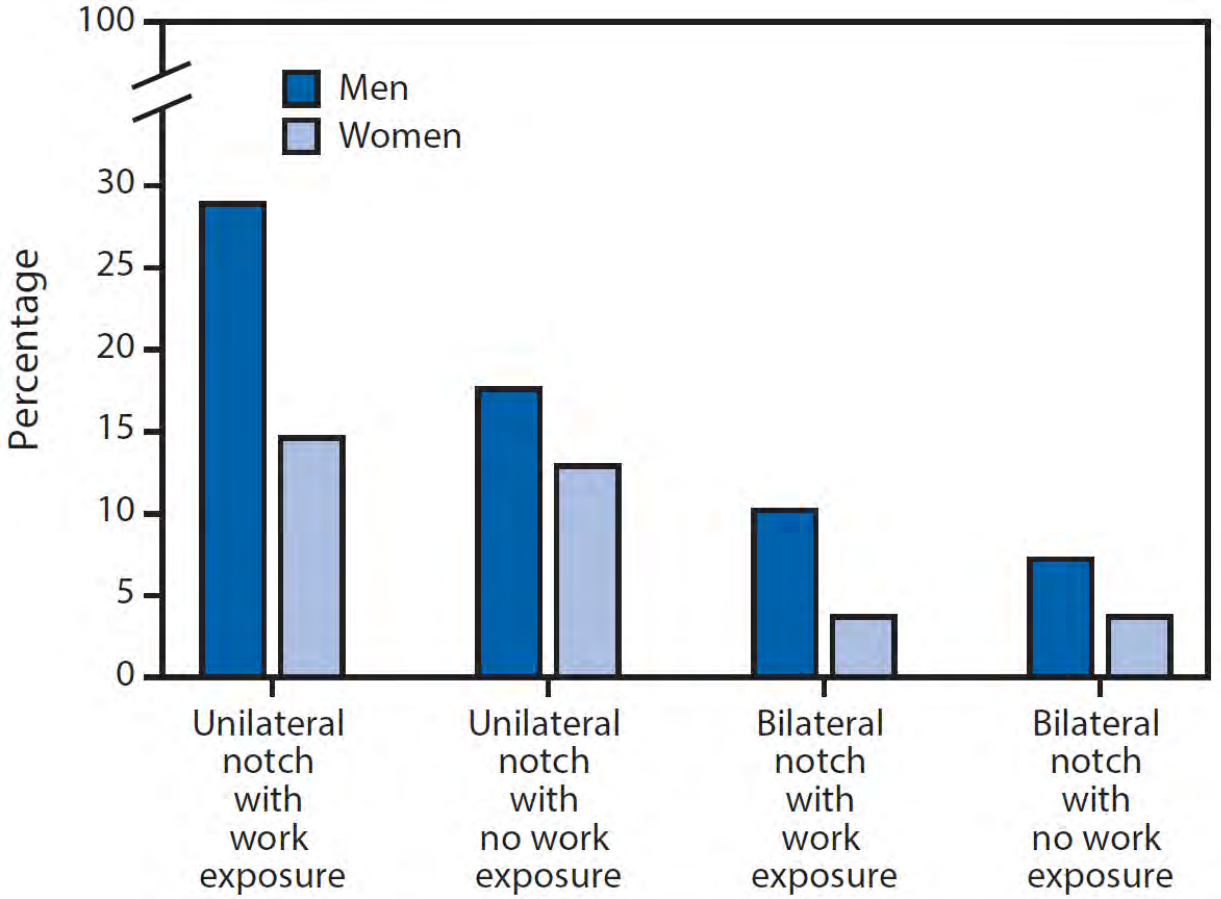
Chart courtesy of NIOSH

It’s not just workers

20% of US adults (21 million) aged 20-69 years who have an audiometric notch report no exposure to noise at work

- Males = 25%
- Females = 17%

(Data from NHANES 2011-2012)



Carroll YI, Eichwald J, Scinicariello F, et al. *MMWR*. 2017

Loud sounds are not just at work

- 21 million adults in the U.S. likely have hearing damage from loud sound sources at home or in their communities
- Noise sources include power tools, recreational vehicles, and listening to music more than 10 hours per week

Photos courtesy of CDC

Carroll YI, Eichwald J, Scinicariello F, et al. *MMWR*. 2017

1.1 billion young people are at risk

- Over a billion individuals aged 12-35 years are estimated to be at risk of hearing loss due to non-occupational exposure to loud sounds, including music.

Photo by Anastasiya Gepp via pexels.com

https://www.who.int/publications/i/item/9789240043114

Damage accumulates over time

Presence of notch in one or both ears:

- Age 20–29 years = **19%**
- Age 30–39 years = **25%**
- Age 40–49 years = **29%**
- Age 50–59 years = **27%**
- Age 60–69 years = **21%**

Photo courtesy of CDC

Carroll YI, Eichwald J, Scinicariello F, et al. *MMWR*. 2017

Unrecognized hearing loss occurs frequently

- People with auditory damage caused by noise frequently don’t recognize it
- One in four people who reported “excellent” or “good” hearing had an audiometric notch
- 70% of adults exposed to loud noise in the past 12 months never or seldom wore hearing protection

Photo courtesy of CDC

Carroll YI, Eichwald J, Scinicariello F, et al. *MMWR*. 2017

Hearing loss has consequences

- Communication
- Cognition
- Education
- Employment
- Social interaction
- Emotional well-being
- Economic productivity

$980 billion

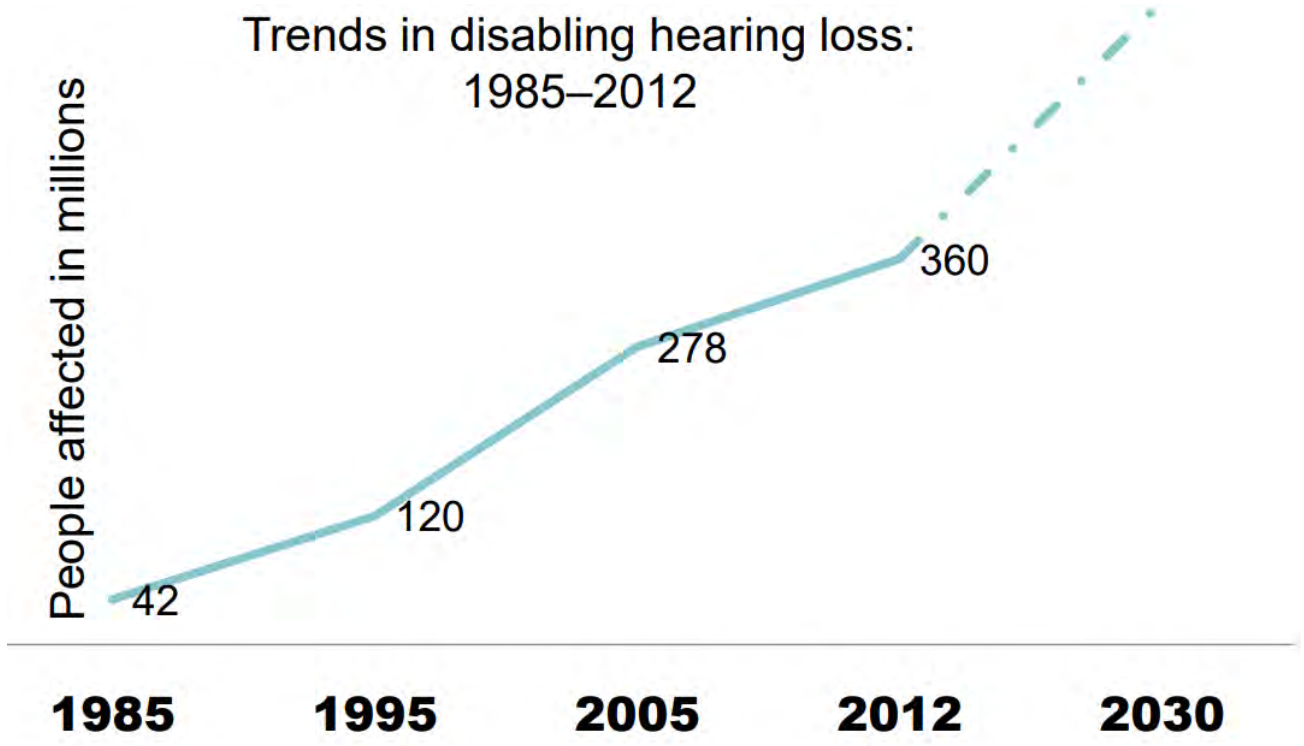
- Health sector costs*
- Educational support
- Loss of productivity
- Societal costs

*excluding the cost of hearing aids/other devices

Photo courtesy of the World Health Organization

https://www.who.int/health-topics/hearing-loss#tab=tab_1

Hearing loss is a growing epidemic



>360 million globally live with disabling hearing loss

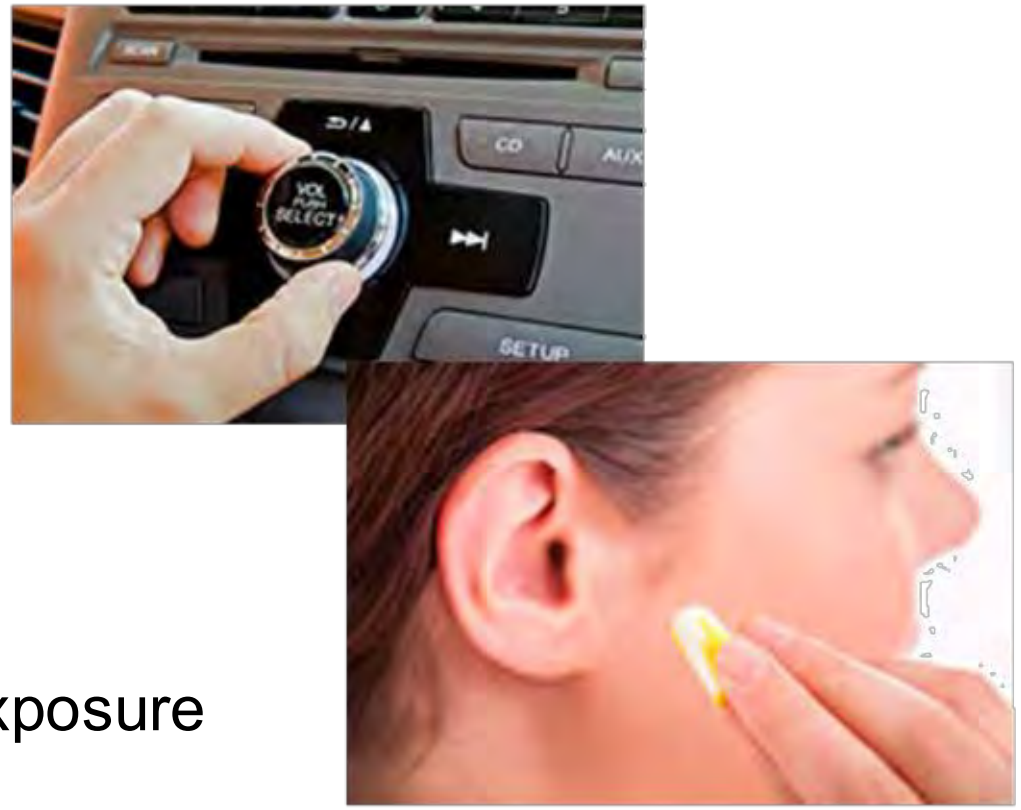
World Health Organization

Data courtesy of the WHO, shared with CDC

How can we control this epidemic?

