HEARING CONSERVATION

FOR PERFORMERS

BEST PRACTICE GUIDANCE 2025

BRITISH ASSOCIATION FOR PERFORMING ARTS MEDICINE

Healthy Conservatoires

March 2025

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Amendment Log	
Amendment date	Additions or Alterations
March 2025	Updated language to better align with Diversity, Equality, Inclusion and Belonging aims Updated format and content based on stakeholder feedback for user-friendliness

Definitions & abbreviations used

Health and Safety at Work etc. Act 1974	The primary piece of legislation covering occupational health and safety in the UK, establishing the general duty of employers to ensure, as far as reasonably practicable, the health and safety of employees and others.
'Management Regulations'	The Management of Health and Safety at Work Regulations 1999 http://www.legislation.gov.uk/uksi/1999/3242/contents/made Regulations that require employers to assess and manage risks to their employees and others arising from work activities, including the risk of hearing damage from sound exposure.
'Noise Regulations'	The Control of Noise at Work Regulations 2005 http://www.legislation.gov.uk/uksi/2005/1643/contents/made UK regulations that set legal limits for workplace noise exposure and require employers to take specific actions when those limits are reached. These regulations were extended to the music and entertainment sector in April 2008.
BAPAM	*see* British Association for Performing Arts Medicine
British Association for Performing Arts Medicine	A healthcare charity giving medical advice to people working and studying in the performing arts http://bapam.org.uk/
Decibel (dB)	The unit used to measure sound intensity. The decibel scale is logarithmic, meaning that an increase of 10 dB represents a sound that is 10 times more intense and sounds about twice as loud to our ears. For context: • Normal conversation: 60-70 dB • Piano practice: 60-85 dB • Symphony orchestra: 80-105 dB • Rock concert: 95-115 dB
dB(A) vs. dB(C)	Different ways of measuring sound that account for how human hearing perceives different frequencies: • dB(A): Weighted to match human hearing sensitivity at moderate sound levels; used for average exposure measurements

	• dB(C): Less filtered measurement that includes more low-frequency sound; used for peak measurements
Diplacusis	A condition where the same sound is perceived differently by each ear, often described as hearing the same note at two different pitches. This can be particularly problematic for musicians who rely on precise pitch perception.
Exposure Action Values	Sound level thresholds that trigger specific requirements under the Noise Regulations: • Lower Exposure Action Value: 80 dB(A) daily average or 135 dB(C) peak • Upper Exposure Action Value: 85 dB(A) daily average or 137 dB(C) peak • Exposure Limit Value: 87 dB(A) daily average or 140 dB(C) peak
HCN	*see* Healthy Conservatoires Network
Health & Safety Executive	The Health and Safety Executive (HSE) is Britain's national regulator and enforcer for workplace health and safety https://www.hse.gov.uk/
Health surveillance	a system of ongoing health checks. These health checks may be required by law for employees who are exposed to noise http://www.hse.gov.uk/health-surveillance/what/index.htm
Healthy Conservatoires Network	A forum of UK conservatoires aiming to create environments that promote and enhance the health and wellbeing of performing artists, enabling them to achieve their full potential and to build healthy, sustainable careers
Hearing Conservation Program	A structured approach to protecting hearing that includes risk assessment, control measures, education, and health surveillance.
Hierarchy of Control	A systematic approach to managing hazards by implementing the most effective controls first: 1. Controlling sound at source 2. Controlling the transmission path *3.* Personal hearing protection
HSE	*see* Health & Safety Executive
Hyperacusis	Increased sensitivity to everyday sounds, making normal sounds seem uncomfortably loud. For musicians, this can make certain instruments or performance environments particularly challenging.
MRHD	*see* Music-related hearing disorders
Music-related hearing disorders	Symptoms experienced by performers including tinnitus, sensitivity to sound, pain and difficulty with pitch perception
NIHL	see Noise-Induced Hearing Loss

Noise-Induced Hearing Loss	Permanent damage to inner ear structures caused by exposure to intense sound over time. NIHL typically affects specific frequencies first (often around 4000 Hz) and can occur at any age.
OAE	*see* Otoacoustic emission
Otoacoustic emissions	A test that measures tiny sounds produced by the functioning inner ear in response to external sounds. These emissions disappear in the earliest stages of hearing damage, making this test particularly valuable for early detection before symptoms appear.
Otoscopy	A visual examination of the ear canal and eardrum using a special instrument called an otoscope. This helps identify any physical issues that might affect hearing.
PTA	*see* Pure Tone Audiometry
Pure Tone Audiometry	The standard hearing test where you respond to beeps of different pitches and volumes. This measures the quietest sounds you can hear at different frequencies but may not detect early signs of damage. It is used to diagnose hearing loss.
Risk assessment	The process of identifying processes which may cause harm to people in the workplace and decide whether you are taking reasonable steps to prevent or control that harm
Tinnitus	Ringing, buzzing, or other sounds in the ears when no external sound is present. This common early warning sign of hearing damage can range from occasional and mild to constant and severe, potentially affecting concentration and sleep.
Tympanometry	A test that measures how well your eardrum moves in response to air pressure. This helps evaluate middle ear function, which can affect how sound reaches your inner ear.

