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Current practice in health surveillance for noise

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Research Report

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Current practice in health surveillance for noise

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Although current HSE Guidance outlines what is required with regards to noise health surveillance, little available information existed on how health surveillance for workers exposed to noise was being implemented and conducted on a day-to-day basis and the quality of such health surveillance.

The aims of this study were to provide an indication of the quality and range of current practice in the delivery of health surveillance for workers exposed to noise at work in Great Britain.

The establishment of noise health surveillance was found to be conducted in a proactive manner with respondents demonstrating their knowledge of the importance and the value of risk assessment. Additionally, communication was seen as a vital component to the effectiveness and success of any noise health surveillance programme.

Variations in practitioner training, background and the setting in which they work created the potential for differences in perspectives and practices that were reflected in the range of responses to questions in this study. This was seen at many levels throughout the assessment process, from pre-test checks, to undertaking audiometry, access to previous test data, categorisation and interpretation of results, frequency of audiometry and the feedback provided to both employee and employer.

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KEY MESSAGES

There are different types of practitioner involved in health surveillance for noise. This project set out to gather information about how noise health surveillance is conducted by interviewing a small number of the various practitioners. The methodology enabled the researchers to obtain reasonably detailed accounts of what procedures are being used by the practitioners. The findings are only illustrative of the practices that exist; a larger more representative sample would be needed to draw conclusions about current practice on a wider scale.

To set the findings in context, it is known that professionals such as Occupational Physicians would normally have suitable qualifications and skills to establish and oversee health surveillance programmes. Audiologists and Occupational Physicians would be expected to have expertise in interpreting audiograms and be able to give advice to the individual about their hearing and risks from exposure to noise. In contrast, occupational health nurses and technicians tend to have a more limited role, which includes conducting the audiometry test.

Variations in responses to questions about the way health surveillance was conducted were found across the different types of practitioner but many of these could be explained by the different roles that the respondents have within the health surveillance programme. The study did not explore in detail how teams with two or more practitioners operate together to deliver the whole programme, how different Occupational Health (OH) provider companies are structured nor how many providers are single practitioner versus multiple practitioners.

The findings revealed good practice across the range of interviews. Some practitioners reported that they thought that their qualifications were British Society of Audiology (BSA) approved and some had higher level qualifications such as a relevant degree or specialist training in occupational medicine. In relation to quality and validity of testing, all respondents noted the importance of calibrating equipment, and some reported verification of equipment before use and checks on prior noise exposure to exclude the presence of temporary threshold shift that could produce a false result. Audiologists adopted more rigorous procedures as they have more advanced understanding and specialist knowledge.

Some practice went beyond minimum compliance whereas other responses from the interviews indicated that health surveillance might not always be suitable in certain respects. If practitioners had undergone appropriate training there is an assumption that they would be competent to undertake otoscopy, but it was found that otoscopy was not always carried out before testing and some practitioners probably did not adopt sufficient measures to exclude the effects of prior exposure to noise and background noise when the test was being conducted.

EXECUTIVE SUMMARY

INTRODUCTION

Current guidance clearly outlines what is expected of those who conduct health surveillance for noise-exposed workers. There are a variety of professionals that may be involved in carrying out the elements of health surveillance for noise-exposed workers. Commonly, many professionals come from within the occupational health (OH) discipline. Other professionals that may be involved include Audiologists and General Practitioners. Anyone involved in audiometry should be appropriately trained, so that testing is conducted in an accurate and repeatable manner. Current guidance from the Health and Safety Executive (HSE) (L108, HSE, 2005) outlines what is required with regards to noise health surveillance. The conditions under which audiometric testing is conducted and quality control of the measurements are important factors influencing the outcomes and success of any health surveillance programme. However, the practices involved within the community of organisations and practitioners undertaking this activity are relatively unknown.

AIMS OF THE STUDY

In order to inform the review of HSE guidance the aims of this study were to identify any deficiencies and gaps in the delivery of health surveillance for workers exposed to noise at work in Great Britain. The information gathered from this study may also help HSE better target messages on improving quality and the subsequent management of workers affected by noise exposure at work, where any shortcomings or poor practice are identified.

METHODOLOGY

The data for this study were collected using qualitative research method i.e. semi-structured interviews. This allowed an in-depth exploration of current practices in the delivery of health surveillance as well as explanations for why respondents engage in those practices. A total of 16 practitioners were selected using established contacts known to the Health and Safety Laboratory (HSL), the wider OH community and contacts of the HSE customer. They worked in a variety of settings and were currently involved with noise health surveillance. All were interviewed except one who gave their answers by e-mail. Practitioners represented a mix of occupations such as Occupational Physicians, Occupational Health Nurses and Technicians, Audiologists and General Practitioners. Although the sample was small and did not necessarily concentrate on the type of practitioner that does the majority of health surveillance in this area, it gave an understanding of some of the current practices.

The question set (Appendix 1) was developed by the research team at HSL in close consultation with the HSE customer, HSE Social Science Unit (SSU) and other specialists within HSE.

RESULTS

- Different practitioners involved in noise health surveillance programmes may vary in terms of their background, training, level of knowledge and the settings in which they work.
- The responses surrounding the setting up (establishment) of health surveillance programmes suggest that it was undertaken in line with current HSE guidance.
- Communication with the duty holder was seen as an essential component to the effectiveness of any health surveillance programme.
- Some OH practitioner[1] respondents thought that the British Society of Audiology approved the training they had received.
- Calibration of equipment was being undertaken. However, checks to ensure that no extraneous noise was being generated by audiometers (i.e. verification) were not always performed by practitioners.
- All respondents recorded that they complete pre-test questioning, but not always an examination of the ear canal and tympanic membrane (otoscopy).
- Not all respondents checked prior noise exposure to exclude the presence of temporary threshold shift[2]. Although most respondents reported the use of an audio booth, it was noted that when testing in a 'quiet room' environment the background noise in the test environment was only assessed subjectively.
- With the exception of Audiologists there was a reliance on automatic testing and the audiometer software to calculate the audiogram categorisation.
- There was a variation in practice in relation to the frequency of audiometry.
- Feedback on the test results was provided to both employee and employer, but the content and detail varied.

SUMMARY

The establishment of health surveillance was conducted in a proactive manner with respondents demonstrating their knowledge of the importance and the value of risk assessment. Additionally, communication was seen as a vital component to the effectiveness and success of any noise health surveillance programme.