Reduce noise-induced hearing loss

- Avoid loud sound sources
- Lower the volume
- Increase distance
- Shorten listening time
- Use hearing protection
  - Needs to fit well to effectively reduce exposure



Photos courtesy of CDC

Fit testing for prevention

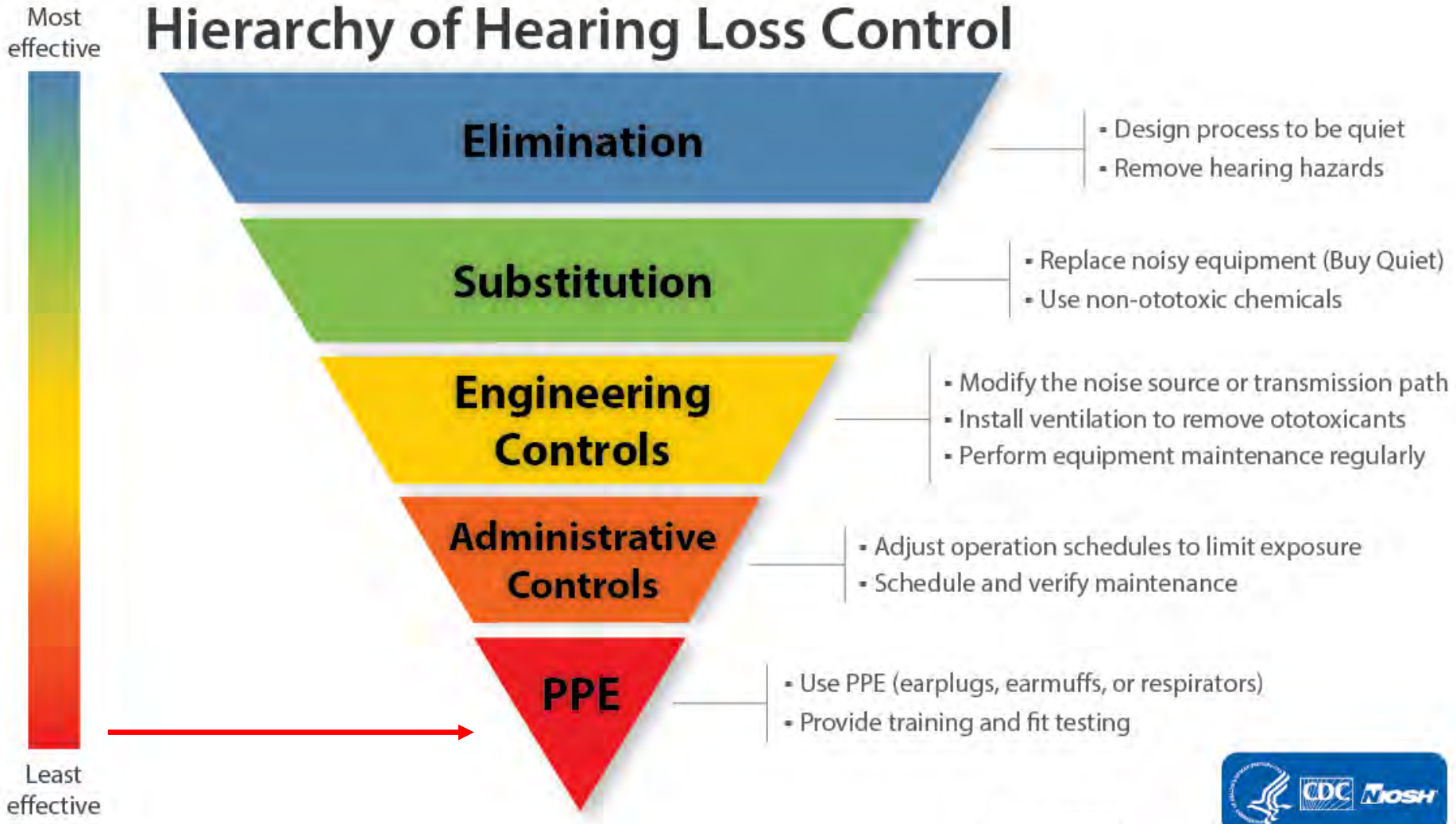
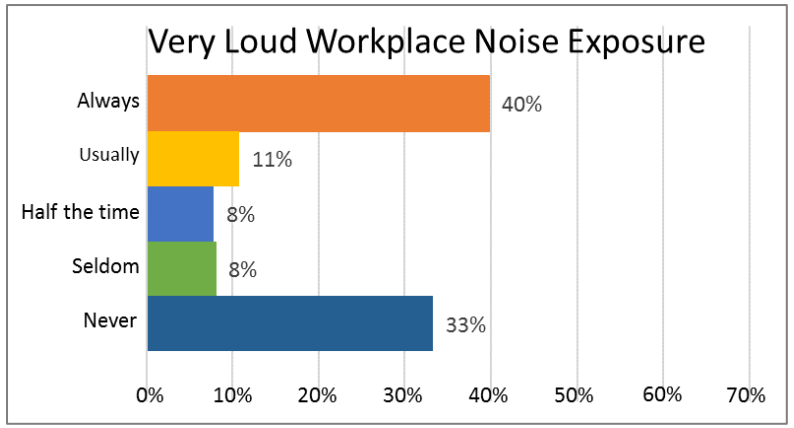
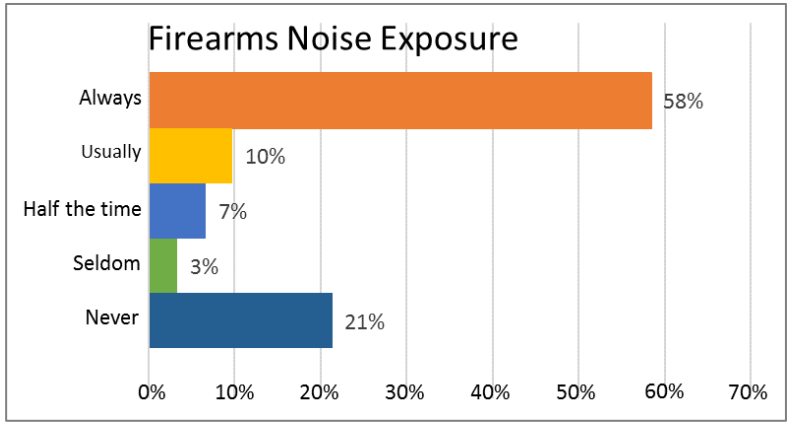


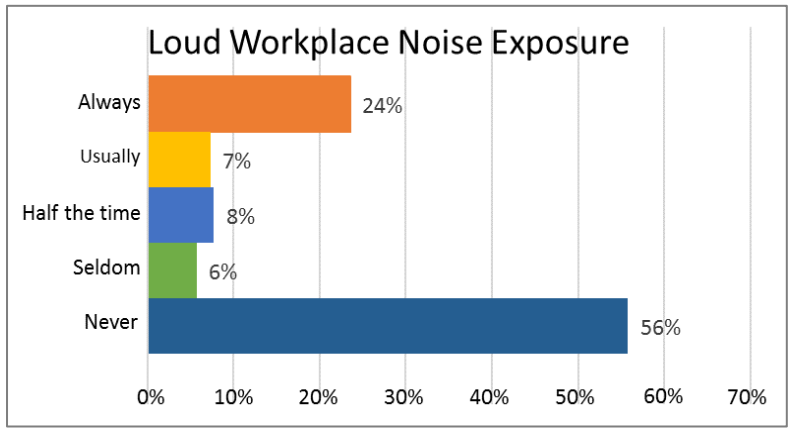
Photo courtesy of NIOSH

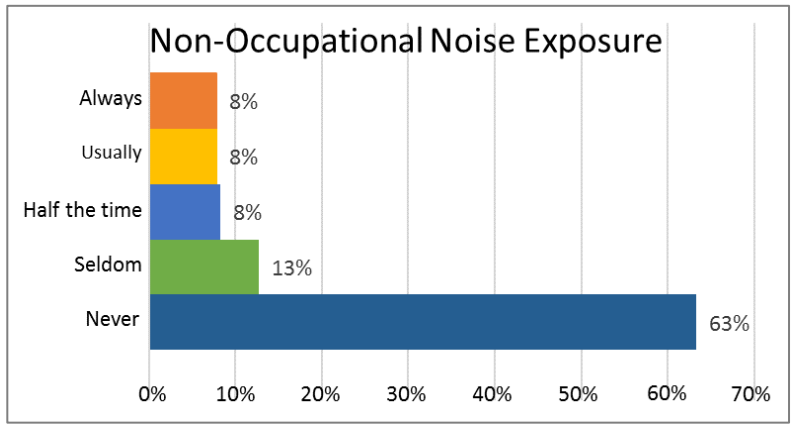
https://www.cdc.gov/niosh/noise/about/noise.html

Prevalence of HPD use among individuals exposed to noise in the past 12 months









HPD = Hearing Protection Device

Unpublished data from the 2014 National Health Interview Survey

Noise Reduction Rating (NRR)

Required by law on all hearing protectors sold in the US

Represents the **noise reduction capability** of a hearing protector

- Single-number
- Laboratory-derived
- 10 subjects, 3 repeated fittings
- Experimenter-fit protocol

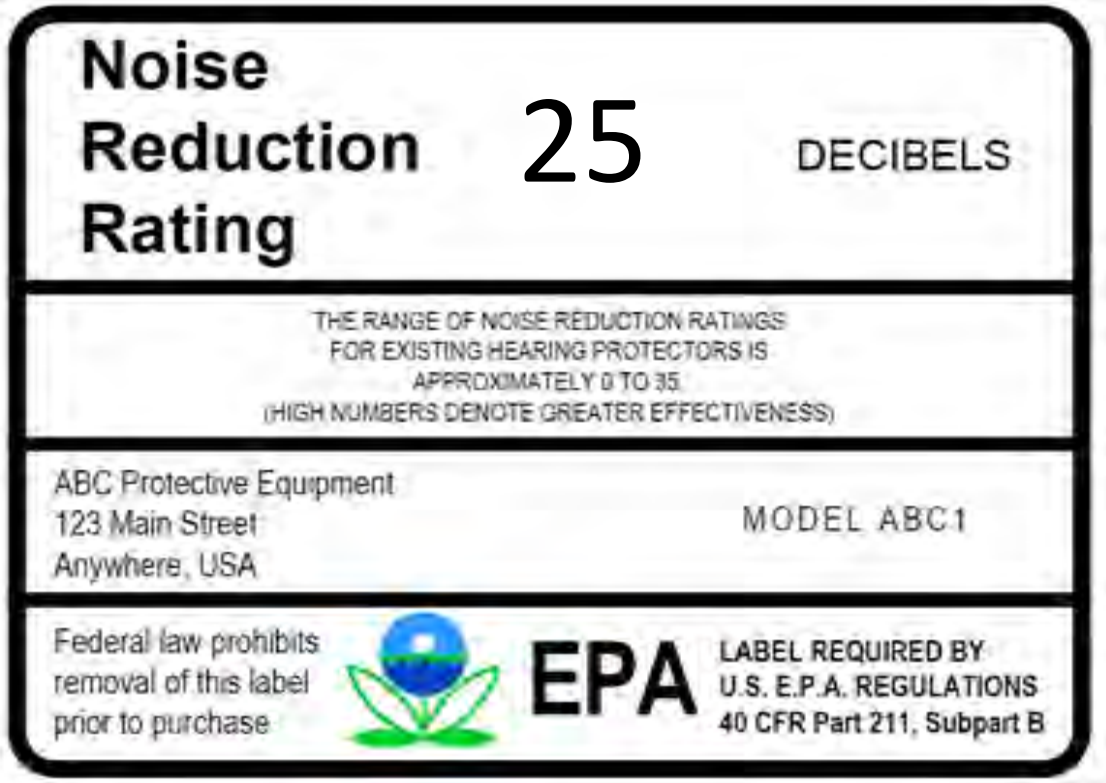


Image adapted from 40 CFR § 211.204: Hearing protector labeling requirements

Poll 2

True or false?

The NRR tells you how much noise reduction a person is getting.

a) True
b) False
c) Not sure

Do laboratory ratings describe real performance?

