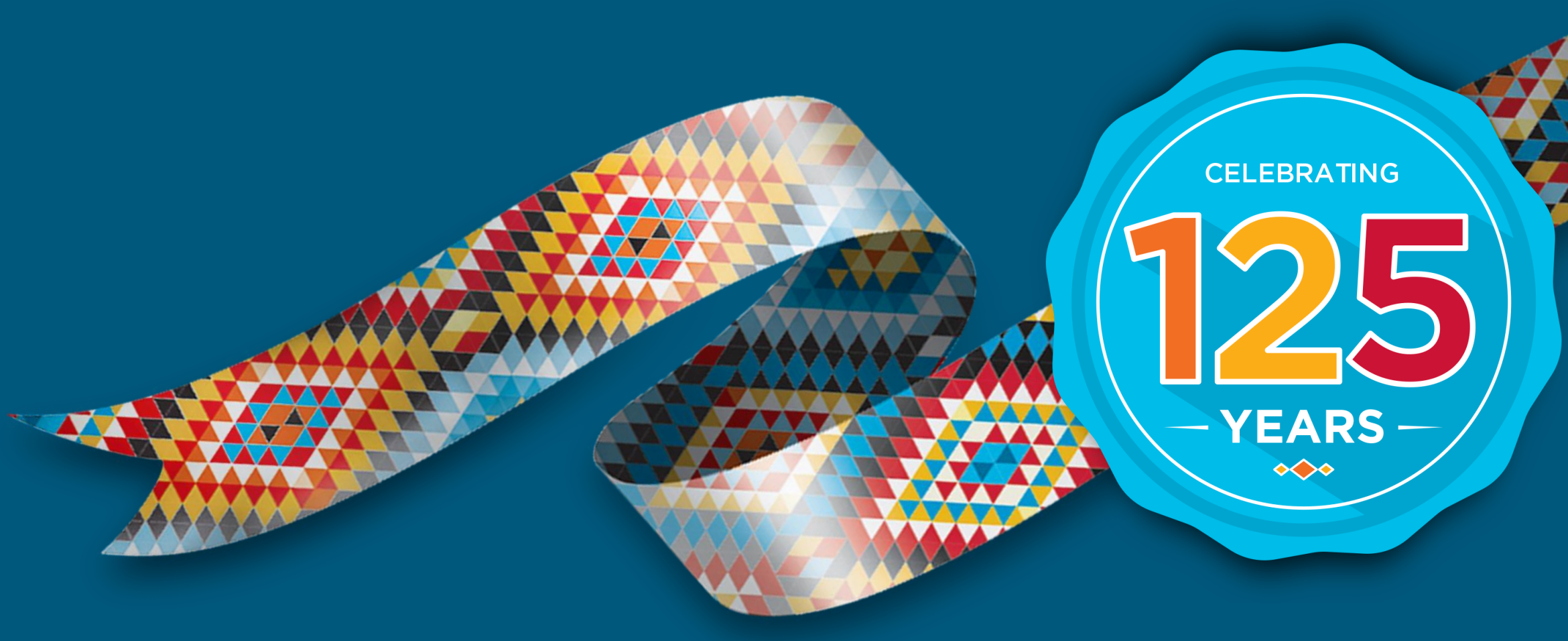
SOUTH AFRICAN NATIONAL OCCUPATIONAL HEALTH AND SAFETY CONFERENCE



MANAGEMENT OF NOISE INDUCED HEARING LOSS IN THE IRON AND STEEL SECTOR

Outline

- How big is the problem?
- Occupational Noise Induced Hearing Loss (NIHL) overview
- Objectives in management
- Challenges
- Way forward
- Compensation
- Conclusion

How big is the problem?

How big is the problem?

- Worldwide Occupational NIHL prevalence ranges from 16% -24% (WHO)
- Occupational NIHL costs approximately 0.2% to 2% of the GDP of developed countries (WHO estimates)
- The average noise levels in developing countries may be on an increase because of industrialization which is not always accompanied by protection.
- Occupations at highest risk for NIHL include those in manufacturing, transportation, mining, construction, agriculture and the military.
- Mining processes generate enormous noise as a result of activities such as percussion drilling, blasting and crushing of ore, often exacerbated by confined and reflective spaces
- High levels of exposure pose a significant risk to death, safety and hearing acuity