Variations in practitioner training, background and the setting in which they work created the potential for differences in perspectives and practices that were reflected in the range of responses to questions in this study. This was seen at many levels throughout the assessment process, from pre-test checks, to undertaking audiometry, access to previous test data, categorisation and interpretation of results, frequency of audiometry and the feedback provided to both employee and employer.

[1] OH practitioner is a generic term that incorporates the roles of OH physicians, nurses and technicians.
[2] Temporary threshold shift is a short-term effect, which may follow an exposure to noise, and as its name indicates, the elevation of the hearing level is reversible.

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1. INTRODUCTION

Hearing loss caused by exposure to noise at work continues to be a significant occupational disease. Over 1 million employees in Great Britain (GB) are exposed to levels of noise that puts their hearing at risk (HSE, 2011). The Control of Noise at Work Regulations (CNAWR, 2005) came into force for GB on 6 April 2006. Their aim is to ensure that workers' hearing is protected from excessive noise at their place of work. The regulations apply to all parts of industry (initially there was a two-year transitional period for the music and entertainment sectors which lasted until 6 April 2008).

Where workers are exposed to specific risks, (e.g. noise that has the potential to cause work-related ill health), health surveillance is a legal requirement that is undertaken to identify the early warning signs of work related ill health, allowing further action to be taken to prevent its progression. It is also useful in monitoring the effectiveness of controls.

1.1 NOISE HEALTH SURVEILLANCE

Guidance is available for employers on CNAWR, 2005 (L108) and provides advice on their legal obligations under the regulations. The guidance introduced a revised approach to compliance and gives pertinent advice on the assessment and management of noise risks and noise control, including buying and hiring quieter tools and machinery, selection and use of hearing protection and the development of health surveillance procedures.

Health surveillance for workers exposed to noise has been established for many years; specifically regulation 9 of the CNAWR (2005). Employers are required to provide health surveillance for workers regularly exposed to noise above either of the upper exposure action values (daily or weekly exposure 85dB(A) or peak exposure of 137dB(C)).

When undertaking health surveillance for workers exposed to noise, competence is required to be able to understand the levels of noise exposure, when health surveillance is required, use of personal protective equipment (PPE), conducting audiometry, feeding back and acting on results. Audiometry is one of the main elements of health surveillance for workers exposed to noise. Audiometry is the testing of an individual's hearing ability through the measurement of hearing at different frequency thresholds. Typically, audiometric tests determine a subject's hearing levels with the use of an audiometer, and the graphical output is an audiogram. The most commonly used assessment of hearing is the determination of the threshold of audibility, i.e. the level of sound required to be just audible at a given frequency. Audiometry provides a useful tool in monitoring the actual ill effects of exposure to noise.

Current Health and Safety Executive (HSE) guidance, L108, clearly outlines what is expected of those who conduct health surveillance for noise-exposed workers. There are a variety of professional roles that may be involved in carrying out the elements of health surveillance for noise exposed workers and usually these professionals will work within a multi-disciplinary team. Commonly, many of these professionals have an occupational health (OH) background, e.g. Occupational Health Physicians (OHP), Occupational Health Nurses (OHN) and Occupational Health Technicians (OHT). Other professionals that may be involved include Audiologists and General Practitioners (GP). As outlined in the current guidance, a suitably experienced and competent person should oversee any noise health surveillance programme. This may be an OHP, OHN or Audiologist with access to occupational health (OH) support. Others may be involved in the audiometry process, for example OHTs. Anyone involved in audiometry should be appropriately trained, so that testing is conducted in an accurate and repeatable manner. HSE suggest training courses approved by the British Society of Audiology (BSA) in L108 and on the HSE website.

1.2 IMPLEMENTATION

Current HSE Guidance, L108 outlines what is required with regards to noise health surveillance. It is currently unclear how health surveillance for workers exposed to noise is being implemented and conducted on a day-to-day basis and the quality of such health surveillance. Conditions under which audiometric testing is conducted and the quality control of the measurements are important factors influencing the outcomes and success of any health surveillance programme.

The information gathered from this study may help HSE better target messages on improving the quality of noise health surveillance and the subsequent management of workers affected by noise exposure at work, where any shortcomings or poor practice are identified. The findings from this research will help to inform future guidance, should any deficiencies and gaps be identified. Where possible, findings in this report have been related to current HSE guidance.

1.3 AIMS OF THE RESEARCH

The aims of this study were to provide an indication of the quality and range of current practice in the delivery of health surveillance for workers exposed to noise at work in GB.

1.4 RESEARCH QUESTIONS

The study sets out to answer the following research questions:

- How do practitioners differ in the ways they carry out health surveillance? i.e. equipment used.
- What qualifications/training do noise health surveillance practitioners have? How do these differ between practitioners?
- What are the quality control processes in place for practitioners who carry out noise health surveillance? (e.g. test room conditions, background noise checks, consistency in ongoing monitoring for comparison purposes etc).
- How do practitioners interpret results and come to decisions?
- Is there a clear system for referral and action on results (i.e. feedback to employer beyond just fitness to work)?

2. METHODOLOGY

The data for this study were collected using a qualitative research method. Drawing on a purposive sample of noise health surveillance practitioners this study aims to provide an in-depth exploration of current practice. The findings are not generalisable to the broader practitioner community. But, qualitatively derived data addresses the research questions through generating rich, in-depth descriptive information about the nature and scope of noise health surveillance practice. In addition to helping answer descriptive questions about the nature of specific practices, Ritchie (2003) argues that a qualitative approach is well suited to exploring 'why' related questions, i.e. underpinning reasons for current practice. This allows the researcher to explore explanation-focused issues such as the factors influencing attitudes, beliefs and perceptions.

2.1 SEMI- STRUCTURED INTERVIEWS

In order to address the research questions, the study utilised a series of semi-structured interviews with a range of practitioners to explore noise health surveillance, and specifically audiometry. The objective of carrying out the semi-structured interviews was to obtain information about practitioner practices in the delivery of health surveillance, as well as explanations about the reasons why respondents engage in those practices. The semi-structured interview format was deemed appropriate for this research as it allows:

- In-depth probing and exploration of specific noise health surveillance practices;
- Flexibility of response, giving respondents full opportunity to provide unexpected information;
- The use of open questions, allowing respondents to provide a diverse range of information.