1. Introduction

Listening is essential for musicians. Sound is the medium through which musicians communicate, express, create and collaborate. For performers, careful attention this special sense requires recognising and managing risks in sound-rich environments.

Education providers and performing arts organisations have both legal and moral obligations to identify sound-related health hazards and protect those under their care from potential hearing injury. This guidance offers practical approaches to conserving hearing while maintaining the quality of musical performance and education.

The 2025 update focuses on inclusive language and practical risk assessment tools to help implement effective hearing conservation strategies.

2. Why hearing conservation guidance for musicians is needed

Unique Nature of Musical Sound Exposure

Musicians face sound exposure that differs significantly from industrial noise. Unlike industrial noise with random, continuous frequency components, music consists of structured, rational, discrete frequency components

Musical sound typically contains high energy density at middle and high frequencies, while industrial noise often concentrates at low and middle frequencies.

Music has substantial variations in intensity, with peak levels that can far exceed average measurements.

Understanding sound-related hearing changes

Sound exposure is an integral part of musical activity. For musicians, prolonged exposure to intense sound during performances, rehearsals, teaching, and practice is inevitable.

Sound-related hearing changes can include:

- tinnitus (ringing in the ears)
- hyperacusis (reduced tolerance to louder sounds)
- diplacusis (problems with pitch perception)
- Noise-induced hearing loss (NIHL) - permanent damage to inner ear structures (Zhao et al., 2010)

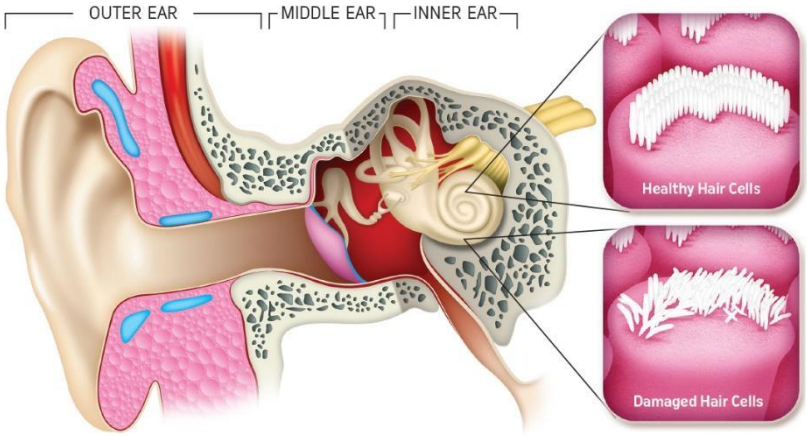


Figure 1: Vulnerable Hair-Like Structures In The Inner Ear

These conditions can significantly impact a musician's ability to perform and can affect career longevity.

Limitations of Standard Noise Control Approaches in Musical Contexts

While guidelines and monitoring protocols exist for industrial noise settings, standard approaches have significant limitations when applied to music and performing arts environments.

The musical environment presents unique challenges not typically addressed in general noise guidance:

Diverse settings with different acoustic properties and exposure patterns:

- Performance venues with varying designs and audience capacities
- Rehearsal spaces that may be acoustically challenging or variable
- Practice rooms that can create intense, concentrated exposure
- Teaching studios where close proximity is necessary for instruction

Temporal variations in exposure that differ from industrial patterns:

- Intense but intermittent exposure rather than continuous noise
- Varied practice and performance schedules with irregular patterns
- Seasonal concentration of performances (e.g., concert seasons, festivals)
- Wide variations in individual exposure based on repertoire and role

Dynamic range characteristics not found in industrial settings:

- Natural crescendos and diminuendos within musical works
- Frequent variations between quiet passages and peak intensities
- Genre-specific sound profiles with different risk patterns - Instrument-specific exposure levels that vary by musical context

The Unique Challenges of Musical Careers:

- For many musicians, auditory perception is an important aspect of their creative process that may be affected by sound-related changes
- The sound sources necessary for musical expression and education can also potentially contribute to hearing changes over time
- For those who rely on specific auditory discrimination in their work, changes in hearing function may present additional professional challenges
- Musicians with hearing impairments or who are deaf bring valuable perspectives and demonstrate that musicianship encompasses many forms of sensory engagement

The Professional Case for Hearing Conservation

These factors combine to create a need for specialised guidance that addresses the unique characteristics of sound exposure in musical environments while preserving the essential qualities of musical performance and education. Effective hearing conservation becomes not merely a health and safety requirement but a professional necessity for career sustainability.

