

# Use of OAE Testing in Hearing Conservation Programmes as a **Leading Indicator of Damaging Exposure to Noise (LIDEN); an International Collaboration**

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# Who we are?

## Health and Safety Laboratory

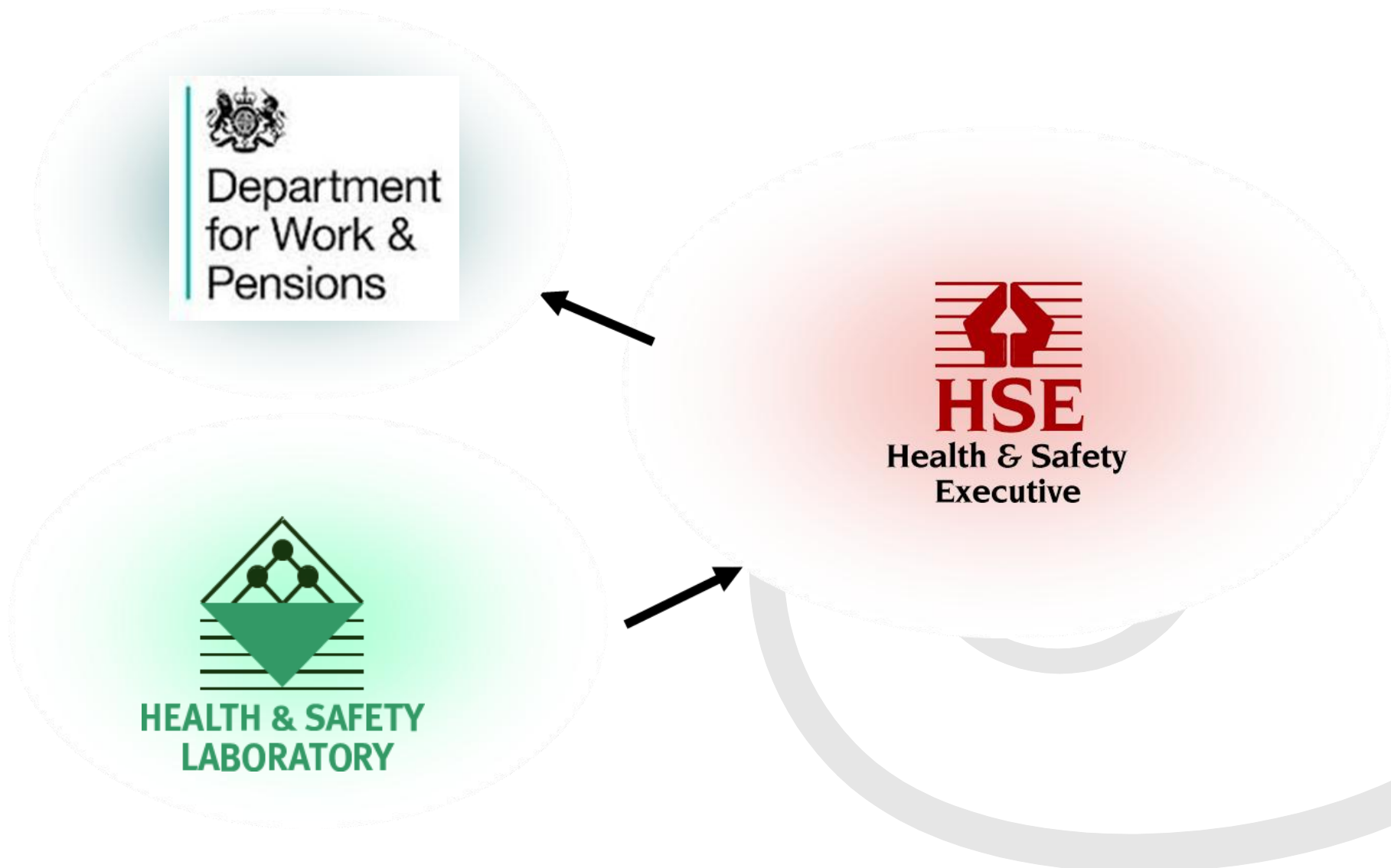
Founded in 1911 by Winston Churchill

### Remit increased many times since -

- Safety in Mines Research Board 1921
- Occupational Medicine Laboratory 1959
- Health & Safety at Work Act 1974
- An Agency of Health and Safety Executive since 1995