2.2 QUESTION SET DEVELOPMENT

The question set (Appendix 1) was developed by the research team at HSL in close consultation with the HSE customer, HSE Social Science Unit (SSU) and specialist practitioners from within HSE. The final agreement on the content of the question set was agreed with both the HSE customer and SSU. The question set was designed to elicit information about noise health surveillance practice, and specifically on the following topic areas:

- Personal and demographic information about the practitioners;
- Approach taken by the practitioners with the duty holders;
- Quality assurance and the process of audiometry;
- The feedback and management of results;
- The effective delivery of noise health surveillance.

2.3 SAMPLE SELECTION

Using established contacts known to HSL (via training course attendance, visits to HSL, and help with other research), the wider OH community and contacts of the HSE customer, a purposive sample comprising an illustrative range of noise health surveillance practitioners was recruited. We used a purposive sample to include a variety of practitioners involved in noise health surveillance and the different settings in which they work. This was to reflect not only the range of audiometry practice undertaken by particular types of practitioner, but also the different types of settings in which they work and how this may impact on their

practice. The range of different practitioner types (Table 1) was chosen based on the research team's current knowledge of the types of practitioner conducting, or involved with, noise health surveillance.

Table 1: Professionals involved in Noise Health Surveillance

An **Occupational Physician** is a Registered Doctor, with specialist training in occupational medicine; however they may not be an accredited specialist. In relation to any particular workplace they take full clinical responsibility for advising management and the workforce on all health matters connected, directly or indirectly, with their employment. For example, fitness for work following health surveillance.
An **Occupational Health Nurse** is a Registered Nurse who, in addition to their general nursing education and training, may have undertaken an additional period of formal study in occupational health, leading to a recognised specialist qualification in occupational health nursing.
An **Occupational Health Technician** (may be referred to as an occupational health support worker, OHSW) is a developing role within an occupational health setting. With supervision from occupational health qualified nurses and doctors and the correct training and clinical supervision they may be able to carry out some aspects of health surveillance, e.g. audiometry.
There are several types of **Audiologist** in the United Kingdom (UK), assistant, associate, hearing aid dispenser, audiologist and clinical scientist (protected name for audiologists with a Masters degree). The difference between practitioners depends on their academic training. Hearing aid dispensers and clinical scientists have to be registered with the Health Professions Council (HPC) and audiologists have to be registered with the Registration Council for Clinical Physiologists (RCCP). Generically the profession specialises in identifying, diagnosing, treating and monitoring disorders of the auditory and vestibular system portions of the ear. Audiologists are trained to diagnose, manage and/or treat hearing or balance problems.
An **Audiometrician** is a technician specialising in the measurement of hearing ability (audiometry). They are trained to measure auditory threshold, and may also carry out a wide variety of other audiological investigations.
An **audiometry training provider** is an organisation that can deliver a training course related to the undertaking of audiometry in a health surveillance setting. The British Society of Audiology (BSA) has prepared a syllabus for the content of audiometry training being undertaken in this situation.
A **General Practitioner (GP)** (registered with the General Medical Council on the GP register) treats acute and chronic illnesses and provides preventive care and health education in a primary care setting. Some GPs have additional qualifications in occupational medicine.
A **provider of health surveillance** is an organisation that can deliver a range of services, which includes conducting noise health surveillance. Other activities may include occupational noise measurement and control advice.

2.4 RECRUITMENT AND INTERVIEW PROCEDURE

A member of the research team approached practitioners for interview; they were given information about the project in writing and this was backed up by verbal communication if required. Once they had been given time to consider if they would like to participate, they were formally invited to take part in the research. After securing verbal agreement to participate, the lead researcher agreed mutually convenient dates and times to conduct the telephone interviews. The interviews each took approximately 45 minutes to complete. A member of the research team experienced in conducting noise health surveillance and audiometry testing carried out all of the telephone interviews. With verbal consent each individual interview was audio recorded and later transcribed in full. Assurances of anonymity were given to each participant.

2.5 DATA ANALYSIS

The data in the transcriptions were analysed using a systematic approach as advocated by the National Centre for Social Research that is consistent with the Government Social Research recommendations for carrying out qualitative data analysis. The approach involves deploying a systematic and consistent approach to interpreting responses to the interview questions in line with the research objectives. Interviewee responses were interpreted resulting in the extraction of themes and sub-themes derived directly from the data.

3. RESULTS

A sample size of 16 practitioners was achieved. Fifteen practitioners were interviewed and one response was received in writing, as it was not possible to conduct an interview. Whilst the written response deviated from the original methodology of the study, it was felt that the information provided by this practitioner was relevant and important to include alongside the data set obtained from the telephone interviews. It is not possible to state which type of practitioner this was, in order to maintain anonymity. The 'interview matrix' (Table 2) describes the mix of practitioners, the settings in which they work and the numbers of practitioners interviewed.

The minimum numbers of interviews as agreed in the research proposal were achieved for each practitioner role with the exception of audiometrician. It was not possible to identify practitioners from this role to help with the study. This may be related to the evolving role of audiology and the changes in the academic training of these practitioners and the job titles they hold. This concern was highlighted with the HSE customer at an early stage and as a result it was agreed that we would look to recruit an audiometry training provider as an alternative.

Practitioner ⇨ **Organisation Type ⇩**	**OHN**	**OHT**	**Audiometry Training Provider**	**OHP**	**GP**	**Audiologist**	**Total Number of Interviews**
In-house OH Provider	3	1		1		1	6
External OH Provider	2	1		2			5
Self-employed Practitioner	1		1		1	1	4
Provider of Health Surveillance						1	1
	6	2	1	3	1	3	16

Table 2. Interview Matrix - Interviews Completed

3.1 INFORMATION ABOUT PRACTITIONERS

Table 2 presents the spread of practitioner type and the different settings in which they conduct noise health surveillance. The practitioners provided services to a range of industry sectors and to organisations of different size.

Summary

The information gathered shows that:

- Noise health surveillance was practiced by a variety of professionals, working in a range of settings.
- Practitioners that do not work in a traditional OH Provision setting, e.g. audiologists, were undertaking and leading noise health surveillance programmes.

These audiologists work in a variety of ways from working as independent practitioners to working alongside an OH Provider.

- Of the people interviewed, where audiometry was conducted in an OH setting:
    - OHPs assume responsibility for the overall management of noise health surveillance programmes. But, they did not routinely conduct audiometry and only saw referrals from other OH colleagues.
    - OHNs and OHTs were the practitioners who normally undertake audiometry testing.

3.2 HOW ARE NOISE HEALTH SURVEILLANCE PROGRAMMES ESTABLISHED AND RUN?

3.2.1 Establishing a Health Surveillance Programme

Participants were asked questions about setting up and establishing health surveillance programmes and about the ongoing communication strategies with the duty holder.