3. Legal framework and exposure limits

The Control of Noise at Work Regulations 2005 ('The Noise Regulations') came into effect for the music and entertainment sector in April 2008.

While these regulations primarily address workplace environments, all organisations involved in musical activities—including educational institutions, performance venues, and event organisers—have legal obligations under:

- Health and Safety at Work etc. Act 1974
- The Management of Health and Safety at Work Regulations 1999
- Common law duty of care

These frameworks establish the general principle that those responsible for music environments should take reasonable steps to identify and manage sound-related health risks, regardless of the specific relationship with the individuals involved.

These principles can guide decision-making for anyone responsible for or participating in musical activities, including educational institutions, freelance musicians, community groups, and performance venues.

Sound exposure levels

Understanding sound exposure is essential to effectively assess and manage risk.

Sound exposure is influenced by three key factors:

- Duration of exposure
- Intensity (measured in dB)
- Proximity to the sound source

The Control of Noise at Work Regulations 2005 established exposure action values:

Daily/Weekly Average Exposure Limits:

- Lower exposure action value: daily exposure of 80 dB(A)
- Upper exposure action value: daily exposure of 85 dB(A)
- Exposure limit value: daily exposure of 87 dB(A)

Peak Sound Pressure Limits:

- Lower exposure action value: peak sound pressure of 135 dB(C)
- Upper exposure action value: peak sound pressure of 137 dB(C)
- Exposure limit value: peak sound pressure of 140 dB(C)

The control principles established in the Noise Regulations provide a valuable framework that can be applied in any musical setting to reduce the likelihood of sound-related hearing effects:

- At 80 dB(A) or above: Information, training, and hearing protection should be available
- At 85 dB(A) or above: Implement control measures, designate protection zones, and require hearing protection
- At 87 dB(A) or above: Take immediate action to reduce exposure

For musicians, these levels can be reached quickly during standard rehearsal and performance activities. Imagine a violinist who plays in a symphony orchestra for a 3-hour rehearsal (averaging 88 dBA), teaches two 1-hour lessons (averaging 82 dBA), and practices individually for 2 hours (averaging 80 dBA) – their daily noise dose would exceed the upper action value, despite many periods of moderate sound levels. Meanwhile, a percussionist playing a single cymbal crash (138 dBC peak) would exceed the upper peak action value in an instant, regardless of the overall rehearsal's average level.

The BBC Musicians' Noise Guides have further worked examples of a musicians' typical noise dose available for musicians and a toolkit for managers.

Alternative approaches to meeting these obligations may be considered where the nature of musical work makes strict compliance with industrial noise standards impractical, provided the organisation fulfils its duty to reduce risk "so far as is reasonably practicable." This principle was clarified in the Goldscheider v Royal Opera House case, where the Court of Appeal recognised that it was not reasonably practicable for orchestra members to wear hearing protection throughout performances or rehearsals, particularly during quieter passages where musicians need to hear clearly. The Court distinguished between what is "physically practicable" and what is "reasonably practicable," acknowledging the practical realities of musical performance. Organisations must document their risk assessment process, demonstrate that they have meaningfully considered all reasonably practicable control measures, and implement appropriate protection strategies based on sound levels throughout different parts of rehearsals and performances.

Health Surveillance Requirements

Based on these exposure values and control principles, health surveillance requirements are also established in the regulations. The Noise Regulations require health surveillance where there is a risk to health. Specifically:

- At the Lower Action Value (80 dB(A)): Health surveillance should be provided where risk assessment identifies risk
- At the Upper Action Value (85 dB(A)): Health surveillance becomes mandatory

Health surveillance is vital for early detection of any hearing changes and evaluation of control measure effectiveness. While traditional Pure Tone Audiometry (PTA) testing can detect changes after significant damage has occurred, musicians are likely to benefit from a more specialised approach.

For musicians, we recommend a surveillance program that includes both traditional audiometry and Otoacoustic Emissions (OAE) testing. OAE can detect early changes to inner ear structures before symptoms develop or before they would be identified by conventional tests. This early detection provides a crucial opportunity to implement protective measures before permanent damage occurs.

4. Developing a hearing conservation strategy

An effective hearing conservation program requires a coordinated approach that includes:

- Risk assessment and management
- Implementation of control measures
- Education and training
- Health surveillance
- Regular review and adaptation

Organisations should designate a responsible person to coordinate and maintain the hearing conservation program.

