

Highlights & features of our products, tips on best practices, and how to use PATH MEDICAL devices.

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### **Occupational Hearing Loss: A Preventable Global Health Risk**

Occupational hearing loss, particularly occupational noise-induced hearing loss (ONIHL), is one of the most prevalent work-related health conditions worldwide. It occurs when workers are exposed to hazardous noise levels—typically  $\geq 85$  dBA over an 8-hour workday—for prolonged periods, leading to progressive and irreversible damage to the auditory system.

Commonly affected industries include mining, construction, manufacturing, and heavy industry where continuous exposure to machinery and industrial equipment is common. Because the damage usually develops gradually and without immediate symptoms, it may go unnoticed until permanent threshold shifts occurred.

This condition has significant implications for communication, workplace safety, productivity, and quality of life. For these reasons, international occupational health agencies such as the National Institute for Occupational Safety and Health and the World Health Organization recognize occupational hearing loss as a major public health concern requiring systematic prevention and monitoring strategies (Basner et al., 2014; Nelson et al., 2005).

### **Prevention Starts with Reliable Monitoring**

An effective protocol for monitoring occupational hearing loss should be integrated within a hearing conservation or hearing loss prevention program. The recommended approach begins with a **baseline audiometric evaluation** conducted at the time of employment to establish each worker's reference hearing thresholds. This baseline should be followed by **periodic audiometric testing**, typically annually, to identify early threshold shifts that may indicate excessive noise exposure.

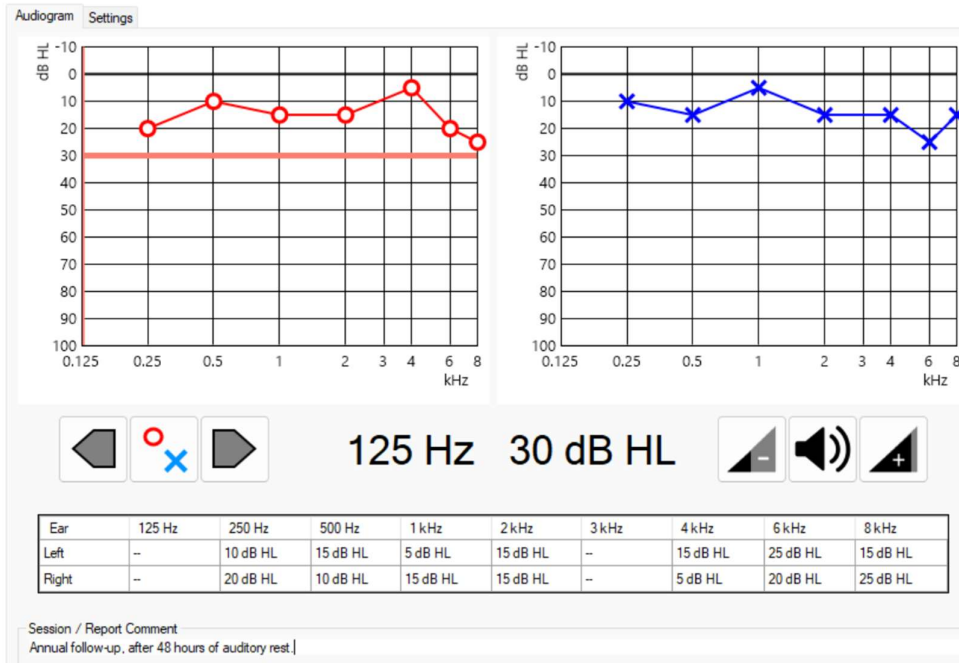


Fig 1. Example of "Auto-audio". Audiometry test performed with the equipment NanoAudio using the automatic Hughson Westlake technique and the patient response button.

In addition, workplace noise assessments should be conducted regularly using sound level measurements or personal dosimetry to quantify exposure levels. When threshold shifts are detected, follow-up evaluations should include confirmation testing, review of exposure conditions, and assessment of hearing protection use. Documentation and longitudinal **tracking of audiometric results** allow occupational health professionals to detect trends and evaluate the effectiveness of preventive interventions over time (Masterson et al., 2016; NIOSH, 2021).

Preventive strategies for occupational hearing loss follow the hierarchy of controls, which prioritizes interventions according to their effectiveness. Engineering controls are the most effective and focus on reducing noise at its source through equipment maintenance, machine isolation, sound-dampening materials, and workplace redesign.

Organizations are also encouraged to implement "buy-quiet" initiatives, selecting machinery that produces lower noise levels. When engineering controls cannot sufficiently reduce exposure, administrative controls such as task rotation, reduced exposure time, and relocation of workers away from high-noise areas may be implemented. Personal protective equipment, including earplugs and earmuffs, represents the final level of protection and must be accompanied by training and proper fit-testing to ensure effectiveness.

Modern prevention programs also recognize that occupational hearing loss may be influenced by multiple interacting hazards, including ototoxic chemicals, vibration, and extreme heat, emphasizing the need for comprehensive risk management strategies (Basner et al., 2014; NIOSH, 2021).

Comprehensive hearing loss prevention programs that integrate noise monitoring, worker education, protective equipment, and continuous evaluation provide the most effective approach to reducing the risk of permanent hearing damage. Current occupational health strategies increasingly emphasize preventing hearing loss rather than simply conserving hearing, highlighting the importance of proactive workplace policies and long-term surveillance to ensure safer working conditions and improved worker well-being.

### **Reliable Testing with nanoAudio®**

Accurate and efficient audiometric monitoring is essential for effective hearing conservation programs.

**nanoAudio® from PATH MEDICAL** provides a **portable, PC-based solution for occupational audiometric testing**, enabling:

- ✓ Fast and reliable hearing assessments
- ✓ Flexible testing in clinics, occupational health centers, or directly at the workplace
- ✓ Easy integration into hearing conservation programs
- ✓ Efficient documentation and monitoring of hearing thresholds over time
- ✓ Create your own testing protocols and use the automatic “Auto-audio” mode

With its compact design and intuitive software, nanoAudio® supports **early detection of hearing changes and long-term monitoring of workers’ hearing health.**

**Learn more NanoAudio in our Website**

[https://www.pathme.de/download/brochures/100837-30\\_MA\\_nanoAudio\\_02.pdf](https://www.pathme.de/download/brochures/100837-30_MA_nanoAudio_02.pdf)

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