In describing the establishment of a noise health surveillance programme, those who 'led' noise health surveillance programmes emphasised the technical aspects of the process. All practitioners saw gathering and gaining access to relevant information as important to the success of any health surveillance programme. Details surrounding the completion of risk assessments were mentioned frequently. Getting access to risk assessment information was not always easy and was dependant on the relationship between duty holder and OH provider, one respondent quoted:

'That type of information I think is vital and it's a problem I would have to say, with the provider relationship that you can have in OH because often it's only really being effectively done, having an in-house relationship'.

Respondents who were predominantly involved in carrying out audiometry found the questions on this topic more difficult to answer. This could be due to the more narrow and technical scope of their job roles, e.g. limited to undertaking audiometry, as opposed to a role that includes the 'setting up' of a noise health surveillance programme. These practitioners did make reference to the importance of risk assessment and communication with the duty holder, but the detail and depth of knowledge was not apparent.

When discussing risk assessment a number of additional themes emerged, showing the range of activities practitioners get involved with. These included:

- Gathering information on noise exposure;
- Consulting existing risk assessments;
- Conducting baseline monitoring e.g. noise surveys;
- Identification of employees most at risk from exposure to noise;
- Determining when employees require health surveillance;
- Gaining access to relevant information;
- Gaining insight into the extent of duty holder understanding of the effects of noise exposure;
- Feedback/referral arrangements;

- Offered the employer the expertise to *'Assess the risk (with dosimetry) - by taking area noise level measurements. Provide individual risk assessments based on ISO 1999[3], on the potential risk of hearing loss to those individuals in that noise environment'*. Thus creating the appropriate management for hearing conservation within an organisation.

The more detailed responses from some practitioners leading noise health surveillance programmes indicated that they were able to determine the noise profile of an organisation through:

- Identifying the processes that expose employees to noise and what the noise levels are e.g. above 80dBA or above 85dBA;
- A need to understand the compatibility of the Personal Protective Equipment (PPE) being used against the noise exposure levels;
- Knowledge about the shift lengths, because most calculations are based on an eight hour shift weighting.

Additionally other activities were also highlighted, which included:

- Organising information;
- Liaising with managers and health and safety colleagues;
- Drawing up of noise reduction plans.

Summary

From the responses to the questions about the establishment of health surveillance programmes, those leading such programmes were able to present information that demonstrated their competence and technical knowledge to undertake such a role. The most detailed responses came from those practitioners that specialised in the practice of audiology. All practitioners were able to demonstrate knowledge of risk assessment and the importance of this activity in relation to the practice of noise health surveillance. This may sometimes involve working with other groups of practitioners within an organisation, e.g. health and safety practitioners.

3.2.2 Communication with the Duty Holder

There was a common perception from respondents of the importance of effective communication channels with the duty holder/client organisation. Many respondents reported that they had access to effective systems facilitating on-going communications with duty holders with *'systems'* in place, examples being weekly meetings with managers, access to necessary information when required and engaging with managers when problems or issues arise and vice versa, *'it's a two way street'*. Others reported that they had *'no formal systems in place'* and that communication was sometimes difficult *'when working for a third party'* to get to the person that may hold the information that was required.

Effective communication was seen as important and essential to achieve good standards of noise health surveillance. Respondents acknowledged the existence of on-going and regular communications with duty holders, describing communications as '*informal and relaxed*' and striving to make the client organisation '*fully aware of the aims of noise health surveillance up front*'. Communication also included written reports as well as verbal communication. Communication strategies, although mentioned by all were not described

[3] ISO 1999 - Acoustics -- Determination of occupational noise exposure and estimation of noise-induced hearing impairment.

in as much detail by those practitioners just undertaking audiometry compared to those with overall management of noise health surveillance programmes.

Summary

Respondents are aware of the importance of communication with the duty holder if noise health surveillance was to be successful. Communication with the duty holder was seen as an essential component to the effectiveness of any health surveillance programme. The legal obligation to ensure that noise health surveillance was undertaken lies with the employer and therefore the responses from the practitioners undoubtedly present a picture of their endeavours to support the employer to achieve their obligations. Communication was not always established in a formal manner and could be difficult for some practitioners to achieve, depending on which setting they work in, e.g. for an external OH provider.

3.3 QUALITY OF AUDIOMETRY RESULTS

3.3.1 Practitioners

Practitioner experience of involvement in noise health surveillance was varied, ranging from 4.5 to 27 years. Frequency of performing testing varied, between daily and fortnightly.

There was a difference in responses regarding training and qualifications of practitioners in relation to audiometry. Respondents possessed various qualifications ranging from shorter courses run by audiometer equipment providers, more detailed training by NHS audiology departments, through to specialist practitioner degree courses (in occupational health and audiology). Some OH practitioners reported that they believed that their qualifications were British Society of Audiology (BSA) approved.

Qualifications included:

- Training provided by audiometer manufacturers (thought to be British Society of Audiology approved);
- BSc/MSc in Audiology;
- Occupational Health Degree
- Specialist training in Occupational Medicine.

Time since training was completed varied between 3 to 30 years. Refresher training had been undertaken by some respondents, but not all.

In terms of measures taken to ensure the quality of the testing process, two primary themes occur across all the practitioner groups, but to differing degrees of knowledge: checks on equipment and client related checks.

3.3.2 Checking the integrity of the testing equipment

All respondents mentioned equipment calibration as key to the quality control process, with calibration typically carried out annually. However, there were differences between practitioner groups in terms of the extent and technical depth of the equipment checking process and frequency of calibration. Practitioners who provided the most thorough descriptions were the ones with higher-level qualifications in audiology.

To a lesser extent, respondents reported checking the audiometer equipment before use (verification). However, several respondents indicated that they did not undertake such

checks, but did not give an explanation as to why. Using a new machine and conducting tests in an audio booth were also mentioned as contributing to better quality results.

The most detailed responses came from the audiologists, this included carrying out a wider and more technical range of quality control measures, mainly equipment related, and included:

- Weekly calibration of equipment;
- Testing air conduction;
- Testing the masking channels;
- Checking response buttons and earphone cups;
- Testing the equipment using a 'biological ear';
- Conducting own audiometry;
- Checking pre-test noise exposure levels.