# Who we are?





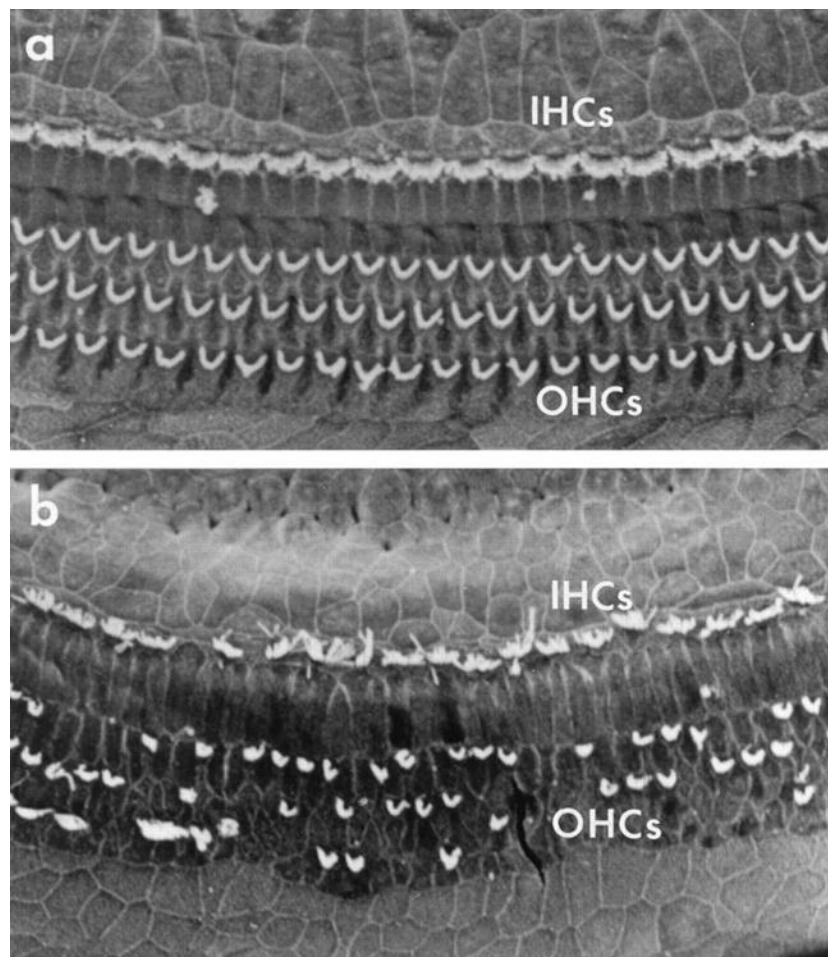
Buxton, Derbyshire in the Peak District

Who has been on the journey with us?

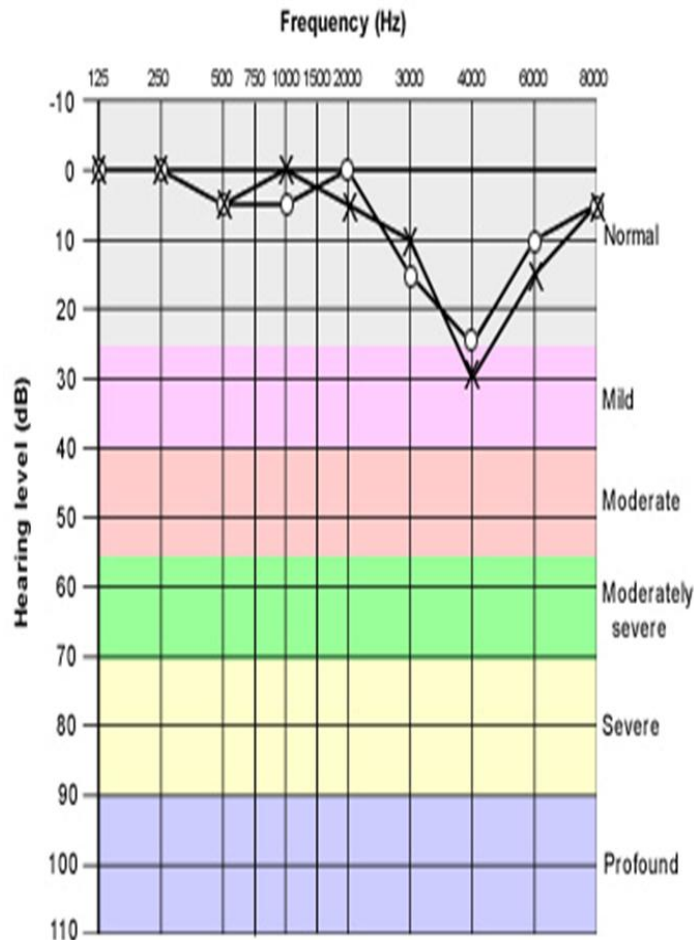
- Professor David Kemp, Emeritus Professor Auditory Biophysics, UCL, UK
- Professor Bart Vinck, Head of Audiology, University of Pretoria, South Africa
- Dr Anita Edwards, Council for Scientific and Industrial Research, South Africa
- Members of the OAE Web Community
- Participants of the Delphi Exercise (see QR code)
- Hearing Coach International



# What are we trying to prevent?



# What are we trying to prevent?



NIHL - Reduced worker quality of life + possible compensation claim

Gold standard currently audiometry - subjective method that relies on co-operation from the worker

If we are to prevent NIHL we need an early opportunity to take preventative action

An alternative approach would be to include an objective testing method e.g. OAEs



# What does a noisy workplace look like?



What year is this photograph from?