- Early NIOSH study (1977-1981)
- 400 workers at 15 industrial plants
- 8 types of earplugs
- Each worker tested 5x with hearing protectors as worn in the factory
- Workplace attenuation levels did not match laboratory attenuation
- Lower attenuation, higher standard deviations

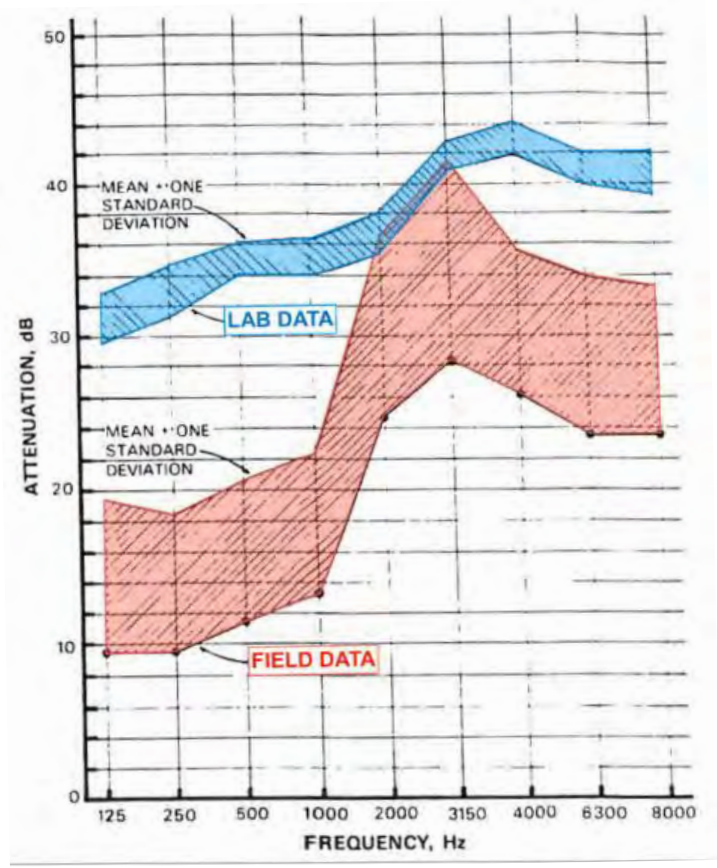
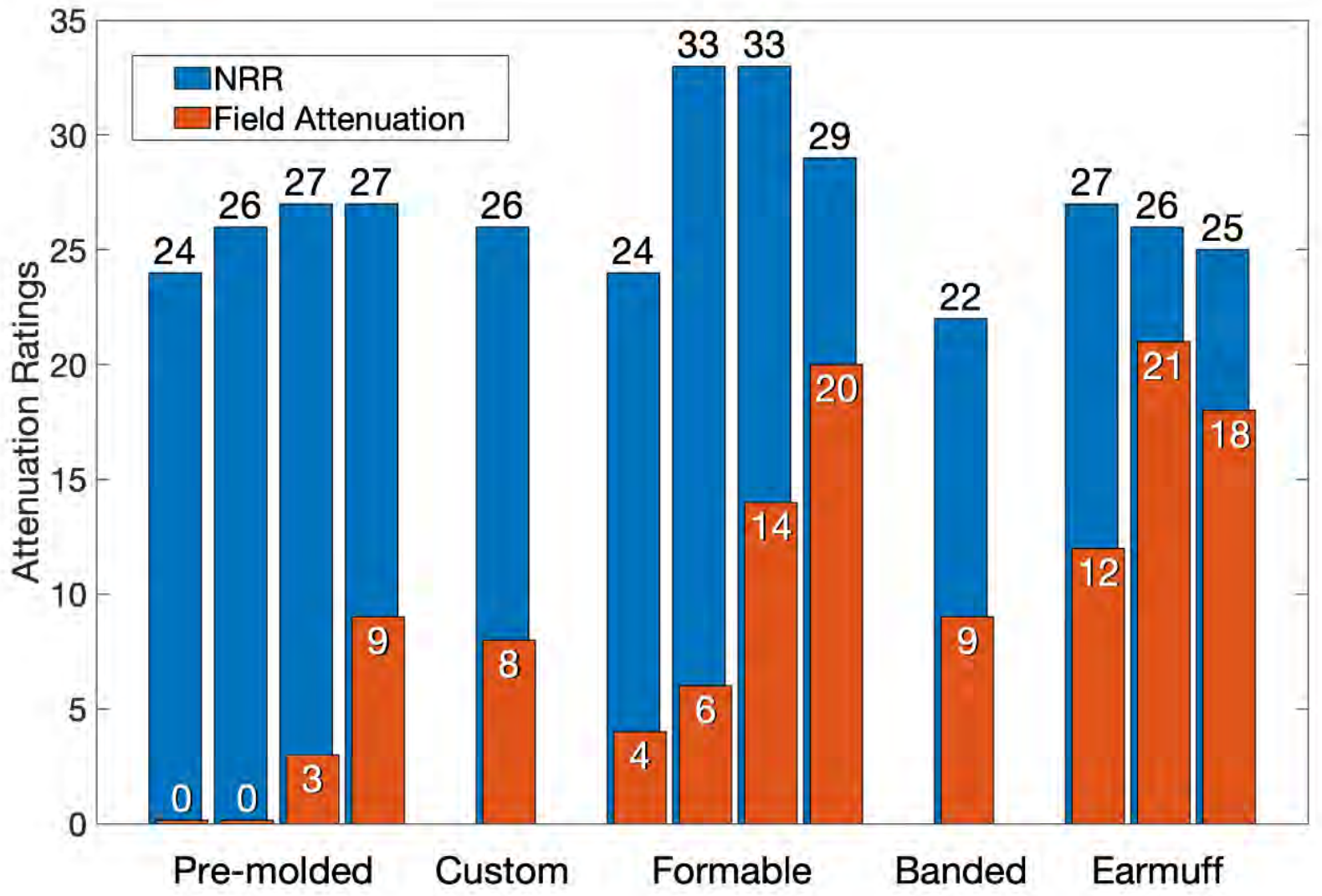


Figure from Edwards et al., *Noise Cont. Eng. J.* **20**, 6–15 (1983). Used with permission.

NRR ≠ real world attenuation



Data compiled from multiple NIOSH field studies

Image courtesy of NIOSH

Mismatch led to derating schemes

NIOSH:	Earmuffs:	NRR × 0.75 – 7
	Formable plugs:	NRR × 0.50 – 7
	Other plugs:	NRR × 0.30 – 7
OSHA:	Earplugs & earmuffs:	$L_{Aexp} = L_A – (NRR – 7) / 2$
Canada :	Earmuffs:	NRR × 0.7 – 3
	Earplugs:	NRR × 0.5 – 3
China: before January 2021	Earplugs & earmuffs:	SNR × 0.6

LAexp= A-weighted noise exposure level; NRR = Noise reduction rating; SNR = Single number rating.

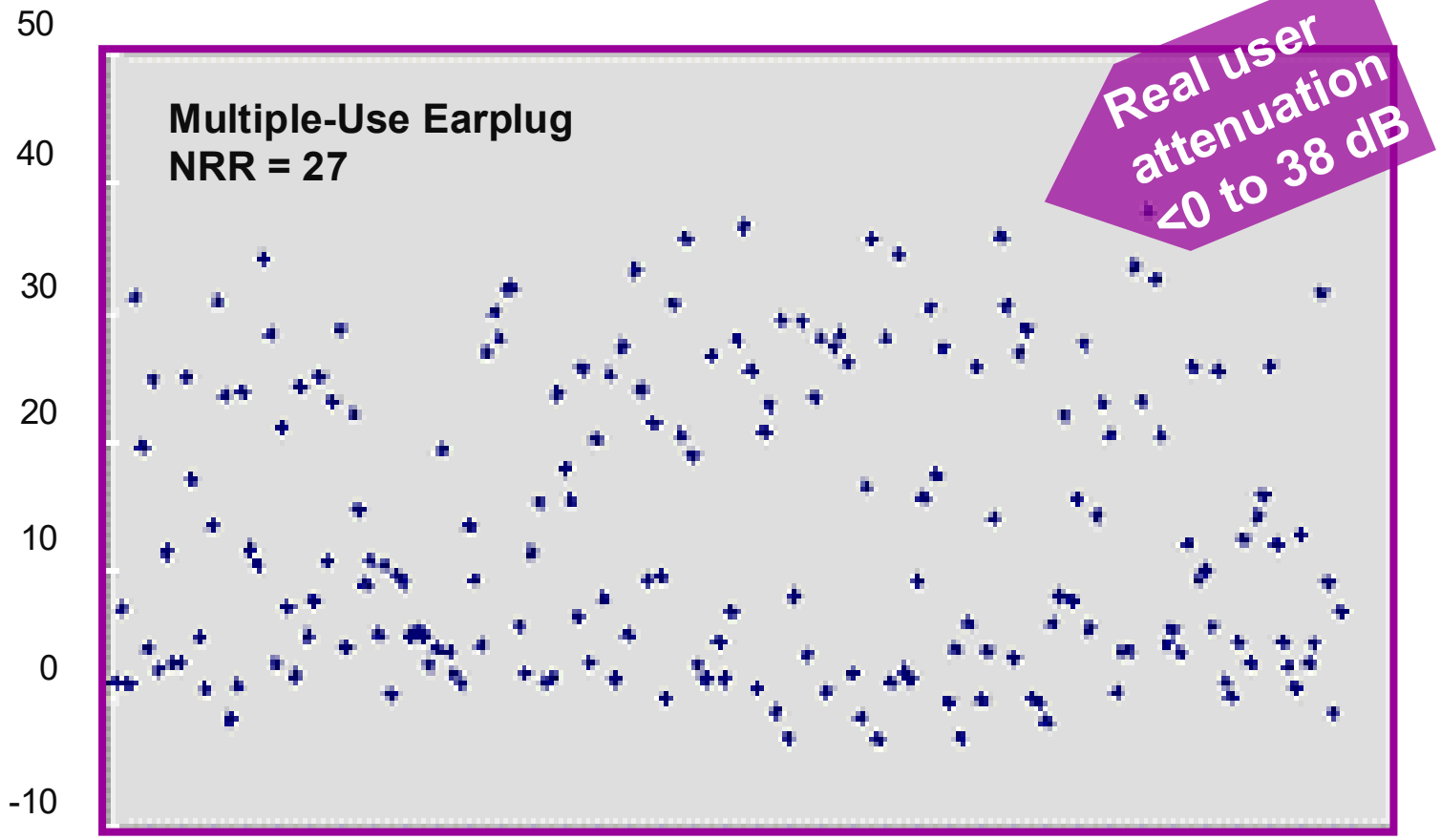
The problem with derating schemes

- Derating applied to various HPDs

HPD Manufacturer and Model	OSHA (dBA)	NIOSH (dBA)	Canada CSA (dBA)	China before January 2021 (dBC)
3M™ 1270	9	0	6	15
3M™ 1100	11	8	13	22
3M™ Yellow Neon	13	10	15	22
Honeywell MAX	13	10	15	22
Honeywell Bilsom 303s	11	8	13	20
Moldex Pura-Fit®	13	10	15	22

Another problem with derating

- Derating does not account for variability across users
- These data show noise reduction achieved by 192 users of the same earplug



Unpublished data from Kevin Michael, PhD and Cindy Bloyer

Factors contributing to the variability in noise reduction

- Anatomical differences: Ear canal, head size
- Knowledge about proper fitting techniques
- Awareness of noise hazards
- Hearing protector comfort
- Incompatible safety equipment

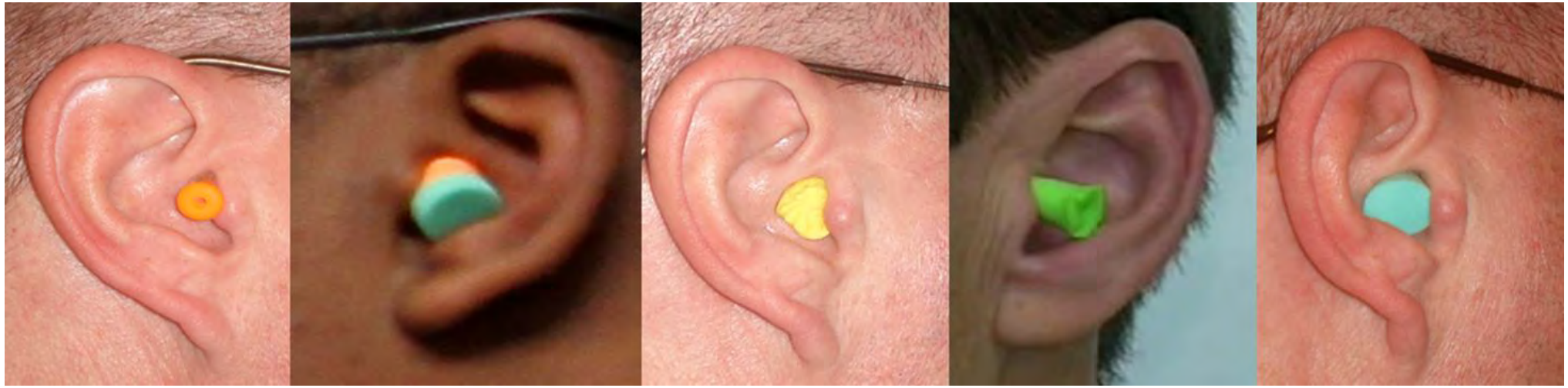


Photo courtesy of NIOSH

The solution:
Personal Attenuation Ratings (PARs)

Measuring noise reduction individually for each user

Image Credit: Stephenson 2010

https://www.cdc.gov/niosh/docs/2025-104/

Quiz Hint

Q2

NRR vs PAR

NRR	PAR
Laboratory test	Field test
Population statistic	Individual measure
Experimenter fit	User fit