One practitioner described quality control measures as a *'very strict protocol in terms of instructing the patient to follow the BSA guidelines for conducting audiology'.*

3.3.3 Obtaining information from those undergoing testing

Issuing pre-test questionnaires and performing otoscopy[4] were the most frequently mentioned actions taken prior to testing and were reported by all types of practitioner. Most respondents used questionnaires and kept a written record, whilst others used verbal questioning with no written record. Pre-test questionnaires asked about various issues such as medical history, recent health issues (e.g. colds, infections), recent noise exposure and past medical history of tinnitus.

Otoscopy was frequently carried out, but not always. The outcome of how the otoscopy results are used varied, i.e. some respondents reported postponing testing in the light of identified problems, e.g. infection. As for excessive or hard wax, others said that they would test anyway and wax was not a barrier to testing. One participant reported not conducting otoscopy unless the test result was abnormal. Tympanometry[5] was only mentioned by the practitioners with specialist qualifications in audiology.

Other steps taken to ensure the quality of results included making sure employees understood the instructions for the test (particularly if English was not their first language) and comparing the current test results with previous test results. Some respondents mentioned checking on immediate prior noise exposure, but the time period varied from 2 up to 24 hours. A number of respondents reported that if the client had been exposed to noise prior to the test, they checked to see if PPE had been worn.

Pre-test quality steps quoted by respondents included '*ensuring that competent people, following and adhering to BSA guidelines conduct tests and ensure that testing is carried out in an appropriate environment'*.

3.3.4 Use of Audio Booths

With regards to where testing was conducted the following responses were collected from respondents:

- In an audio booth;

[4] *Otoscopy – Examination of the ear canal and tympanic membrane (ear drum).*
[5] *Tympanometry – Is an examination used to test the condition of the middle ear and mobility of the tympanic membrane (ear drum) and the conduction of the bones by creating variations of air pressure in the ear canal.*

- In a quiet environment;
- In a mobile vehicle, with audio booth in-situ.

Predominantly, testing was reported as being undertaken in audio booths (either in OH premises/departments or in mobile facility). A small number of respondents reported that in situations where it was not practical to test in an audio booth in specific circumstances (e.g. when required to test employees near to their place of work in order to minimise adverse impact on business or service delivery), testing was carried out on site in a *'quiet room'*, with respondents mentioning the use of *'noise attenuating headphones'* or *'audio cups'*. Some respondents made reference to the background noise being assessed subjectively, but no respondents made reference to a formal background noise assessment being completed prior to testing in a quiet room.

Summary

Taking the issues in the context of current HSE guidance, they do show some areas of deviation:

- Some OH practitioner respondents thought that the training they had received was BSA approved. In contrast, practitioners who were not OH practitioners had in depth knowledge of audiometry and were qualified to a much higher level, e.g. MSc in audiology.

  L108 quotes: **'*The person actually conducting the tests needs to have, as a minimum, appropriate training so that testing is carried out in a repeatable and accurate manner. A training syllabus for industrial audiometricians has been prepared by the BSA, which has approved a number of courses'*.**

- Although calibration of equipment was reported by respondents as an action being undertaken (usually annually) and use of audio booths, both as quality control methods, no respondents made reference to the current *EN 26189:1991* (*Specification for pure tone air conduction threshold audiometry for hearing conservation purposes*) or *BS EN 60645-1:2001*(*Audiometers. Pure-tone audiometers*) (HSE, 2005) although this does not imply they were not aware of it.
  - Not all equipment was 'verified' before use, for example by using a 'listening check'. ***In summary the BS EN 60645-1:2001 standard requires that a listening check should be undertaken daily before use and an experienced person with good hearing should listen at each frequency and at three sound intensities to ensure that no extraneous noise is generated by the apparatus'*** (HSE, 2005);
- All respondents recorded that they take (either written or verbal) pre-test questioning;
- Otoscopic examination was not always undertaken as a pre test examination. L108 guidance states: **'*It is important that the person being tested has undergone otoscopic examination of the ear immediately before the test to detect any major abnormality or the presence of exudate or wax which might affect the results';***
- Not all respondents checked prior noise exposure to exclude the presence of temporary threshold shift (TTS). L108 quotes; '***unless there is a prolonged (16 hour or more) period free from high noise levels before testing it is difficult to exclude any contribution from TTS'.*** Although the guidance does recognise this as at times being ***'difficult to achieve'***;
- Practitioners noted the use of audio cups and noise attenuating headsets when testing in a 'quiet room' environment. Some practitioners noted they *'subjectively'*

assess the presence of background noise in the test environment. No practitioner made reference to a formal assessment or made reference to the use of noise attenuating headsets in line with *BS EN 24869-1:1993 Acoustics. Hearing protectors. Sound attenuation of hearing protectors. Subjective method of measurement,* as quoted in L108 (HSE, 2005).

3.3.5 Types of Audiometry Undertaken

In terms of the types of audiometry undertaken, respondents reported a mixture of automatic (Békésy and Hughson-Westlake[6]) and manual testing methods being used. For OH professionals, automatic testing tends to be the default, reverting to manual approaches in specific circumstances e.g. if the results prove to be abnormal, the trace was abnormal or the testing process was problematic. Those practitioners where their work focussed purely on completion of audiometry described both a wider range of tests and in more technical detail.

The audiology practitioners reported undertaking a much broader range of tests. In addition to pure tone audiometry, the audiologists reported carrying out bone conduction audiology, tympanometry, loudness discomfort levels, speech tests and otoacoustic emissions testing.

Summary

From the perspective of OH professionals, when conducting audiometry there was a reliance on automatic testing using various methods (Békésy and Hughson-Westlake) with computer-controlled audiometers. OH professionals only reverted to a manual test if problems were identified. Audiology professionals have knowledge and experience in a greater range of testing methods and appear to carry out more thorough and detailed assessments. No practitioners mentioned the methodology reference from L108 of EN 26189, but again this does not preclude a lack of knowledge on this method.

3.3.6 Interpretation of Results

Most respondents reported that they compared current test results with past data. Those practitioners that did not do this comparison explained that it was because previous data was not available to them. This practice caused them concern, and it was inferred that sometimes if organisations change OH provider, the passing on of previous medical records was not always as complete as it could be. Some practitioners suggested it was *'vital'* to compare current with past results.