5. Risk assessment

Risk assessment is the foundation of any hearing conservation strategy. The process involves:

1. Identifying sound sources and exposed individuals
2. Characterising sound profiles (instrument, environment, duration, intensity)
3. Assessing exposure against established limits
4. Estimating probability of hearing damage

[See Risk Assessment Table in Appendix]

We suggest risk assessments should be reviewed at least every year and when significant changes occur in activities, environment or an individuals vulnerability.

6. Understanding & implementing Control measures

What Are Control Measures?

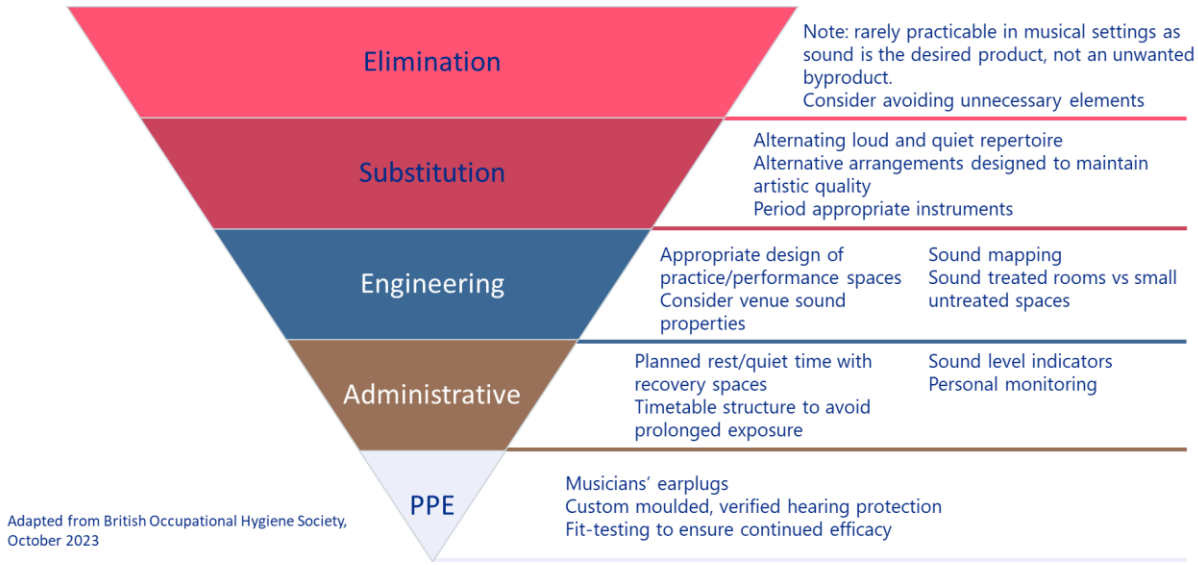
Control measures are the actions and interventions taken to reduce the risk of harm from sound exposure. In sound-rich environments such as music education and performance, control measures must balance hearing health with the artistic and educational needs of the setting.

The Hierarchy of Control Approach

When implementing control measures, the hierarchy of control defines the order to follow when planning risk reduction:

1. **Controlling sound at source**
2. **Preventing and controlling exposure** (controlling the transmission pathway)
3. **Personal hearing protection**

This approach ensures that efforts focus first on the most effective control methods before moving to less effective options.



Applying Control Measures in Musical Settings

1. Controlling Sound at Source

Controlling sound at its source involves modifying or substituting the sound-producing activity:

- **Elimination considerations:** While complete elimination of sound exposure is rarely practical in musical settings—as music is the desired product rather than an unwanted byproduct—certain high-risk activities can be modified when appropriate.
- **Modify the process** to reduce sound exposure as low as reasonably practicable:
    - Planned rest/quiet time with recovery spaces
    - Development of standards on timetable structure
    - Appropriate design of practice and performance spaces
    - Sound mapping for orchestras and ensembles
    - Limiting non-vocational sound exposure
- **Substitute sound sources:**
    - Careful consideration of repertoire, alternating louder pieces with quieter work
    - Using period-appropriate instruments (e.g., Baroque instruments for Baroque music)
    - Electronic instruments with volume control for appropriate contexts
    - Alternative arrangements that maintain artistic quality with reduced intensity

Example: A brass department implements a structured rehearsal program that alternates high-intensity repertoire with chamber works, providing recovery periods between demanding pieces.

2. Preventing and Controlling Exposure (Transmission Pathway)

When source controls are insufficient, focus on the path between the sound source and the listener:

- **Engineer the environment:**
    - Ensure adequate distance between musicians (recommendation of $2m^2$ per musician)
    - Implement acoustic treatment in practice and performance spaces
    - Use transparent sound shields between sections
    - Design practice rooms with appropriate dimensions and surface treatments
- **Administrative approaches:**
    - Record, respond to, and reduce the duration and intensity of exposure
    - Use visual sound level indicators in rehearsal spaces

    - Implement personal sound level monitoring apps
    - Rotate musicians during high-exposure activities
    - Schedule activities to avoid prolonged exposure

Example: A conservatoire installs visual sound level monitors in ensemble rehearsal rooms, giving real-time feedback that helps conductors and musicians manage sound levels while maintaining musical quality.