Did you guess correct? The year is 2011.



# Background – what we have been doing

- HSE awareness and interest from early 1990's
- Lutman & Hall 2000; Novel methods for early identification of noise induced hearing loss [http://www.hse.gov.uk/research/crr\\_pdf/2000/CRR00261.pdf](http://www.hse.gov.uk/research/crr_pdf/2000/CRR00261.pdf)
- Supplementary condition of a derogation from Regulations to ensure adequate protection of at risk workers
- Developed HSL capability in area of OAE testing, 2009
- HSL research - optimum test conditions and variability of OAE testing in normal hearing individuals <http://www.hse.gov.uk/research/rrpdf/rr840.pdf>
- Expert symposium on use of OAEs in occupational health, 2011
- South African conference & workshop on 'The use of OAEs in health surveillance – an international discussion', 2012
- Delphi exercise 2012 to 2013
- HSE/HSL research project – held OAE workshop – Introducing the LIDEN approach Nov 2013

## Aim

To develop a recommended procedure of how to use OAEs  
in Hearing Conservation Programmes

## Delphi Technique

- Widely used and accepted method
- Gathers data from experts in a particular domain
- Aims to achieve a convergence of opinion on a specific issue
- Well suited as a method for consensus-building

- Techniques used in this project include:
  - Survey questionnaire
  - Conference telephone calls
  - Email
  - Meetings
  - Formal conference or seminar
  - OAE Web Community
- Survey questionnaire:
  - Circulated to known users, web community and interested parties
  - Responses used to develop the recommended procedure

- Initiated at symposium hosted by HSE in February 2011
- Maintained via OAE web community and email communication
- Essential element of research to seek collaboration and input from international colleagues



# Progress to date

- Agreed with international experts (collaborators)
  - common OAE terminology and their meaning in reporting and use in occupational settings
  - a draft ‘recommended procedure’ for including OAE testing within hearing conservation ready for the next phase of research (data collection)
- Qualitative research project (HSE funded)
  - To test out the developed ‘recommended procedure’
  - Requires engagement with UK based occupational health providers to help with research project
  - Aims to explore added value, practical issues and challenges of including OAE testing in hearing conservation programmes
  - To see how the LIDEN concept can work within, but improve the current approach (more on this to follow)
  - Buy in from leading UK manufacturer to develop commercially available equipment geared at occupational use (loaning equipment for research)
    - In recent months this has extended to other manufacturers and suppliers of OAE equipment

# Who is helping with our research?



- Many papers have been read and a detailed evidence base gathered as we have been on our OAE journey
- For the purposes of attending this conference, we have developed a dedicated website for presenting the evidence base we have used for our work.
- This can be either accessed using the QR code on our business cards or by visiting:

<http://www.hsl.gov.uk/centres-of-excellence/centre-for-workplace-health/oae-research.aspx>

- Ethics approval for research granted
- Draft recommended procedure developed for research project
- Recommended procedure will be developed throughout research project
- Currently aim to publish in 2016

# Benefits of including OAE testing

- OAE testing is an objective test
- Specific to Outer Hair Cell (OHC) damage
- Detects small changes in OHC function
  - Therefore used in the 'Leading Indicator of Damaging Exposure to Noise' (LIDEN) approach
- Less stringent test environment than required for PTA
- Quick test
- Key motivational & educational tool
- Takes a hierarchical approach to noise control
- Providing useful and timely data to enable a preventative and intervening measures to be adopted

# What is the LIDEN Approach?

- LIDEN - Leading Indicator of Damaging Exposure to Noise
- Incorporates OAE testing within Hearing Conservation Programmes
- Developing them into a proactive

**Hearing Conservation Programmes**



# What is the LIDEN Approach?

- Baseline = Pre-test procedures (questionnaire, otoscopy, tympanometry & acoustic reflex) OAE & PTA testing
- Annual test = Pre-test procedures & OAE test only. Unless requirement for PTA indicated by information gathered at this time
- Triannual test = Pre-test procedures, OAE & PTA testing

Thanks for listening