With the exception of one practitioner, the HSE categorisation scheme (Appendix 2)[7] was used as the basis for audiometry test result interpretation. One respondent had developed a bespoke interpretation scheme, which they use all of the time as they believe that the HSE scheme has limitations; particularly in identifying noise induced hearing loss (NIHL). From the responses it would appear that at times there was a reliance on the categorisation provided as standard by modern audiometers as the sole means of categorisation, without necessarily reviewing the audiogram or a manual categorisation being undertaken. Where audiometry was undertaken by junior grades of staff within a multi disciplinary team the respondents reported that they would refer on to a more qualified member of staff if there was *'something they were unsure about'* or if '*initial interpretation done but I would refer non-category 1 results for verification by the OHP'.*

[6] *Békésy and Hughson-Westlake are techniques used to conduct pure tone audiometry.*
[7] *In relation to audiometry categorisation abnormal results would be any other category than 1, i.e.2, 3 or 4.*

In relation to the interpretation of audiograms, respondents were asked the following question:

In the cases where the audiogram trace presents as a possible case of noise induced hearing loss (NIHL) but, still classifies as HSE category 1, what would you do?

A number of different responses were gathered:

- I would look back at the raw data;
- Educate the employee;
- Re test in a month;
- Advise patient of their results;
- Check results by undertaking a manual categorisation;
- May refer to OHP but depends if they have been referred before;
- Automatic referral to OHP or the employee's GP;
- If the patient was experiencing problems, practitioners advise them to see their GP and/or offer immediate appropriate advice;
- Lastly, it was reported on a number of occasions that it was likely that no action would be taken given current protocols in place and it would be difficult to write a protocol for such a circumstance.

Practitioner quotes include:

- *'They get put through as Category One as far as I know. They didn't take into account the trace'.*
- *'Well you'd compare it with the previous one, you'd question them again to see what they might be doing differently let's have a look at it again in another month and re-do it. If the second one shows the same as the first one well then you know you've got a problem somewhere'.*
- *'Yeah ... .if there are any dips I'd sort of question the individual and....I still want to pass it by our physician for him to have a look it and this type of thing'.*
- *'Well technically, if it's a category 1, it's not noise induced hearing loss. So you wouldn't say to a guy in there 60's, well you are category 1, you're normal for your age but you've got noise induced hearing loss that's nonsense. But if someone is of an age where they have a hearing loss that is nonetheless category 1 and it's causing them problems, are they aware of it? I'd advise them. You have a hearing loss, is it causing you problems? If so, go and have a chat with your doctor, I would refer them to their GP for a referral to ENT and possibly a hearing aid, but an awful lot of people are category 1 with quite significant hearing losses.*

Summary

Current HSE guidance (L108) states that '***The results of previous audiograms should be available for comparison'***. Most respondents reported this was happening, but what may be of concern was that it does not happen in all cases. Respondents who reported situations where comparisons were unlikely or not possible were practitioners working for external OH providers. This finding would appear to be related to the way the providers operate and the difficulties of medical records being transferred between OH providers when organisations change their OH provider.

HSE guidance refers to ***'interpretation of results'*** and ***'methods of evaluating audiograms'. 'Once the test has been completed, the relevant quality control issues have been taken into***

consideration and a noise and health questionnaire completed, the following steps should be carried out to categorise the audiogram'. Appendix 2 details the HSE Categorisation Scheme and actions to be taken following categorisation. The HSE guidance refers to a ***'manual'*** interpretation of results, but does not clarify or state that category 1 results should be reviewed to ensure that signs of NIHL are not visible in the trace.

Responses from the OH professionals would suggest that there was reliance on the audiometer software to calculate categorisation, which may not always include interrogation of the audiogram trace by the individual practitioner.

Responses from respondents who are members of the OH community suggest that '*junior grades*' of practitioner interpret results and those that are interpreted as 'category 1' are not always seen by more experienced practitioners.

Frequency of Audiometry

Responses varied widely concerning frequency of audiometry testing. A selection of responses included:

- Annually (for first three years), then routinely every three years;
- Every three years unless there was a problem;
- Annually, more frequently if problems suspected;
- Test mandatory cases annually for three years, then move to two yearly;
- Category 1 cases tested every three years, category 2 or 3 annually;
- 2 yearly testing;
- 3 yearly testing;
- Depends on the clients wishes;
- Category 1- yearly, category 2 - annually at first, reverting to 3 yearly if remains stable, category 3 - annually and referral;
- 3 yearly, annual screening for anything other than a category 1 result;
- Annually for first two years, then three yearly unless there was a clinical need;
- Baseline/pre-employment test followed by annual testing for two years, then three years thereafter.

Practitioner quotes include:

- *'It depends on what the client company wishes'.*
- *'All of our industrial patients are seen yearly as a maximum'.*
- *'Frequency depends on the organisation, the noise levels, what they're exposed to, it's either annually or every two years'.*
- *'It is three yearly if their hearing is normal. If they were a Category 2 then we would probably do it in a year and if it remains stable we'd put them back to three yearly. If it was a Category 3, we would see them again probably within the year and obviously refer to their GP and monitor it for stability and once it became stable we might put them back to the three years again'.*
- *'We follow HSE guidance'.*

Summary

L108, Appendix 5, 19 states:

The schedule of audiometric testing should include annual tests for the first two years of employment and at three yearly intervals thereafter. More frequent testing may be required if significant changes in hearing level are detected or exposure conditions change, increasing the risk of hearing damage. As a quality control measure, it would be prudent to repeat any audiogram, which showed a difference from the previous result of more than 10 dB at any frequency.

Frequency of audiometry responses varied. To summarise, some reported carrying out additional testing beyond that required by HSE guidance and others as current HSE guidance. It is not clear whether some practitioners were failing to do annual testing for the first two years since the interview did not specifically ask about this.

No practitioners mentioned repeating an audiogram if the result showed a difference from the previous result of more than 10 dB at any frequency. It is important to note that this was not a specific question in the interview and is only a suggestion in current HSE guidance as a quality control measure.

3.4 FEEDBACK OF RESULTS

Consistently feedback was reported as being provided both to individuals (usually verbal at the time of audiometry and may include explanatory leaflets, e.g. HSE pocket guide) and their employing organisations (e.g. line manager, health and safety practitioners). However there were differences both between and within practitioner groups in terms of whether the feedback was done verbally or in writing. Feedback to the employee was reported as being typically verbal and included categorisation as well as advice. This may then be backed up with written communication. The person conducting the testing usually provided the employee feedback.