3. Personal Hearing Protection

If it is not practical for the risk presented by loud sound to be reduced at source or through transmission controls, then appropriate personal protection becomes essential:

- **Select appropriate protection** for the assessed risk level:
    - Musicians' earplugs with flat frequency response
    - Custom-moulded protection with verified fit
    - In-ear monitors with limited output levels
- **Ensure effectiveness:**
    - Verification by fit testing at time of supply is strongly recommended
    - Regular re-verification to ensure continued protective levels
    - Training on proper insertion and use
    - Maintenance of hearing protection

Example: A percussion student receives custom-moulded earplugs with a verified fit, providing appropriate attenuation while maintaining the frequency balance needed for accurate musical perception.

Combining Control Measures for Maximum Effectiveness

The most effective approach combines multiple controls across all three categories:

Example of Combined Controls:
A jazz program implements:

- Repertoire planning with varied intensity levels (Source Control)
- Acoustic treatment and musician spacing (Transmission Control)
- Custom hearing protection for particularly exposed positions (Personal Protection)

This multi-layered approach provides significantly better protection than any single control measure alone.

Implementing Proportionate Controls

The level of control required depends on the degree of risk:

- **Lower risk settings** (sound levels rarely exceed 80 dB) may need only basic measures
- **Medium risk settings** (levels between 80-85 dB) require more structured controls
- **High risk settings** (levels frequently exceed 85 dB) need comprehensive approaches

The key is proportionate implementation – using sufficient controls to manage the risk without unnecessarily impeding musical activities.

7. Information, instruction and training

Education and training are essential components of an effective hearing conservation strategy. All individuals engaged in musical activities should receive appropriate training on:

- Sound-related hearing risks specific to their musical context
- The principles of hearing conservation
- Proper selection, use, and maintenance of hearing protection
- Recognition of early warning signs of hearing changes

Organizations should designate a responsible person (e.g., manager, Health & Safety coordinator, or other named staff member) to maintain records of attendance and participation in education and training activities.

Refresher training should be provided every 1-2 years to:

- Address newly identified risks
- Introduce advances in protective technology and monitoring tools
- Reinforce good practices
- Update individuals on any changes to guidance or regulations

Training can be delivered through various formats, including in-person workshops, professional development sessions, or online modules. Digital learning platforms offer the advantage of consistent content delivery with automatic completion tracking. Training should be tailored to specific roles and contexts, recognising that different musical activities present unique challenges and require specific protective strategies.

8. Considerations when using Personal Hearing Protection for Musicians

When source and transmission controls cannot sufficiently reduce sound exposure, personal hearing protection becomes essential. Modern technology has significantly improved the options available to musicians, addressing many of the concerns that previously made musicians reluctant to use hearing protection.

Advancements in Musicians' Hearing Protection

While earlier hearing protection options often created a hollow, echoey sensation and diminished high-frequency perception, today's solutions provide much more natural sound experiences. Modern musicians' earplugs are designed to:

- Reduce sound levels evenly across frequencies
- Minimise the occlusion effect (the "talking in a barrel" sensation)
- Preserve sound quality and tonal balance
- Maintain spatial awareness and directionality
- Provide comfortable, extended wear

Types of Musicians' Earplugs

High-Fidelity Earplugs

Products such as ER-15 or ER-20 earplugs use acoustic filters that reduce sound levels while maintaining relatively flat frequency response:

- **Custom-moulded options** provide a precise fit to the individual's ear canal
- **Universal fit options** offer a more affordable alternative with standardized sizing
- **Attenuation levels** typically range from 9dB to 25dB, allowing selection based on exposure risk

Vented or Tuned Earplugs

These custom solutions feature carefully designed acoustic chambers:

- A tuned hole or cavity drilled down the centre of the earplug
- Frequency response can be tailored to the musician's specific needs
- Effectively eliminates the occlusion effect
- Can be tuned to address specific frequency concerns for different instruments

In-Ear Monitoring Systems

In-ear monitors (IEMs) serve a dual purpose of sound delivery and protection:

- Replace stage monitor speakers, reducing overall stage volume
- Deliver a controlled, personalised mix directly to the musician

- Available in universal fit or custom-moulded options
- Provide sound isolation from stage noise

Advanced IEM Features

Modern in-ear monitors can incorporate:

- **Ambient microphones** that allow musicians to hear their surroundings while maintaining isolation
- **Adjustable sound isolation** to match different performance environments
- **Frequency response tailored** to specific instruments or vocal ranges
- **Variable limiters** that protect against sudden volume spikes

Selection and Implementation Considerations

When implementing personal hearing protection:

1. **Match protection to the specific risk level**
    - Higher sound exposures may require greater attenuation
    - Different ensemble types may benefit from specific protection features
2. **Ensure proper fit and effectiveness**
    - Custom-moulded protection should be verified at fitting
    - Regular re-verification ensures continued effectiveness
    - Training on proper insertion and use is essential
3. **Address musician-specific concerns**
    - Different instruments create different monitoring needs
    - Communication requirements vary by ensemble type
    - Individual preferences affect acceptance and compliance

Limitations of Personal Protection

While modern hearing protection options offer significant benefits, important limitations remain:

- Protection is only effective when consistently worn
- Even the best options alter sound perception to some degree
- Individual response to different protection types varies considerably
- Protection levels achieved in laboratory testing may not be realized in practice

For these reasons, personal hearing protection must be considered as the final component of a comprehensive hearing conservation strategy, implemented after meaningful efforts to control sound at source and along transmission pathways.

9. Health surveillance

Health surveillance provides ongoing assessment of hearing health and evaluates the effectiveness of control measures. A comprehensive approach includes:

Baseline Assessment:

- Symptom questionnaire
- Otoscopy (visual inspection of outer ear)
- Pure Tone Audiometry (PTA)
- Tympanometry (middle ear function)
- Otoacoustic Emissions (OAE)

Regular Monitoring:

- Regular symptom checks
- Regular testing based on risk assessment
- OAE testing for early detection of changes
- Additional PTA if significant OAE changes detected
- Referral to specialists when indicated

Health surveillance records should be maintained and trends analysed to evaluate program effectiveness.

10. Individual responsibilities

While organisations must implement comprehensive hearing conservation strategies, individuals also have responsibilities:

- Attending education and training sessions
- Following recommended control measures
- Using provided hearing protection correctly
- Managing personal sound exposure (including recreational)
- Participating in health surveillance
- Reporting concerns or symptoms promptly

These shared responsibilities create a culture of hearing health awareness that supports career longevity. Smartphone Apps can inform daily personal exposure can be helpful for personal monitoring.

11. Key challenges and practical considerations

Breadth of Music Education Settings

This guidance applies to all settings where music education takes place, including:

- Conservatoires and specialist music schools
- University music departments
- Community music programs
- Primary and secondary schools
- Private teaching studios
- Youth orchestras and ensembles
- Online and digital learning environments

Each setting presents unique challenges and opportunities for hearing conservation, requiring tailored approaches while maintaining the core principles outlined in this guidance.

Working Arrangements in Music Environments

The music sector encompasses diverse working arrangements, including direct employment, contracted services, educational provision, freelancing, and more. Organisations across this spectrum have legal and ethical obligations to protect those who might foreseeably be affected by their activities from risks to hearing health.

While specific duties may vary according to the nature of the working or educational relationship, the following are essential requirements for all organisations involved in musical activities:

1. **Suitable and sufficient risk assessments** tailored to the specific sound environment
2. Written warnings and information about risks to hearing health provided to all potentially affected individuals
3. **Regular health surveillance programs** where residual risk remains after control measures
4. **Clear referral pathways** for suspected cases of sound-related hearing changes
5. **Appropriate support for affected musicians** through reasonable adjustments and guidance

Organisations should recognise that failure to implement appropriate control measures may have substantial implications, particularly where earlier intervention could have prevented career-limiting progression of symptoms.

Implementing the Hierarchy of Controls

While the hierarchy of controls provides a structured approach to risk management, its application in musical settings requires careful consideration:

- **Complete elimination of sound exposure is not practicable** in musical environments where sound is the intended product

- Personal hearing protection alone is insufficient and should never be the sole control measure
- Each level of the hierarchy offers important opportunities for risk reduction
- A comprehensive approach utilising multiple control levels provides the most effective protection

Organisations should document their decision-making process when implementing controls, demonstrating meaningful consideration of higher-level controls before resorting to personal protection.

Health Surveillance Considerations

Effective health surveillance is essential to check the efficacy of control measures and for early detection of hearing changes:

- While Pure Tone Audiometry (PTA) is recommended in HSE guidance document L108, it has limitations for musicians
- Otoacoustic Emissions (OAE) testing is recommended as a complementary approach as it:
    - Specifically targets the area of the ear affected by sound exposure
    - May detect early changes before they appear on PTA
    - Overcomes the "better performance" of musicians on PTA (which tests ascending octaves)
- OAE should not replace PTA but should be used alongside it for comprehensive monitoring

Organisations are advised to consult with occupational health professionals experienced in musicians' hearing health when establishing surveillance programs.