Quiz Hint

Q3

More attenuation isn't necessarily better

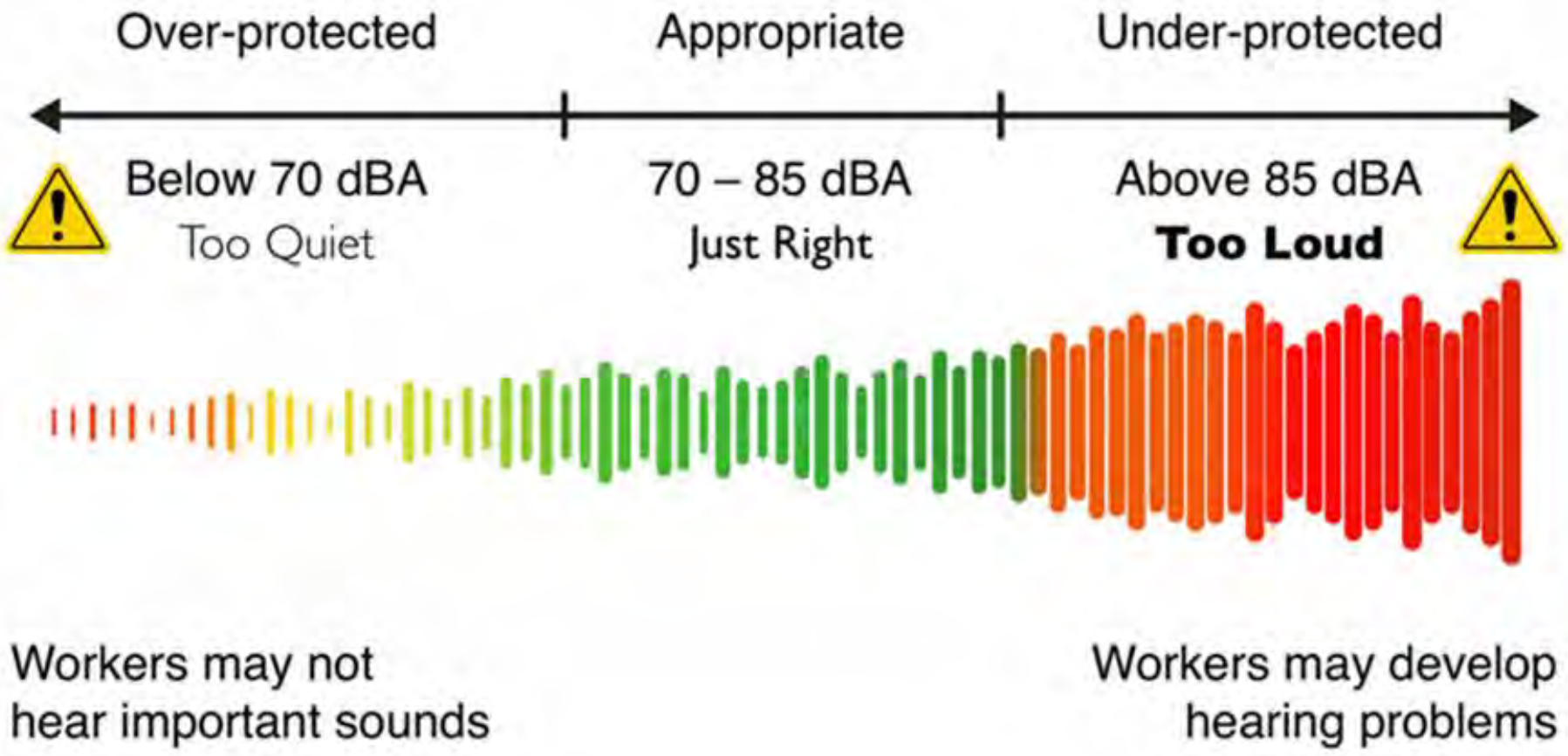


Image courtesy of NIOSH

Over- and under-protection

Properly protected

Under protected

Over exposed

Overprotected

Underexposed

Aim for 70-80 dB protected exposure level

Image by W.Carter, CC0, via Wikimedia Commons

Proper protection avoids common complaints

"I can't understand speech when wearing my hearing protectors."

"How will I know if the equipment is acting up if I have to wear hearing protection?"

"Everything sounds muffled with my earplugs in."

"I'm worried I won't hear warning signals with my earplugs in."

"I feel isolated from what's going on around me when I'm wearing hearing protectors."

1977:
First Fit-Testing System

Photos courtesy of NIOSH

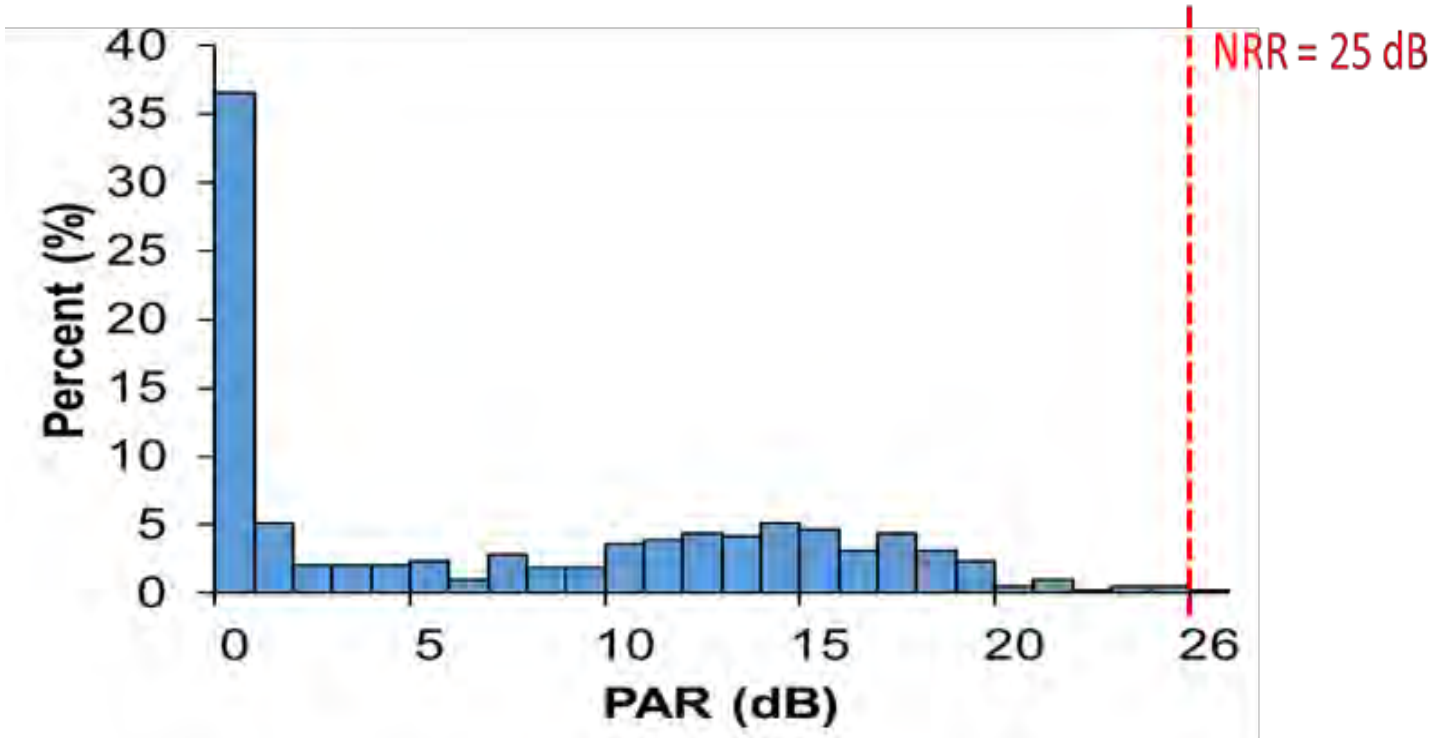
40 years later…

- Laptop computers made portable fit-test systems possible
- Threshold-based systems required:
  - Computer with sound card
  - Large volume headphones
  - User interface
- **A number of fit-test systems using a variety of test approaches are now commercially available**

Photo courtesy of NIOSH

Just handing out hearing protectors does not ensure sufficient noise reduction

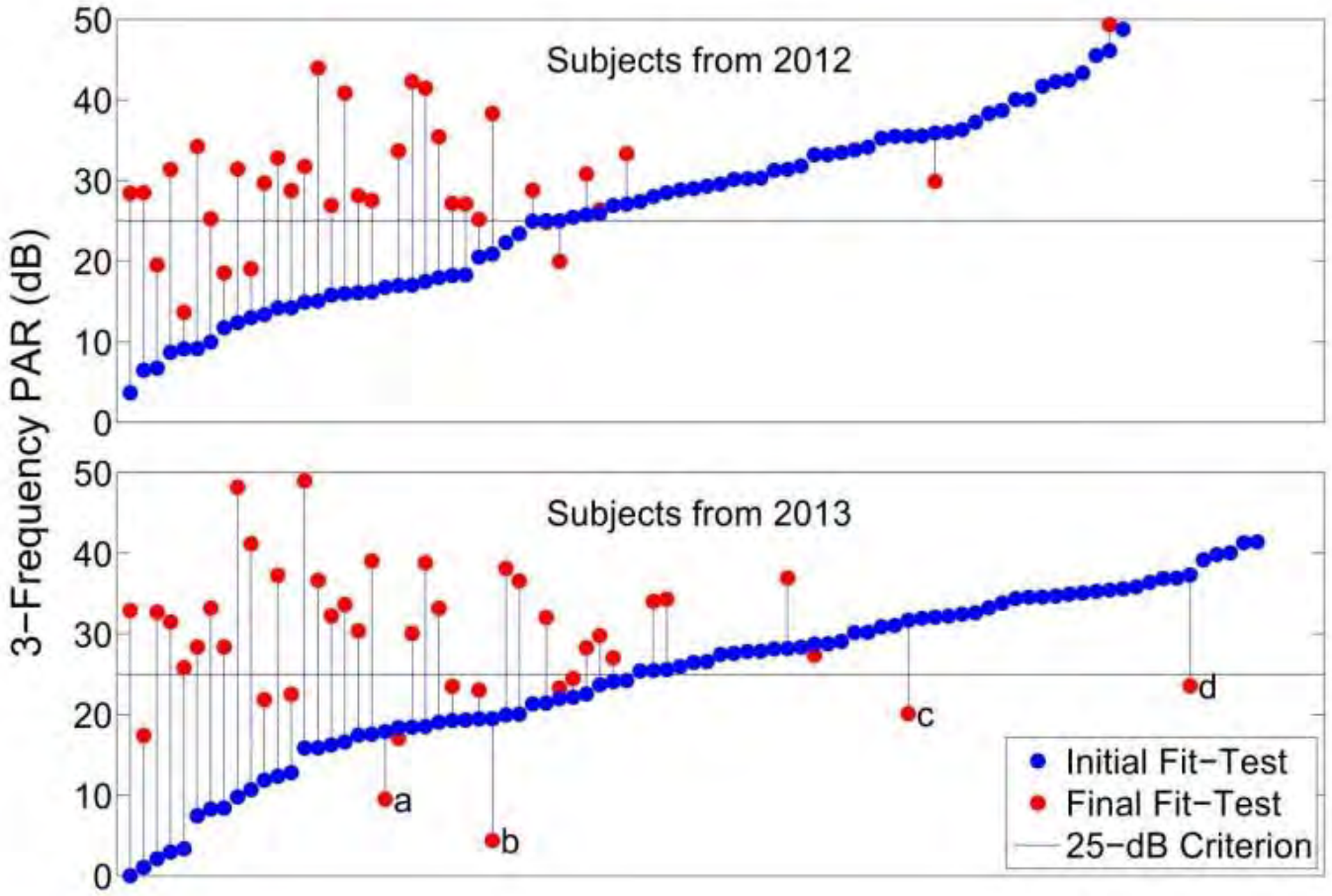
- 385 workers
- 1 pre-molded earplug with NRR = 25 dB
- Wearing over 8-h shift for 6 years



Data from Gong et al. *Int. J. Environ. Res. Public Health*. **18**(13):7190 (2021). doi: 10.3390/ijerph18137190.