With regards to feedback to the employer a mixed picture was presented. Responses from OH professionals said that the feedback would take the form of *'fitness to work'.* Sometimes this may include categorisation information, but if this was given consent was gained from the client. One respondent from outside the OH community said '*don't routinely give feedback to the employer on an individual basis*? *Not unless there's cause for referral'.* Regarding fitness for work, '*we would leave that decision up to the employer or the decision maker... we would make recommendations, but it won't be as part of the report that we suggest they're not fit for work'.*

With the exception of technicians who would not be expected to provide feedback to the duty holder, some respondents reported providing anonymised data to duty holders, but this was not universal. In one case, anonymised data aggregated at group level were collated and fed back to the organisation.

If abnormal[8] results were correctly identified they may be dealt with in a number of ways e.g. by onward referral, either to the relevant OHP and/or to the employee's GP. When an OHT had completed the audiometry test, a small number of respondents reported the referral of abnormal results to OHN or OHP for a decision. One non-OH professional described referring directly into the NHS.

[8] *In relation to audiometry categorisation abnormal results would be any other category than 1, i.e.2, 3 or 4.*

There was a mixed picture in terms of how results are managed and reviewed. Many respondents reported systems (OH software, use own web based databases, use of medical records) were in place to help manage results and medical records.

Responses included:

- *'We feedback to the individual, these are your results, this is what the category is, this is what four means, three means all that sort of thing…..report back, quarterly reviews we have with the Production Director.....quarterly we send a report to each site we'll say how many audios were done, how many were abnormal and what was the reason for the abnormal, what the action plan for that one is. On an individual basis if we've got concerns about an individual then we go directly to the safety manager on the site'.*
- *'We have developed a specialty report form which is very simple to use and simple to understand and it tells the specific line managers or the nominated person what he need to do as a result'.*

Communication patterns with duty holders were described, and included the following practices:

- Weekly meetings with managers;
- Quarterly reports;
- Verbal feedback about specific issues/problems;
- Use of informal communication channels e.g. phone calls to duty holder;
- Some respondents noted the value of good relationships when working with duty holders, although poor communications are frequently experienced.

Summary

Paragraph 110 of L108 advises that the employer will be informed about the fitness of the worker to continue in work with noise exposure. Participant responses present a picture of feedback being provided to both employee and employer. Feedback to the employee was mainly verbal, which was, in certain cases, backed up with written information. Some practitioners supplied employees with HSE 'pocket guides'. Feedback to the employer was mainly on an individual basis and centred on 'fitness to work'. If audiometry categories were disclosed to the employer it was with written consent from the employee. Not all feedback from non-OH professional included fitness for work advice.

HSE guidance refers to ***'grouped, anonymised analysis of audiometric results providing useful information to the employer about the overall effectiveness of a hearing conservation programme'.*** Modern computerised audiometers are able to provide statistical assessment of results, it was noted that only some practitioners reported providing this information to the employer. Although not derived from this study, it is relevant to the note that the size of the populations under health surveillance and protection of anonymity could have affected the responses provided.

3.5 DELIVERING NOISE HEALTH SURVEILLANCE EFFECTIVELY

Participants were asked:

- **In your opinion, what works well or less well in general for an effective delivery of noise health surveillance?**
- **Do you have any other issues, comments or observations you would like to raise regarding health surveillance for noise?**

Feedback from participants on these questions was limited. What 'works well' practitioner comments included:

- *'Appointment systems and having access to the services of a hygienist';*
- *'I think it works because we have the good communication and I think being in-house helps because we've managed to develop that relationship. Having a good plan and then being able to follow up with it';*
- *'In large organisations where health surveillance for noise was properly incorporated within the OH services. That was probably, and is probably a more effective way of delivering, not just the noise health surveillance, but any health surveillance. The problems I had encountered in the past when I was working for a small occupational health provider providing OH services to a large number of small to medium sized companies is that there they did not have any single person or a unit responsible for managing the overall health surveillance process';*
- *'Incorporating/integrating NHS in OH service';*
- *'No major problems with running a health surveillance programme in accordance with HSE guidance. It helps if clients take a similar view to the provider and workforce are used to audiometric health surveillance';*
- Another respondent offered the opinion that *'education is the most effective form of hearing protection, and also advocated the use of otoacoustic emissions testing technology as an alternative to standard pure tone audiometry'.*

What works 'less well' comments based on interviewees' perceptions included:

- *'Poor competence of practitioners (which was perceived to be a training problem)';*
- *'Too much reliance on automated testing';*
- *'Not having one person to manage the whole health surveillance process';*
- *'In practical terms the HSE categories do not indicate NIHL e.g. a Cat 3 result could be unrelated to noise exposure. This ambiguity is made clear in the guidance and the classification scheme is better than the old one. To reliably identify noise induced hearing loss the HSE classifications need to be reasonably robust, sensitive and specific. It's impossible to devise a classification system that can distinguish what is noise induced hearing loss and what is not'.*

Comments were also made about:

- The need to improve HR recording systems and the need to educate both providers and purchasers of noise health surveillance services about the need to reduce complacency and negligence;
- The processes for reviewing initial needs and understanding the requirements of the duty holder;
- Duty holders understanding the rationale and reasons for undertaking health surveillance;
- One respondent commented on the advantages of HSE taking a tiered approach to defining the competence requirements for those involved in audiometry testing and noise health surveillance i.e. '*if you've got a technician doing a test then they need to be competent to do the test, but not to interpret the results'*.

4. IMPLICATIONS

A clearer definition of good practice for audiometry in the HSE guidance would be useful so that employers and providers have better information on how to comply with the regulations. It would be helpful to better define the different roles of practitioners in HSE guidance.

5. REFERENCES

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6. APPENDICES

6.1 APPENDIX 1 QUESTION SET FOR SEMI-STRUCTURED INTERVIEWS

A Information about the Practitioner
Background (years of experience, qualifications, tenure, experience in role)

1. Can you tell me what is your profession and role is please?
   (e.g. OHT, OHN, OHP, GP, audiologist).
2. What type of organisation do you work for?
   (e.g. in-house OH provider, external OH provider, provider of health surveillance).
3. What training /qualifications have you got in relation to carrying out audiometry?
4. How long ago did you attain your audiometry qualifications? Have you undertaken any refresher training?
5. For how long have you been undertaking audiometry?
6. How often do you carry out audiometry? (e.g. weekly, monthly).

B Approach taken with Duty Holder

7. Can you describe how you would initially set up noise health surveillance for a company? (if information provided by respondent to this question is not sufficient, then prompt respondent. Remember trying to establish use of competence/influence on the duty holder/audiometry for those that require it, not for all). Follow up with why?
   Prompt: What information do you require as a minimum from a company for undertaking noise health surveillance?
   e.g. risk assessment, policy, agreement on how noise health surveillance will be conducted etc….
   Prompt: What are the benefits of getting this information?
   What are the difficulties?
8. Do you have a system or agreement for ongoing communications with the duty holder?