Cost-Effective Approach to Hearing Conservation

For organisations where resources are limited, a strategic focus on exposure reduction can be both protective and cost-effective:

Focus on keeping sound exposure As Low As Reasonably Practicable (ALARP) as the primary intervention

Ensure levels below the Upper Action Value (85 dBA) to reduce requirements for health surveillance

Ideally, keep exposure below the Lower Exposure Action Value (80 dB) where possible, which provides enhanced protection for potentially vulnerable individuals, including young people

Economic Benefits of Preventive Approaches

Effective sound control at source reduces or potentially eliminates costs associated with:

- Extensive health surveillance programs
- Personal hearing protection provision and fitting
- Specialist referrals for affected individuals
- Adjustments for those who develop hearing symptoms

Practical Implementation for Resource-Limited Settings

1. **Start with low-cost engineering and administrative controls:**
    - Strategic scheduling and timetabling to limit continuous exposure
    - Optimising room layouts and musician positioning
    - Utilising existing spaces with better acoustic properties
2. **Targeted investment in key areas:**
    - Focus limited resources on highest-risk activities first
    - Consider shared resources across departments or organisations
    - Implement phased approaches to improvements
3. **Monitor effectiveness through simple measures:**
    - Basic sound level measurements to verify exposure levels
    - Self-reported symptoms as an early warning system
    - Targeted health surveillance for highest-risk individuals

This preventive approach not only protects hearing health but can significantly reduce the overall cost burden of hearing conservation programs while providing enhanced protection for potentially vulnerable groups.

From Classroom to Career: Building Lifelong Hearing Health

Educational institutions can prepare students for sustainable careers by establishing hearing conservation practices early. By implementing protective scheduling, balanced repertoire choices, and healthy practice environments, these institutions model essential professional habits.

Students face different hearing health challenges depending on their career path:

- **Employed musicians** will have organizational protection through employer risk reduction strategies
- **Freelance musicians** bear greater individual responsibility with limited control over performance environments and scheduling

Educational settings should equip all students with knowledge of risks, self-monitoring skills, and advocacy capabilities. This preparation helps prevent avoidable hearing changes that can threaten career sustainability.

Useful resources for Implementation

Organisations seeking to implement comprehensive hearing conservation strategies may benefit from:

- **HSE guidance document L108** for detailed information on the Noise at Work Regulations
- **Training programs** on hearing conservation specific to musical environments (available through organisations such as BAPAM, though costs may apply)
- **Consultation with specialists** in performing arts medicine, audiology and acoustics
- **Collaboration with other music organizations** to share best practices and resources

Special Considerations for Vocalists

Singers face a unique dual health risk that requires specific attention within hearing conservation programs:

- Vocal loading: In rehearsal environments, especially when not in the final performance space, singers often strain to project over instrumental accompaniment without. This creates excessive vocal load that can lead to vocal fatigue and potential injury.
- Simultaneous hearing risk: While straining vocally, singers are also exposed to high sound levels from surrounding instruments, creating a compounded health risk.
- Practical challenges: Unlike instrumentalists who can use ear protection while playing, singers rely heavily on hearing themselves and others accurately for pitch, blend, and timing.

Effective solutions must address both vocal and hearing health:

- Adjust rehearsal dynamics for vocal sections
- Consider separate sectional rehearsals before combining with louder instruments
- Ensure appropriate acoustic treatment in rehearsal rooms used by vocalists
- Implement sound level monitoring specific to vocalist positions
- Schedule adequate vocal recovery time between intensive rehearsals

Organizations should recognize that vocal health and hearing conservation are interconnected concerns for singers, requiring an integrated approach rather than treating them as separate issues.

12. Summary of recommendations

- Implement comprehensive hearing conservation strategies that address all aspects of sound exposure
- Conduct thorough risk assessments with regular reviews
- Apply the hierarchy of controls, addressing sound at source whenever possible
- Provide appropriate personal hearing protection with verified effectiveness
- Establish health surveillance programs using OAE in addition to PTA testing for early detection
- Educate all stakeholders on sound exposure risks and protective measures
- Document and evaluate program effectiveness through regular audit
- Develop a culture that values hearing health as essential to musical careers

Appendix

RISK ASSESSMENT TOOL

Description of workplace	(e.g., music rehearsal rooms, performance venues, teaching studios, practice rooms)
Main job tasks	(e.g., solo performance, ensemble rehearsal, orchestra performance, teaching, recording)
Relevant health and safety law	• Control of Noise at Work Regulations 2005 • Health and Safety at Work etc. Act 1974 • Management of Health and Safety at Work Regulations 1999
Details of workforce at potential risk	(e.g., students, faculty, professional musicians, technical staff, audience members)