Occupational Noise Induced Hearing Loss (NIHL) overview

Overview

- Noise is a well-known cause of hearing loss in the workplace
- NIHL refers to reduction in auditory acuity associated with noise exposure
- NIHL is one of the most reported occupational diseases
- Constitute 90% of reported ODs claims at RMA
- Noise exposure levels relate to an 8-h working day (or a 40-h working week) , exceeding OEL of 85 dB(A)
- Exposure to loud noise causes irreversible auditory damage resulting in SNHL
- NIHL function of continuous or intermittent noise exposure and duration, and which usually develops slowly over several years.
- It is predominantly noted in the high frequency region with typical notch at 4–6 kHz and extends to the lower frequencies
- The amount of hearing loss increases with noise intensity and duration of exposure
- Individual susceptibility to NIHL varies greatly

Noise Induced Hearing Loss (NIHL)

Is Permanent

Caused by noise exposure over 85dBA

Affects both ears-high frequencies

Develops slowly over 2-10 years

Is 100% Preventable

Noise Induced Hearing Loss (NIHL)

Hearing Loss Due To

Noise Exposure Is …

Painless

Permanent

Progressive

… and very Preventable!

RMA NIHL claims experience – Mining and Metal

Industry	(All)
Industry Class	(All)

Sum of Number of Claims	Column Labels										
Row Labels	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Grand Total
Gauteng	690	653	623	721	560	820	591	690	572	189	6109
North West	282	459	435	357	386	345	439	465	251	111	3530
Mpumalanga	231	253	163	119	198	155	90	183	158	55	1605
Free State	19	13	11	20	52	47	43	23	118	53	399
Limpopo	80	34	40	60	38	24	13	21	4	1	315
Northern Cape	25	24	20	24	35	13	10	8	10	1	170
KwaZulu-Natal	1	8	3	11	18	14	9	28	31	16	139
Western Cape	4	3	2	8	5	17	13	17	13	5	87
Eastern Cape						8	18	27	8	2	63
Namibia			3								3
Grand Total	1332	1447	1300	1320	1292	1443	1226	1462	1165	433	12420

RMA NIHL claims experience – Mining and Metal

Industry	(All)
Industry Class	Mining

Sum of Number of Claims Column Labels											
Row Labels	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**Grand Total**
Gauteng	**690**	**653**	**623**	**718**	**557**	**700**	**463**	**553**	**443**	**149**	**5549**
North West	**282**	**459**	**435**	**357**	**386**	**324**	**430**	**456**	**241**	**110**	**3480**
Mpumalanga	**231**	**253**	**163**	**119**	**198**	**138**	**74**	**172**	**146**	**50**	**1544**
Free State	**19**	**13**	**11**	**20**	**52**	**46**	**41**	**22**	**116**	**50**	**390**
Limpopo	**80**	**34**	**40**	**60**	**38**	**23**	**13**	**21**	**4**	**1**	**314**
Northern Cape	**25**	**24**	**20**	**24**	**35**	**9**	**9**	**8**	**8**	**1**	**163**
KwaZulu-Natal	**1**	**8**	**3**	**11**	**18**	**9**	**1**	**12**	**14**	**12**	**89**
Western Cape	**4**	**3**	**2**	**8**	**5**	**7**	**3**	**2**	**6**	**1**	**41**
Namibia			**3**								**3**
Grand Total	**1332**	**1447**	**1300**	**1317**	**1289**	**1256**	**1034**	**1246**	**978**	**374**	**11573**

RMA NIHL claims experience – Metal industry

Industry	(All)
Industry Class	Metals

Sum of Number of Claims	Column Labels							
Row Labels	2013	2014	2015	2016	2017	2018	2019	Grand Total
Gauteng	3	3	120	128	137	129	40	560
Eastern Cape			8	18	27	8	2	63
Mpumalanga			17	16	11	12	5	61
North West			21	9	9	10	1	50
KwaZulu-Natal			5	8	16	17	4	50
Western Cape			10	10	15	7	4	46
Free State			1	2	1	2	3	9
Northern Cape			4	1		2		7
Limpopo			1					1
Grand Total	3	3	187	192	216	187	59	847