C Quality Assurance of the Test Results

9. How do you ensure the quality of the results obtained from audiometry? Follow up with why.
   Prompt: calibration/frequency
   verification/frequency
   keeping records of this information
   prior exposure to noise
   need to exclude TTS
   complete a questionnaire before audiometry
   what information is sent to the employee before their audio test
   Use of equipment and personnel administering the test for ongoing comparisons?
10. What actions do you take before starting the audiometry test on an individual?
    Prompt: Correlate the results from otoscopy or tympanometry with the completion of the audiometry test? Or don't complete the audiometry test?
    Interpret information gathered from completed questionnaire?
    Coach the individual undergoing the test, put at ease, explain why testing and what will happen?)

D Audiometry

11. What types of audiometry do you undertake? Follow up with why does this differ? How do you decide?
    Prompt: automatic versus manual test.
12. Where and by whom are audio tests conducted? Follow up with why does this differ? How do you decide?
    Prompt: audio booth.

13. If the tests are not conducted in an audio booth, where are they carried out? Follow up with why does this differ (if it does)? How do you decide?
    Prompt: Quiet room, what criteria do you use to check the background noise level, EN26189.
14. Who interprets the audiometry results? Why?
15. How do you interpret the results? Why?
    Prompt: Use the HSE categorisation scheme or another system for categorisation?
    Does the person undertaking the audiometry visually look at the trace (raw data) to assess as well as looking at the automatic categorisation given by the audiometer software?
16. *(Ask only if interviewee is the interpreter of the audiogram)* If an audiogram is classified as category one using the HSE categorisation scheme, but the trace is abnormal, e.g. indicates NIHL, what do you do?
17. Do you compare the current audiogram against previous test data?
    If yes, how does this impact on the management of the employee?
    If not, why not?
18. How frequently do you conduct audiometry on an individual and how do you decide this?

E Feedback

19. How and to whom do you feedback results?
    Prompt
    To the employee provide written or verbal information such as results, audio category, HSE pocket guide.
    To the employer e.g. individual feedback (health record), just fitness to work or include categorisation an/or group anonymised data, in writing; how quickly, what format?)
20. What other arrangements for communication do you have with the duty holder?
    Prompt: Looking for proactive strategy to ensure results are acted upon.
21. How do you manage abnormal results?
    Prompt: Agreed procedure as to how employees with abnormal results will be referred for further treatment and managed, problems with consent?
22. Does the duty holder(s) have a system for managing, reviewing the results they receive that you are aware of?

F To conclude

23. In your opinion, what works well or less well in general for an effective delivery of noise health surveillance?
24. Do you have any other issues, comments or observations you would like to raise regarding health surveillance for noise?

I have no further questions to ask, do you have more comments or questions?

Thank you for your time.

6.2 APPENDIX 2 THE HSE CATEGORISATION SCHEME AND FOLLOW UP ACTIONS

Audiometry categorisation - abnormal results would be any other category than 1, i.e.2, 3 or 4.

Category	Calculation & Advice	Action
1 ACCEPTABLE HEARING ABILITY Hearing within normal limits.	**Sum of hearing levels at 1, 2, 3, 4 and 6 kHz.** All individuals should be given advice regarding the effect of noise on hearing and the correct use of hearing protectors as part of the health surveillance programme.	None
2 MILD HEARING IMPAIRMENT Hearing within 20th percentile, i.e. hearing level normally experienced by 1 person in 5. May indicate developing NIHL.	**Sum of hearing levels at 1, 2, 3, 4 and 6 kHz. Compare value with figure given for appropriate age band and gender in Table below.** Where the individual falls within category 2 a formal notification should be given to that employee regarding the presence of hearing damage. This should include reference to the extent and implication of the damage and ways in which to minimise or prevent any further damage or loss. Retraining and reinforcement of the correct use of hearing protection including the importance of complying with other hearing conservation methods provided by the employer are the main points to stress. It is recommended that this information be given verbally, while being supported by written documentation for future reference. It is also good practice to provide the employee with a copy of their audiogram following each test.	Warning
3 POOR HEARING Hearing within 5th percentile, i.e. hearing level normally experienced by 1 person in 20. Suggests significant NIHL.	**Sum of hearing levels at 1, 2, 3, 4 and 6 kHz. Compare value with figure given for appropriate age band and gender in Table below.** Arrangements and procedures should be put in place for medical referral of those individuals falling into categories 3 and 4 and where unilateral hearing loss is identified. Where referral is indicated, audiograms should first be brought to the attention of a medical practitioner, which could be the occupational physician involved with the health surveillance programme or otherwise the employee's general practitioner or to an audiologist where available. In some cases the further advice of a consultant ear, nose and throat surgeon will be required.	Referral
4 RAPID HEARING LOSS Reduction in hearing level of 30 dB or more, within 3 years or less. Such a change could be caused by noise exposure or disease.	**Sum of hearing levels at 3, 4 and 6** kHz.	Referral

Age	Sum of hearing levels 1, 2, 3, 4 and 6 kHz			
	Males		Females	
	Warning	**Referral**	**Warning**	**Referral**
18-24	51	95	46	78
25-29	67	113	55	91
30-34	82	132	63	105
35-39	100	154	71	119
40-44	121	183	80	134
45-49	142	211	93	153
50-54	165	240	111	176
55-59	190	269	131	204
60-64	217	296	157	235
65	235	311	175	255

HSE
Health and Safety Executive

Current practice in health surveillance for noise

Although current HSE Guidance outlines what is required with regards to noise health surveillance, little available information existed on how health surveillance for workers exposed to noise was being implemented and conducted on a day-to-day basis and the quality of such health surveillance.

The aims of this study were to provide an indication of the quality and range of current practice in the delivery of health surveillance for workers exposed to noise at work in Great Britain.

The establishment of noise health surveillance was found to be conducted in a proactive manner with respondents demonstrating their knowledge of the importance and the value of risk assessment. Additionally, communication was seen as a vital component to the effectiveness and success of any noise health surveillance programme.

Variations in practitioner training, background and the setting in which they work created the potential for differences in perspectives and practices that were reflected in the range of responses to questions in this study. This was seen at many levels throughout the assessment process, from pre-test checks, to undertaking audiometry, access to previous test data, categorisation and interpretation of results, frequency of audiometry and the feedback provided to both employee and employer.

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