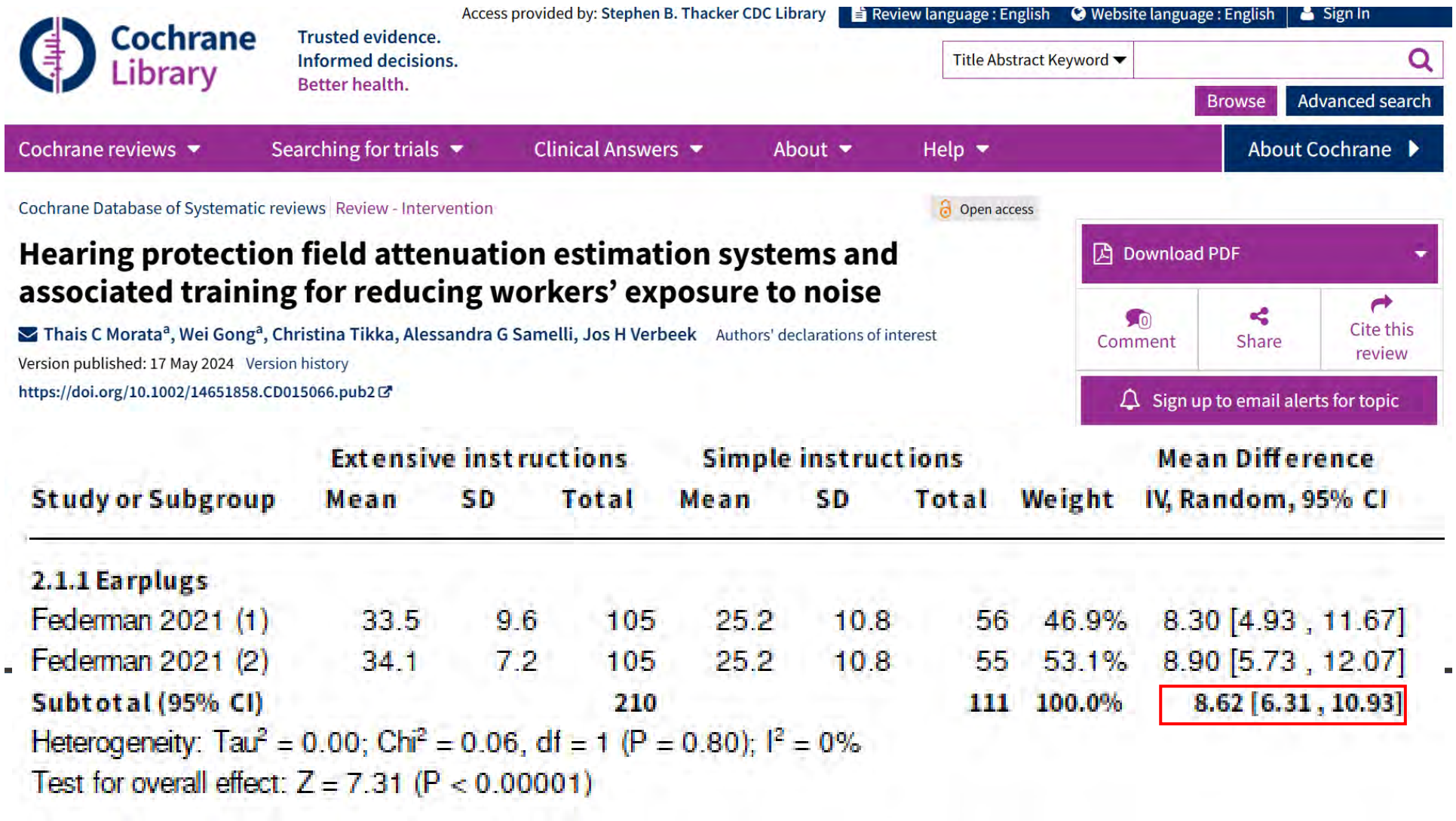
Individualized instruction improves protection

- Initial and final PARs of 126 oil rig inspectors
- ~50% were adequately protected at initial test
- 92% achieved adequate protection by final test
- Workers needing special protectors identified



NIOSH EPHB Report No. 360-11a

Evidence base for fit testing



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Hearing protection field attenuation estimation systems and associated training for reducing workers' exposure to noise

Thais C Morata[a], Wei Gong[a], Christina Tikka, Alessandra G Samelli, Jos H Verbeek | Authors' declarations of interest

Version published: 17 May 2024 | Version history

https://doi.org/10.1002/14651858.CD015066.pub2

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	Extensive instructions			Simple instructions				Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI
2.1.1 Earplugs								
Federman 2021 (1)	33.5	9.6	105	25.2	10.8	56	46.9%	8.30 [4.93 , 11.67]
Federman 2021 (2)	34.1	7.2	105	25.2	10.8	55	53.1%	8.90 [5.73 , 12.07]
Subtotal (95% CI)			**210**			**111**	**100.0%**	**8.62 [6.31 , 10.93]**

Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 0.06$, df = 1 (P = 0.80); $I^2 = 0\%$

Test for overall effect: Z = 7.31 (P < 0.00001)

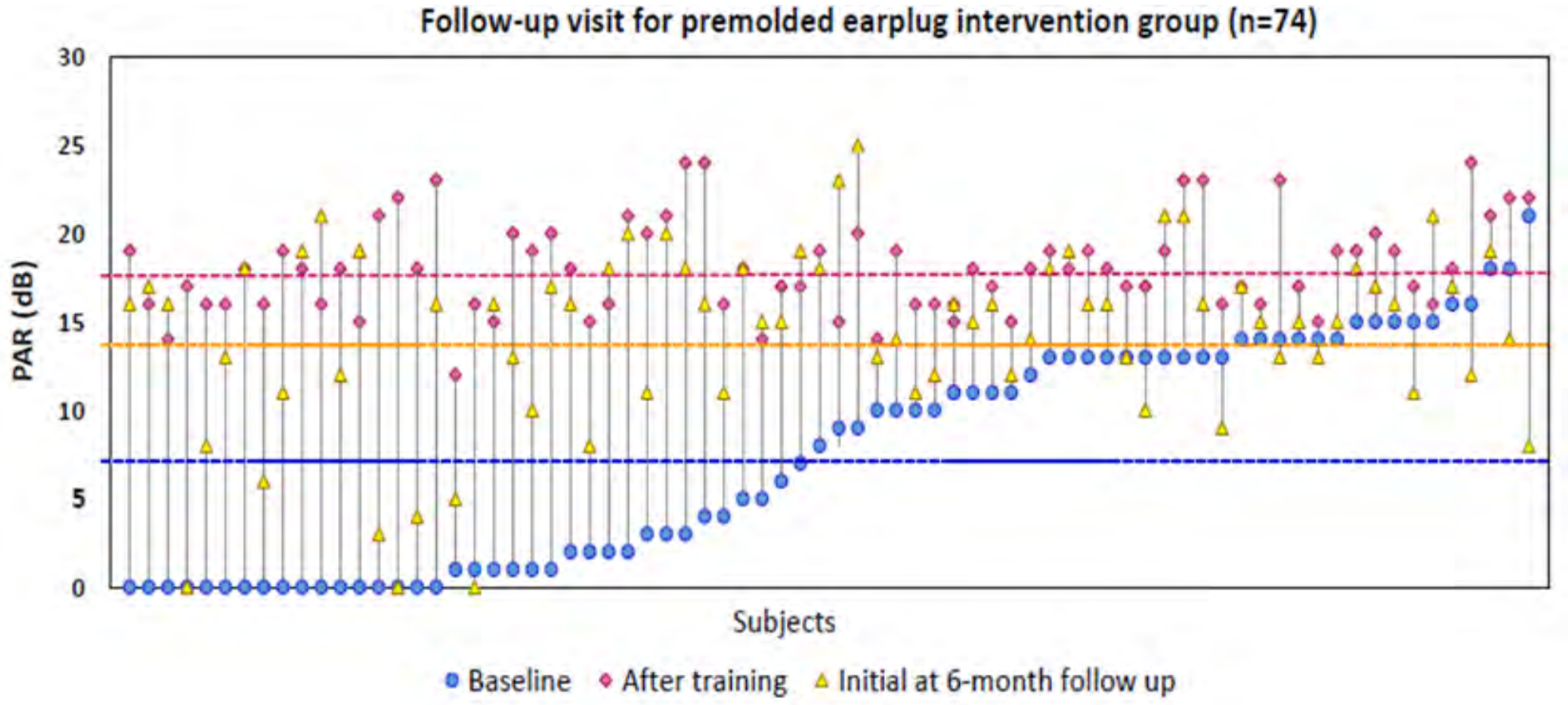
Morata, Gong, Tikka, Samelli, Verbeek. *Cochrane Database of Systematic Review* No.: CD015066. DOI: 10.1002/14651858.CD015066.pub2

Using PARs to evaluate noise reduction over a full shift

Brewery plant

Year	HPD Type	Wilcoxon Signed Rank Statistic	Standardized statistic	p-value (2-sided)
2013	Foam PuraFit®	26.5	-2.57	0.0101
2013	Premolded 1260	51	-0.88	0.379
2014	Foam Classic®	48	-1.89	0.0585
2014	Premolded Fusion®	36	-1.65	0.0979
	Foam MAX®	53	-1.14	0.157
	Premolded Rocket®	13	-2.84	0.0045

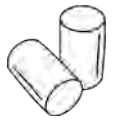
Worker ability to maintain PAR over 6 months

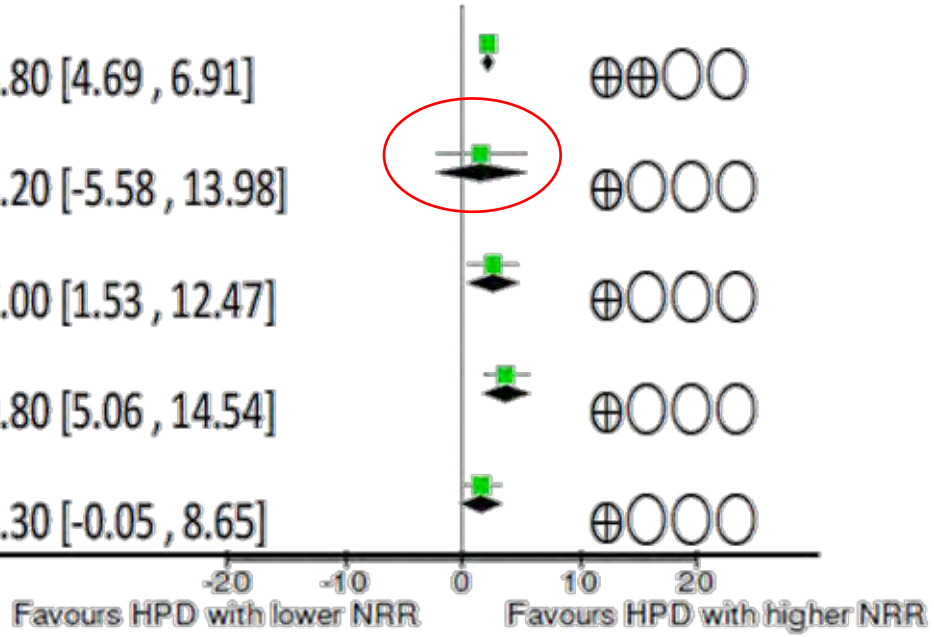


Data from Liu et al., Ear and Hear., **41**:4, 838-846 (2020).

High NRR ≠ High PAR

Differences in mean PARs: high-NRR HPDs VS. low-NRR HPDs

HPD	Instruction	Follow-up	Mean difference [CI] dB	Certainty
	No	Immediate	5.80 [4.69 , 6.91]	⊕⊕◯◯
	Simple	Short-term	4.20 [-5.58 , 13.98]	⊕◯◯◯
	Extensive	Short-term	7.00 [1.53 , 12.47]	⊕◯◯◯
	Simple	Short-term	9.80 [5.06 , 14.54]	⊕◯◯◯
	Extensive	Short-term	4.30 [-0.05 , 8.65]	⊕◯◯◯



Data presented by Gong et al. NHCA HPD Fit Testing Symposium 2023

Poll 3

Had you heard of hearing protector fit testing before this webinar?

a) Yes
b) No

Psychophysical fit testing methods

Subjective

- Thresholds measured with and without hearing protector in place
- Difference used to calculate PAR
- Two current approaches:
- Real-ear attenuation at threshold
- Loudness balance