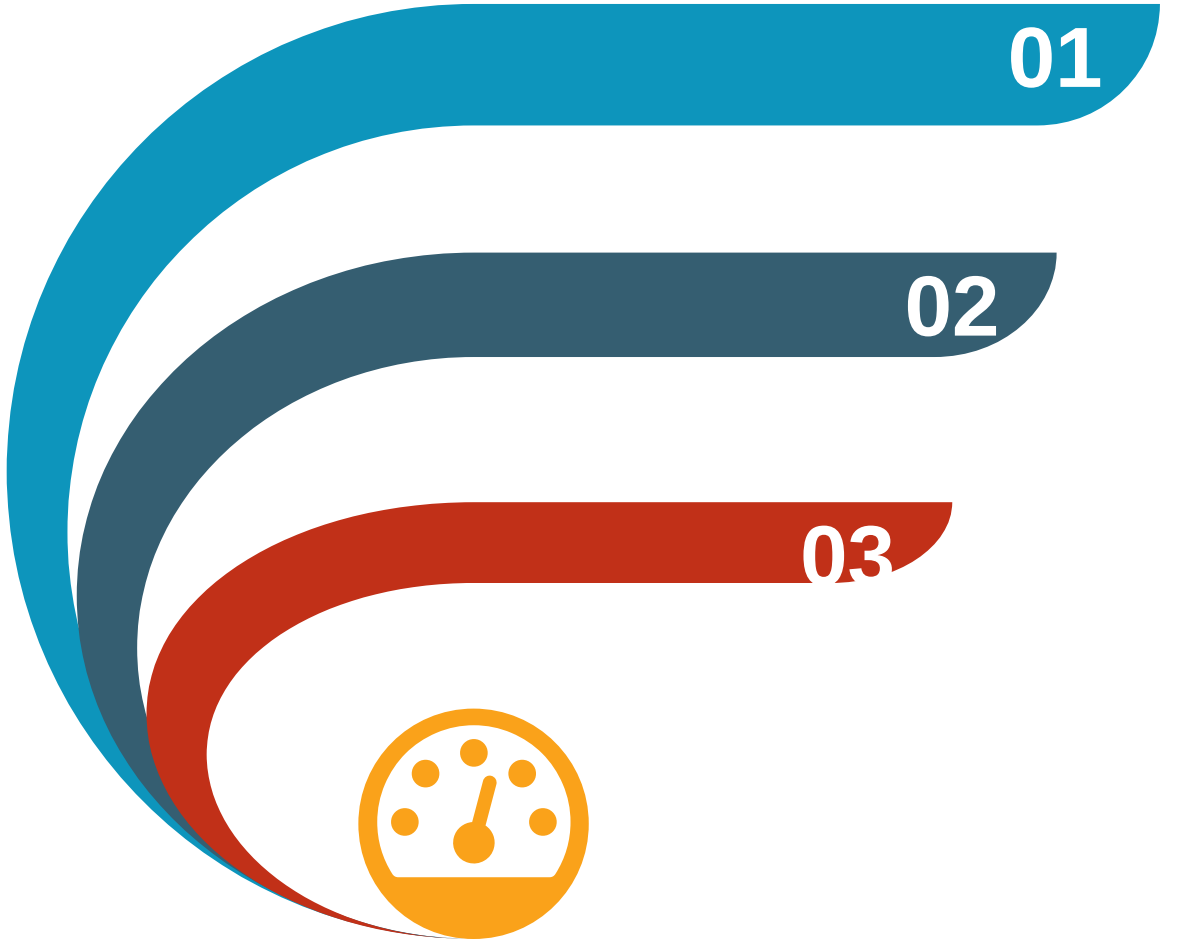
RMA NIHL claims experience – Metal industry

IndustryClass	Metals

Sum of Number of Claims	Column Labels							
Row Labels	2013	2014	2015	2016	2017	2018	2019	Grand Total
Metal tube,furniture, door etc manufacturing			130	131	148	139	42	590
Iron and Steel production including processing	3	3	30	22	24	19	5	106
Motor car assembly including all operations			5	26	10	6	5	52
Foundry products and stove manufacturing			5	4	12	10	2	33
Wagon,coach,carriage,motor body building			2	3	16	7		28
Motor garaging			3	3	3	2	5	16
Electric cable and safety razor blades			5	2	2	3		12
Iron button,bucke,hook,eye,hairpin,vehicle			7	1	1	1		10
Grand Total	3	3	187	192	216	187	59	847

Objectives in NIHL management

Prevention NIHL



Primary
Occupation Health legislation

Secondary
Employers - Medical surveillance
- Hearing Conservation Program

Compensation legislation (COIDA)
Financial penalties & incentives

Legislative framework

OHSA (1994)