Workplace Potential Hazards	Work tasks How harm occurs	Worker Who might be harmed	Control Measures already in place	Current (Residual) Risk		Score	Proposed Mitigation of Residual Risk (to inform action plan)
Consider: physical layout/building design, including acoustic properties, room size, reflective surfaces, positioning of musicians	**Consider:** instrument types, duration of playing, repertoire intensity, proximity to other sound sources, amplification	**Consider:** vulnerabilities, pre-existing hearing conditions, age, years of exposure		Likelihood	Impact	L x I	

Assessment undertaken by:

Name: Designation: Signature: Date:

Notes for grading likelihood and impact with score being the multiple of the two figures:

Likelihood			Impact		
1	Rare	May occur only in exceptional circumstances	1	Insignificant	No noticeable effect on hearing (symptoms or test)
2	Unlikely	Could occur in some circumstances	2	Minor	Temporary hearing changes that resolve quickly
3	Possible	Might occur at some time	3	Moderate	Noticeable temporary symptoms affecting performance
4	Likely	Will probably occur in most circumstances	4	Significant	Persistent symptoms affecting musical or day to day activities
5	Almost certain	Is expected to occur in most circumstances	5	Catastrophic	Permanent hearing changes or symptoms, career-limiting symptoms, impact on quality of life

Action Plan

Action agreed	Responsibility	Progress Report	Date to be completed	Date completion confirmed

Action plan agreed by:

Name: Designation: Signature: Date:

Action plan reviewed by:

Name: Designation: Signature: Date:

Risk Assessment Tool: Completed sample

Description of workplace	(e.g., music rehearsal rooms, performance venues, teaching studios, practice rooms)
Main job tasks	(e.g., solo performance, ensemble rehearsal, orchestra performance, teaching, recording)
Relevant health and safety law	• Control of Noise at Work Regulations 2005 • Health and Safety at Work etc. Act 1974 • Management of Health and Safety at Work Regulations 1999
Details of workforce at potential risk	(e.g., students, faculty, professional musicians, technical staff, audience members)

Workplace Potential Hazards	Work tasks How harm occurs	Worker Who might be harmed	Control Measures already in place	Current (Residual) Risk		Score	Proposed Mitigation of Residual Risk (to inform action plan)
Consider: physical layout/building design, including acoustic properties, room size, reflective surfaces, positioning of musicians	**Consider:** instrument types, duration of playing, repertoire intensity, proximity to other sound sources, amplification	**Consider:** vulnerabilities, pre-existing hearing conditions, age, years of exposure		Likelihood	Impact	L x I	
Small, untreated practice room	Extended practice sessions (>2 hours) in confined space with reflective surfaces	Students and faculty with daily exposure	None	4	3		

Orchestra pit - confined space with multiple sound sources	High sound levels during rehearsals and performances	Orchestra musicians	Careful attention to seating and rotation	3	4		
Amplified rehearsal room	Exposure to amplified instruments/sound systems at high volume	Band members, sound engineers	Volume limiters on amplification equipment	4	4		
Performance venue - main stage	Long duration performances with varying sound intensity	Performers, particularly those near loud instruments	Adequate stage spacing	3	3		
Teaching studio	One-to-one instrumental instruction in small room	Teachers with multiple sessions per day	Scheduled breaks between sessions	3	3		

Assessment undertaken by:

Name: Designation: Signature: Date:

Notes for grading likelihood and impact with score being the multiple of the two figures:

Likelihood			Impact		
1	Rare	May occur only in exceptional circumstances	1	Insignificant	No noticeable effect on hearing (symptoms or test)
2	Unlikely	Could occur in some circumstances	2	Minor	Temporary hearing changes that resolve quickly
3	Possible	Might occur at some time	3	Moderate	Noticeable temporary symptoms affecting performance
4	Likely	Will probably occur in most circumstances	4	Significant	Persistent symptoms affecting musical or day to day activities
5	Almost certain	Is expected to occur in most circumstances	5	Catastrophic	Permanent hearing changes or symptoms, career-limiting symptoms, impact on quality of life

Action Plan

Action agreed	Responsibility	Progress Report	Date to be completed	Date completion confirmed
Conduct sound level measurements in all practice rooms	Health & Safety Coordinator			
Provide verified custom hearing protection for high-risk performers	Department Head			
Implement scheduling guidelines with recovery periods	Performance Director			
Install visual sound level indicators in rehearsal spaces	Facilities Manager			
Establish baseline hearing assessments (OAE/PTA) for all students/faculty	Occupational Health			
Develop and deliver hearing conservation training	Health & Safety Coordinator			

Action plan agreed by:

Name: Designation: Signature: Date:

Action plan reviewed by:

Name: Designation: Signature: Date:

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