Image courtesy of NIOSH

Real ear attenuation at threshold procedure

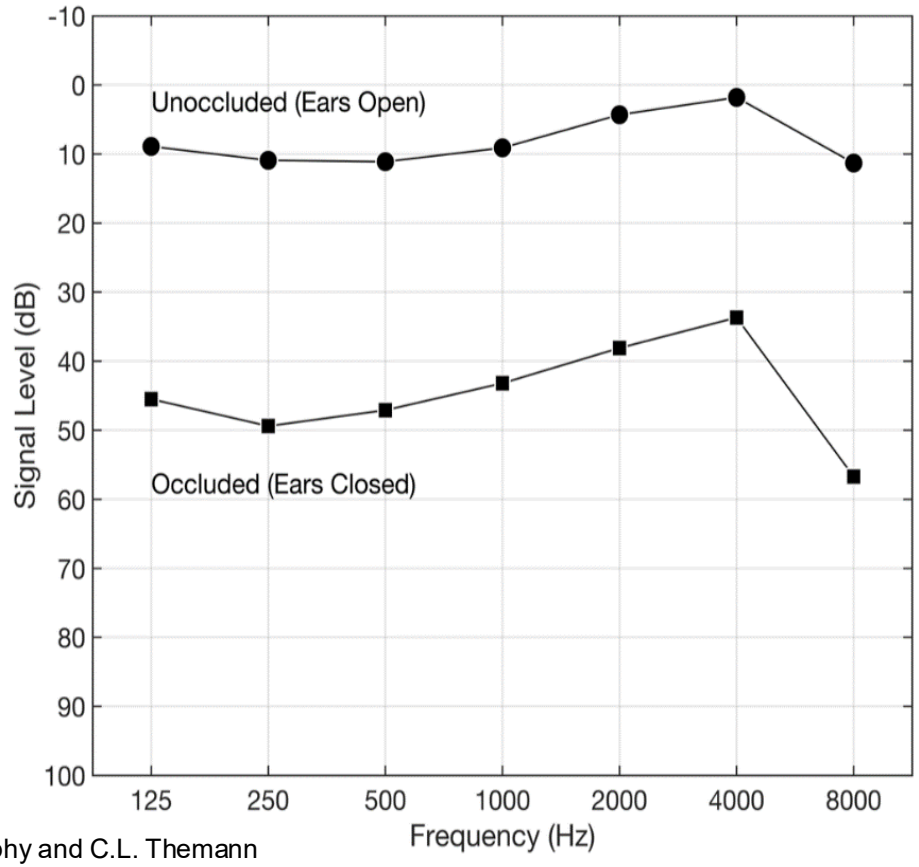
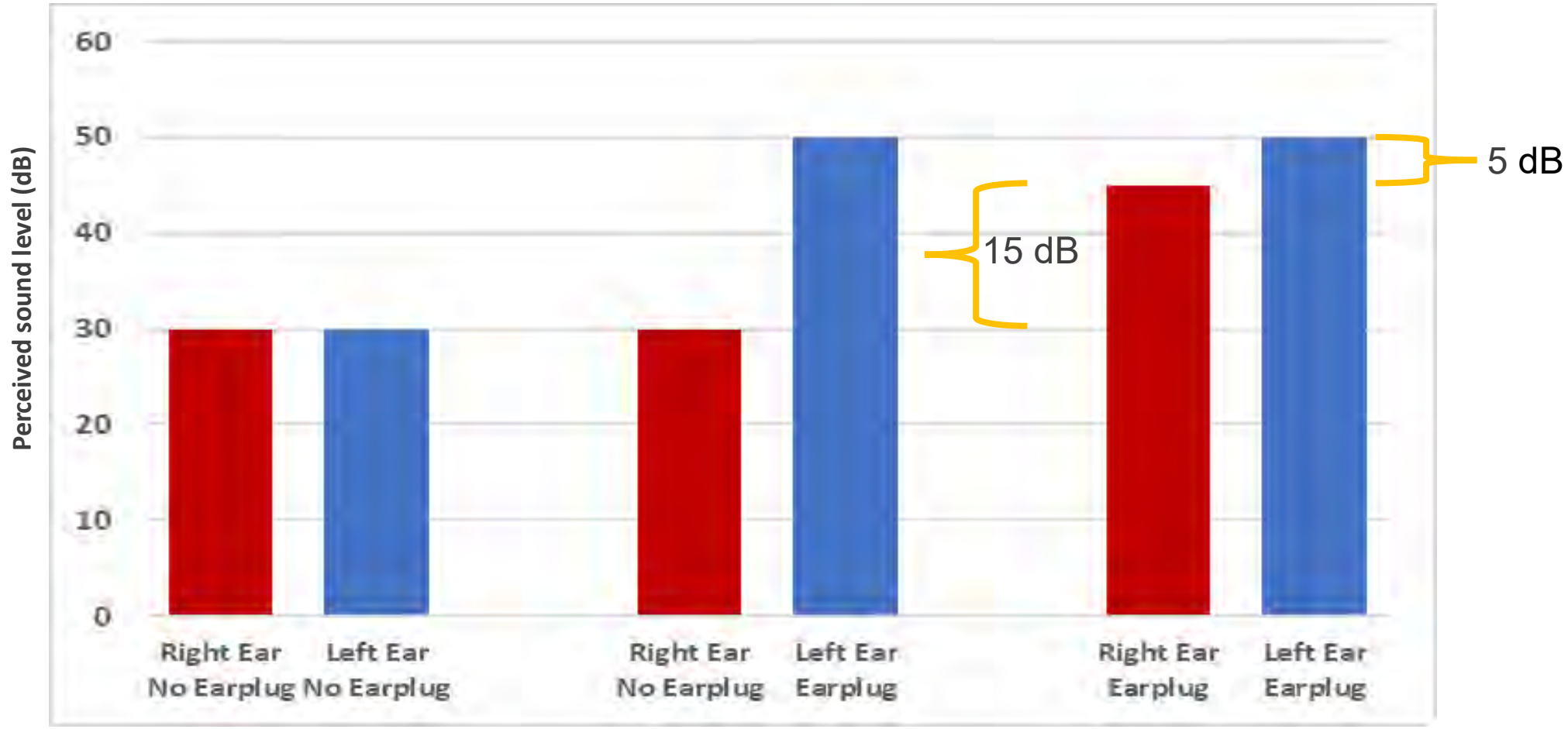


Image Credit: W.J. Murphy and C.L. Themann

Hearing thresholds without hearing protection

Hearing thresholds with hearing protection

Loudness balance procedure



Pros and cons

Photo courtesy of NIOSH

REAT systems:

- Test takes 1-8 minutes
- Test any earplug; not earmuffs
- Test 125-8000 Hz (or a subset, to reduce time)
- Monaural or binaural results
- Potential to use clinical audiogram for unoccluded test
- Possible ceiling effects

Loudness balance systems:

- Test takes 3-10 minutes
- Test any earplug; not earmuffs
- Tests 250-4000 Hz
- Monaural results
- Less affected by background noise
- Unfamiliar task
- Possible ceiling effects

Physical fit testing methods

Objective

- Dual microphones measure noise levels outside and inside the ear with the hearing protector in place
- Difference used to calculate PAR

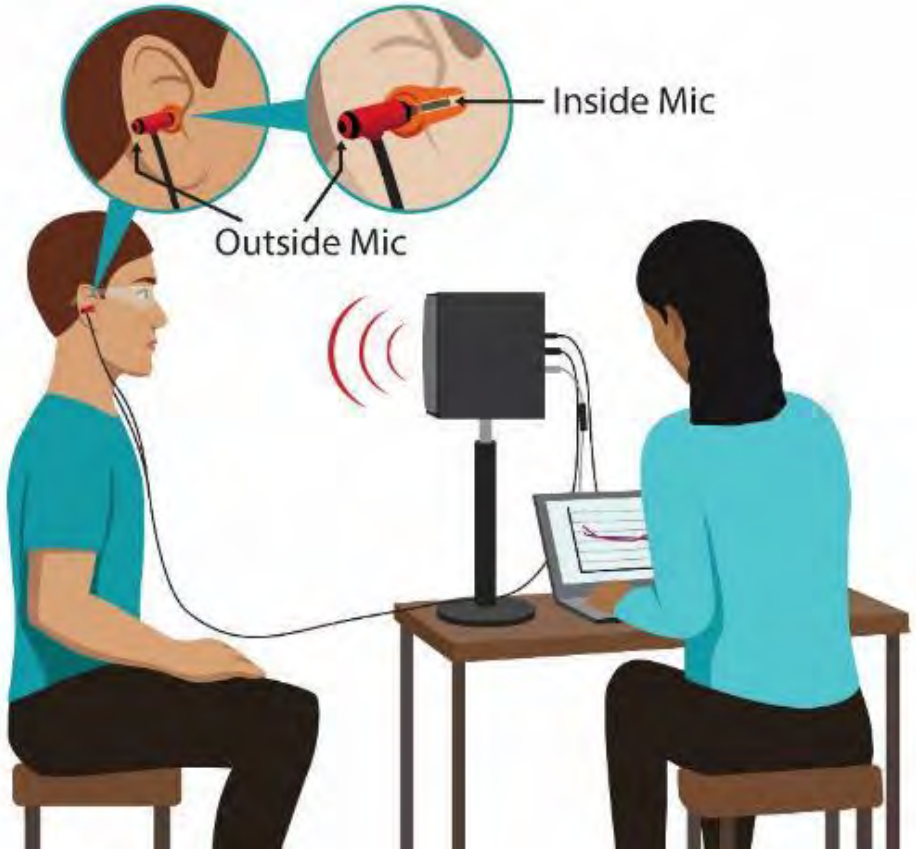


Image courtesy of NIOSH

Pros and cons

- Test takes ~10 seconds/ear plus set-up time
- Tests earplugs and earmuffs
- Requires specially-probed hearing protectors
- Tests 125-8000 Hz
- Monaural results
- Unaffected by moderate background noise
- No ceiling effects

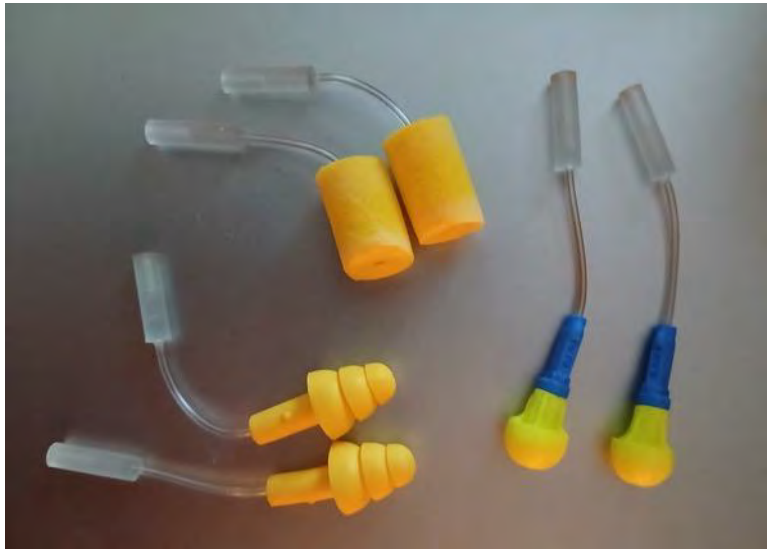


Photo courtesy of NIOSH

Choosing a fit-test method

Issues to consider:

- What types of hearing protection are you testing (earplugs/muffs/canal caps)?
- How loud is the test area?
- How long does the test take?
- Is the test protocol configurable?
- Can people with hearing loss be tested?
- What kind of result is needed?

Image courtesy of DataBase Center for Life Science (DBCLS), CC BY 4.0 <https://creativecommons.org/licenses/by/4.0>, via Wikimedia Commons

You don’t need special equipment

You can fit test hearing protection using equipment found in most audiology clinics.