PEL < 85 dB for a 8-hour time-weighted average (TWA)

≥85 dB is excessive noise exposure

3 dB increase in exposure results in halving of allowed exposure time

The decibel (dB) scale is a logarithmic scale, not a linear scale

MHSA (1996)

Mandates hearing conservation programme

Medical surveillance

Industry milestones

COIDA (1993)

Provides compensation for occupational NIHL

Accepted exposure times for noise before damage occurs	
Noise Exposure dB(A)	Duration
85	8 hours
88	4
91	2
94	1
97	30 mins
100	15
103	8
106	4
109	2
115	30 secs

Medical surveillance program

- **Medical surveillance – risk based**
  - **Baseline hearing assessment**
    - **OAE vs Audiogram**
      - **Sensitivity of test in predicting early possible hearing loss**
      - **Accuracy of audiometric testing and screening**
  - **Review for follow-up, counselling and evaluation**
- **Hearing protection devices**
  - **Various types for different indication**
  - **Noise reduction rate**
- **Control**
  - **OHC, OMP, OHP**
  - **Behavior changes - personal**

Challenges

Operational challenges

Multifactorial Approach - Interventions which combine multiple strategies that have synergistic effect

Leadership

- Engage , commit and champion effective strategies

Measurement of noise exposure levels

- Monitoring of noise exposure levels in risk areas

Hierarchy of control- Noise elimination

Control @ source

- Design & engineering (modify, redesign, substitute or relocate)

Control @ noise path

- Absorb, block, dilute or ventilate

Receiver

- Enclose, Protect or relocate

Hearing protection device

- Selection

Compensation Legislation

Guidelines for compensation purposes of NIHL

- Confirmed excessive noise exposure ≥ 85 dB in 8hrs per day, 5 days a week
- Hearing impairment , PLH or PLH shift ≥10 from baseline audiogram
- Typical pattern of NIHL on audiometry - classical audiometric pattern is of a high-tone hearing loss with a notched appearance centred on 4 or 6 kHz, with some recovery at 8 kHz.
- Absence of other conditions causing hearing loss
- Major diagnostic problems (ototoxic agents & viral infections)
- Review of supplied clinical data
- Establishment of causation and/liability
- Determination of the existence of significant hearing loss
- Calculation of PHL
- Determination of impairment rating

Conclusion

Conclusion

- Insidious onset
- Once acquired, permanent sensorineural condition;
- Hearing loss depends on the nature, intensity, duration and frequency of exposure to noise and individual susceptibility.
- Initially effects high frequencies
- Progresses to lower frequencies
- Nearly always bilateral and symmetrical
- Ceases once noise exposure is discontinued
- **100% preventable**

Way forward

Way forward

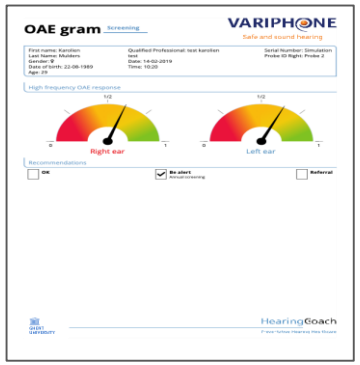
- Provincial and regional awareness and training programs
- Introduce NIHL prevention checklist
  - Excel spreadsheet
  - Checklist for monitoring and evaluation method
  - 13 sections
  - Use as a baseline evaluation and continual improvement
- Finding affordable ways to manage programs operationally
- Introduce new approach to hearing screening in the workplace
- Use of new technology with early warning capabilities
- Follow up on early identified hearing loss cases with counseling and training
- Encourage individual employees to understand their responsibility in managing hearing loss and need for behavior change

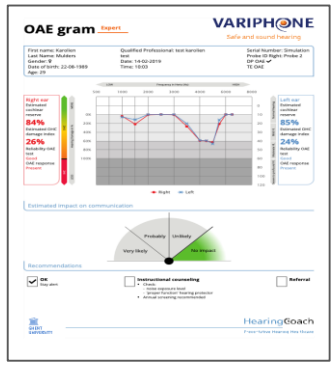
Way forward

Awareness days to focus on the following areas :

- Johannesburg area (include van der Bijl and Vereeniging)
- Witbank/Middelburg (include Lydenburg, Burgersfort, Steelpoort)
- Rustenburg
- Carletonville (include Randfontein, Westonaria)
- Welkom (including Klerksdorp Orkney area)
- Kimberley (including northern Cape area)
- To be followed Pietermaritzburg or Durban, Cape Town as well as Port Elizabeth.