Psychophysical approach: Sound field audiometry

- Binaural open ear thresholds
- Binaural thresholds with earplugs in place
- Calculate threshold differences

CPT code for hearing protector fit testing is 92596

You don’t need special equipment

Physical approach: Real-ear measures using a hearing aid verification system

Use a pink noise signal

- REUR: Real ear unoccluded response (pink curve)
- REAR: Real ear “aided” response (green curve)
- REIG: Real ear insertion “gain” (difference – should show a loss)

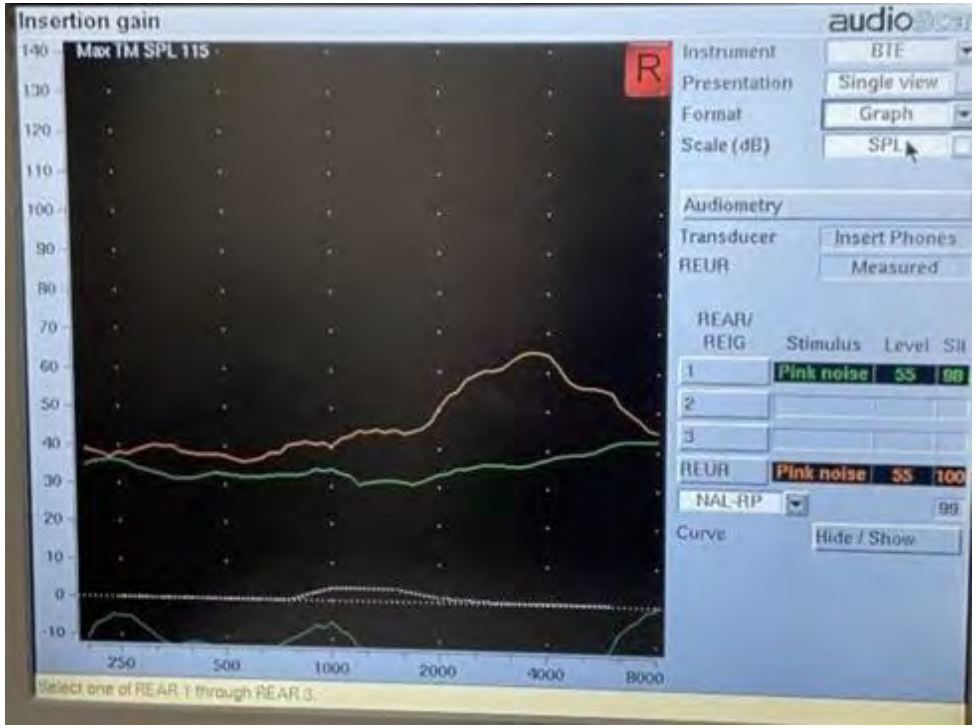


Photo courtesy of the University of Pittsburgh

Same CPT code: 92596

Calculating PAR

	Octave-band center frequency (Hz)							Combined across frequencies
	125	250	500	1000	2000	4000	8000	
Pink noise (dB SPL)	90	90	90	90	90	90	90	
A-weighting (dB)	-16.1	-8.6	-3.2	0	1.2	1	-1.1	
Weighted level (dBA)	**73.9**	**81.4**	**86.8**	**90**	**91.2**	**91**	**88.9**	**97 dBA**
Insertion loss (dB)	28	28	33	31	30	28	16	
Protected level (dBA)	**45.9**	**53.4**	**53.8**	**59**	**61.2**	**63**	**72.9**	**74 dBA**

PAR = 97 – 74 – 3* = 20 dB

*Subtracted to account for uncertainty when the exact noise source is unknown.

Decibel calculator: www.hearingconservation.org/audiometric-and-noise-measurement-calculators

Using PAR

PAR is subtracted directly from the A-weighted noise exposure level to estimate a person's protected exposure level

Image courtesy of NIOSH

How to choose and fit a hearing protector

- Offer several different types and styles
- Rather than selecting based on the NRR, focus on the 5 Cs:
  - Communication
  - Comfort
  - Compatibility
  - Convenience
  - Climate

Resource

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

NIOSH Science Blog

EXPLORE THIS TOPIC

SEARCH

Three Tips for Choosing the Right Hearing Protector

Posted October 24, 2018

For Everyone
OCT. 24, 2018

WHAT TO KNOW

Summary: This blog discusses how to pick the right hearing protector.

By: CAPT William J. Murphy, Ph.D., Christa L. Themann, MA, CCC-A,CAPT Chucri (Chuck) A. Kardous, MS, PE, and CAPT David C. Byrne, Ph.D., CCC-A

https://www.cdc.gov/niosh/blogs/2018/hearing-protection.html /

Training in proper use is key

Any hearing protector that can be worn incorrectly will be worn incorrectly!

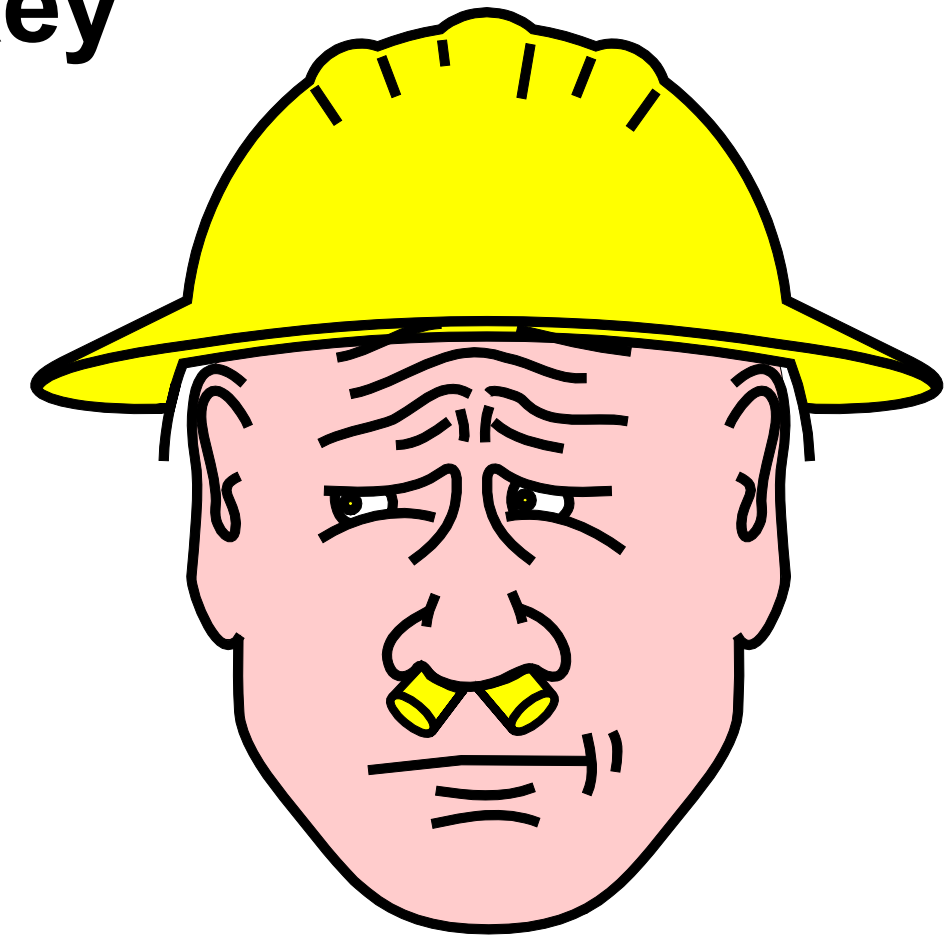


Image by Mark Stephenson, NIOSH

The best hearing protector is the one that is worn correctly and consistently whenever exposed to noise.

Recommendations

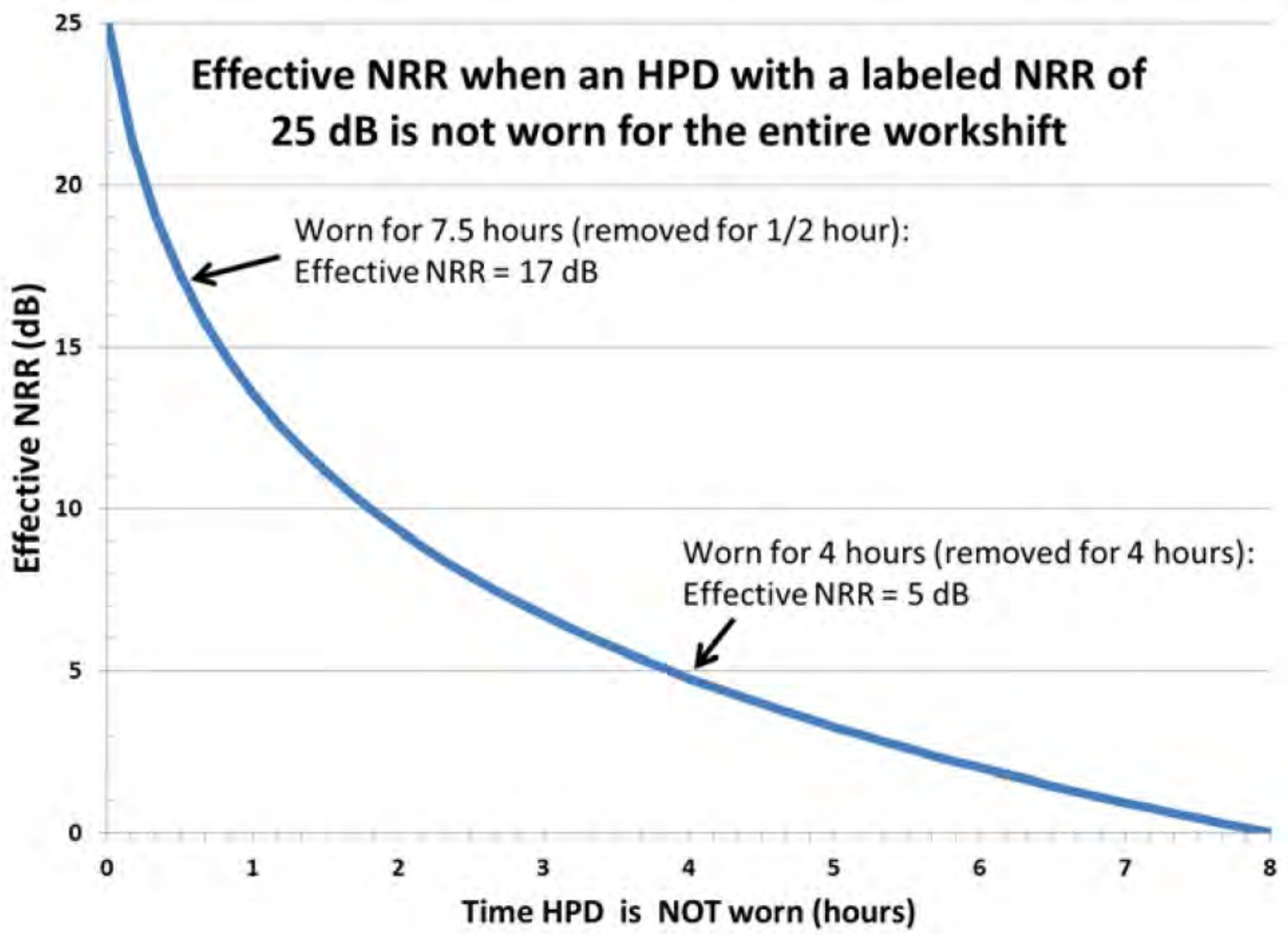
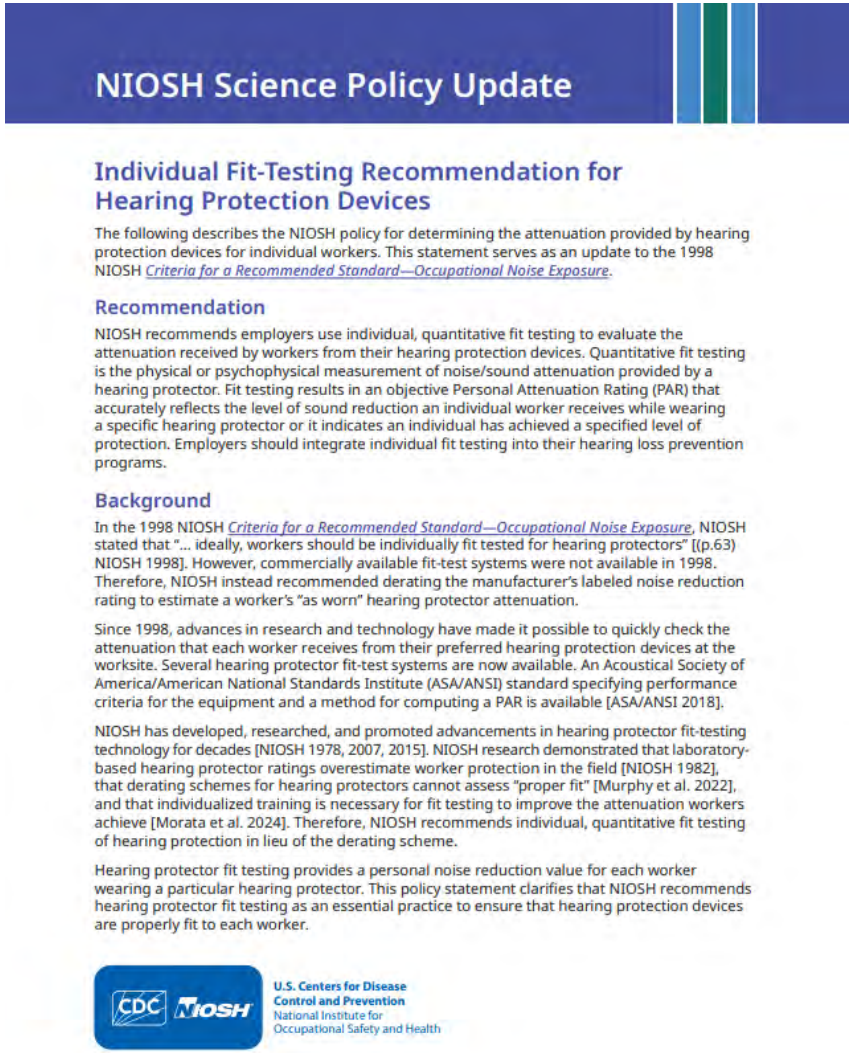


Chart courtesy of NIOSH

NIOSH policy

JANUARY 2025

"… As fit-test systems are now readily available, this NIOSH Science Policy Update recommends employers use individual, quantitative fit testing to evaluate the attenuation received by workers from their hearing protection devices.



NIOSH Science Policy Update

Individual Fit-Testing Recommendation for Hearing Protection Devices

The following describes the NIOSH policy for determining the attenuation provided by hearing protection devices for individual workers. This statement serves as an update to the 1998 NIOSH *Criteria for a Recommended Standard—Occupational Noise Exposure*.

Recommendation

NIOSH recommends employers use individual, quantitative fit testing to evaluate the attenuation received by workers from their hearing protection devices. Quantitative fit testing is the physical or psychophysical measurement of noise/sound attenuation provided by a hearing protector. Fit testing results in an objective Personal Attenuation Rating (PAR) that accurately reflects the level of sound reduction an individual worker receives while wearing a specific hearing protector or it indicates an individual has achieved a specified level of protection. Employers should integrate individual fit testing into their hearing loss prevention programs.

Background

In the 1998 NIOSH *Criteria for a Recommended Standard—Occupational Noise Exposure*, NIOSH stated that "… ideally, workers should be individually fit tested for hearing protectors" [(p.63) NIOSH 1998]. However, commercially available fit-test systems were not available in 1998. Therefore, NIOSH instead recommended derating the manufacturer's labeled noise reduction rating to estimate a worker's "as worn" hearing protector attenuation.

Since 1998, advances in research and technology have made it possible to quickly check the attenuation that each worker receives from their preferred hearing protection devices at the worksite. Several hearing protector fit-test systems are now available. An Acoustical Society of America/American National Standards Institute (ASA/ANSI) standard specifying performance criteria for the equipment and a method for computing a PAR is available [ASA/ANSI 2018].

NIOSH has developed, researched, and promoted advancements in hearing protector fit-testing technology for decades [NIOSH 1978, 2007, 2015]. NIOSH research demonstrated that laboratory-based hearing protector ratings overestimate worker protection in the field [NIOSH 1982], that derating schemes for hearing protectors cannot assess "proper fit" [Murphy et al. 2022], and that individualized training is necessary for fit testing to improve the attenuation workers achieve [Morata et al. 2024]. Therefore, NIOSH recommends individual, quantitative fit testing of hearing protection in lieu of the derating scheme.

Hearing protector fit testing provides a personal noise reduction value for each worker wearing a particular hearing protector. This policy statement clarifies that NIOSH recommends hearing protector fit testing as an essential practice to ensure that hearing protection devices are properly fit to each worker.

https://www.cdc.gov/niosh/docs/2025-104/

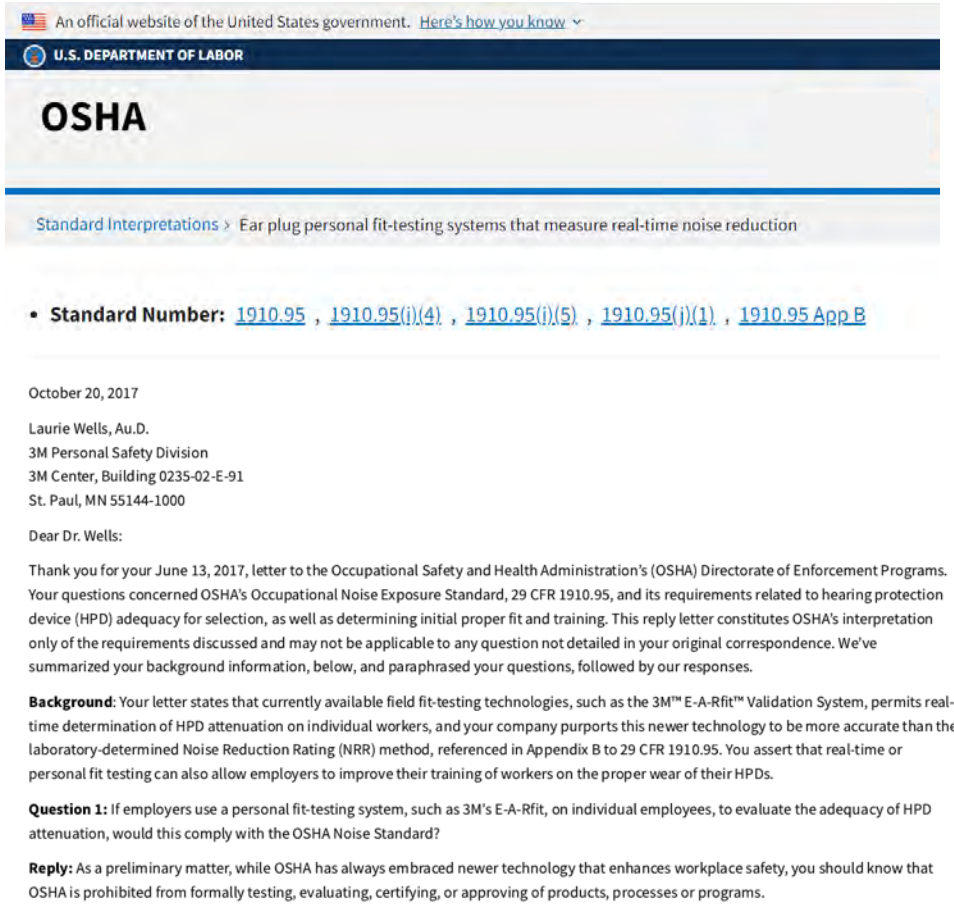
OSHA Policy

2017 Letter of Interpretation

HPD fit testing complies with OSHA requirements for:

- Ensuring initial proper fit
- Effective worker training on use of HPDs

But NOT for evaluating suitability of hearing protector before offering it to the worker



An official website of the United States government. Here's how you know

U.S. DEPARTMENT OF LABOR

OSHA

Standard Interpretations › Ear plug personal fit-testing systems that measure real-time noise reduction

- **Standard Number:** 1910.95 , 1910.95(i)(4) , 1910.95(i)(5) , 1910.95(j)(1) , 1910.95 App B

October 20, 2017

Laurie Wells, Au.D.
3M Personal Safety Division
3M Center, Building 0235-02-E-91
St. Paul, MN 55144-1000

Dear Dr. Wells:

Thank you for your June 13, 2017, letter to the Occupational Safety and Health Administration's (OSHA) Directorate of Enforcement Programs. Your questions concerned OSHA's Occupational Noise Exposure Standard, 29 CFR 1910.95, and its requirements related to hearing protection device (HPD) adequacy for selection, as well as determining initial proper fit and training. This reply letter constitutes OSHA's interpretation only of the requirements discussed and may not be applicable to any question not detailed in your original correspondence. We've summarized your background information, below, and paraphrased your questions, followed by our responses.

Background: Your letter states that currently available field fit-testing technologies, such as the 3M™ E-A-Rfit™ Validation System, permits real-time determination of HPD attenuation on individual workers, and your company purports this newer technology to be more accurate than the laboratory-determined Noise Reduction Rating (NRR) method, referenced in Appendix B to 29 CFR 1910.95. You assert that real-time or personal fit testing can also allow employers to improve their training of workers on the proper wear of their HPDs.

Question 1: If employers use a personal fit-testing system, such as 3M's E-A-Rfit, on individual employees, to evaluate the adequacy of HPD attenuation, would this comply with the OSHA Noise Standard?

Reply: As a preliminary matter, while OSHA has always embraced newer technology that enhances workplace safety, you should know that OSHA is prohibited from formally testing, evaluating, certifying, or approving of products, processes or programs.

https://www.osha.gov/laws-regs/standardinterpretations/2017-10-20

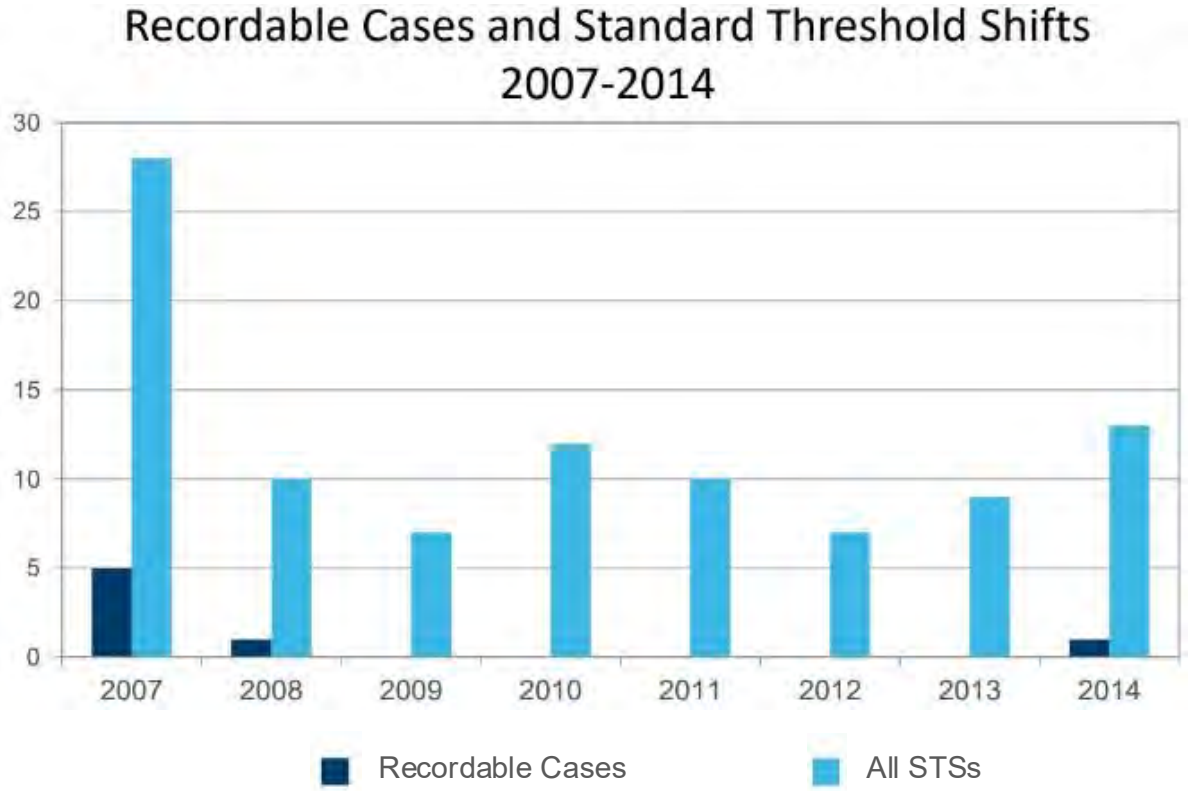
3M (Hutchinson, MN)

Findings from Testing 84 Hutch Employees 12/1/09 and 12/2/09		
Good fit with the plugs they use or plugs closest to what they use or would use	47/84	55%
Good fit achieved after 30 seconds of training	20/84	24%
Those who had to switch plugs and achieved a good fit	15/84	19%
Those who could not be fit with any of the test plugs	2/84	2%

- Conducted fit-testing pilot to demonstrate its value to management
- Proper hearing protector fit increased from 55% to 98%
- Management expanded fit-testing to all employees
- Other 3M plants have done the same

http://www.safeinsound.us/swf/3M/index.html

Mahrt Mill (Cottonton, AL)



- 50-year-old plant with challenging noise issues
- High rate of hearing shifts
- Launched several initiatives to reduce hearing loss, including fit-testing
- Hearing shifts dropped

https://safeinsound.us/pdf_pres/2015_MWV_Excellence_Award.pdf

Resource

Introductory guide

Overview of fit testing:

- Why it is important
- Considerations for getting started
- Step-by-step instructions

Developed by panel of experts

Hosted on the website of the National Hearing Conservation Association

www.hearingconservation.org/intro-to-fit-testing-for-hearing-protection

Summary

Hearing protector fit testing:

- Helps prevent noise-induced hearing loss
- Expands and enhances clinical practice
- Ensures noise-exposed individuals are properly protected
- Identifies problems with over- and under-protection
- Provides real-time feedback to patients/clients
- Meets federal and policy requirements for fitting hearing protectors and providing training

Best practices

- Recommend hearing protection to patients/clients any time the noise level is 85 dBA or higher
- Offer a WIDE variety of hearing protectors
- Focus on factors other than the NRR in selecting HPDs
- Use fit-testing to ensure proper attenuation
- Provide individualized training in care and use

Questions, comments, discussion

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For more information, contact: NIOSHNoiseResearch@cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention.

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