To cover the fast growing market of hearing loss we have to create **easy access** to our ‘USPs’ and make them available to anyone who, in good faith, wants to use them.





Hearing Conservation Program

- Roadmap HCP

- Multidisciplinary
- Continuity

healthy hearing program

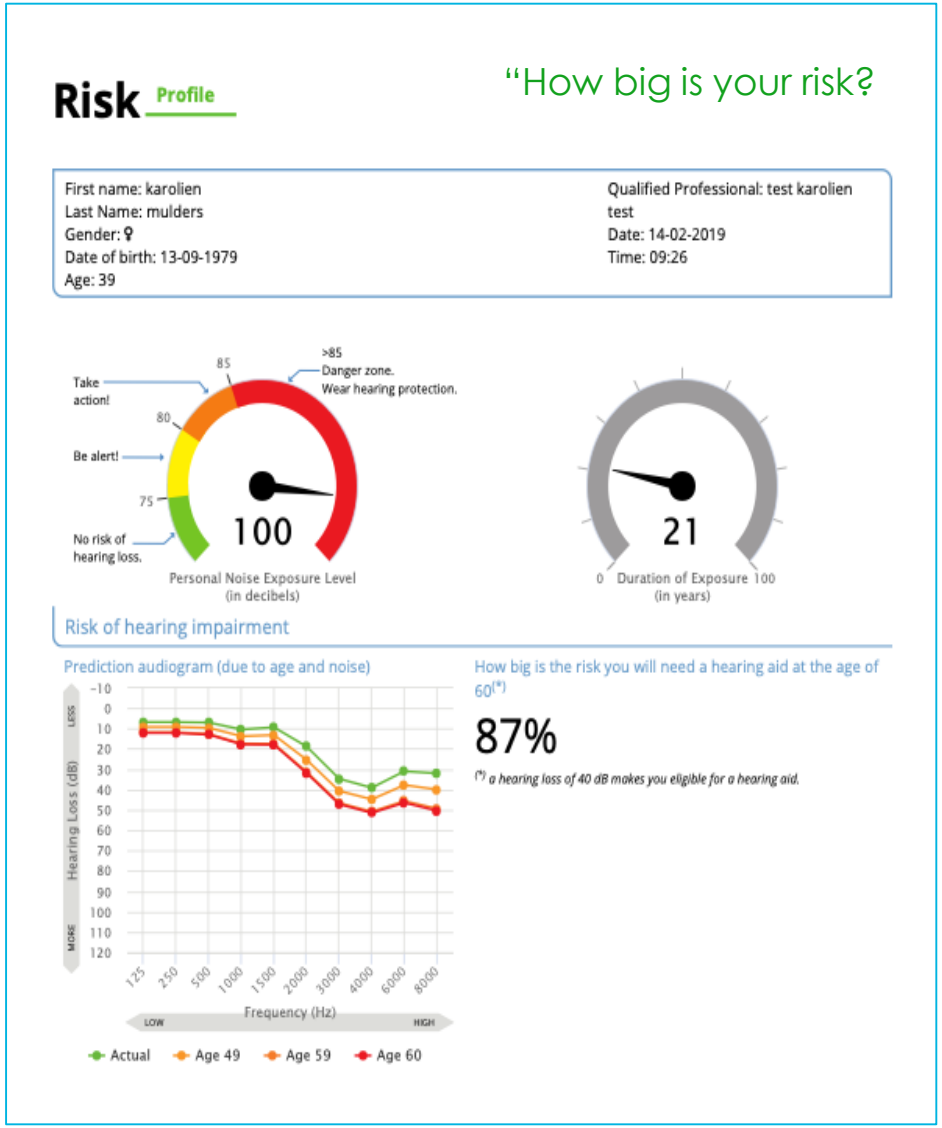
Exposure
Risk Profile

Protection
Verification & Training

Behaviour
Positive behavioural change

Hearing
Preventive Ear Scan

Risk assessment



Risk Profile

"How big is your risk?

First name: karolien
Last Name: mulders
Gender: ♀
Date of birth: 13-09-1979
Age: 39

Qualified Professional: test karolien test
Date: 14-02-2019
Time: 09:26

Risk of hearing impairment

Prediction audiogram (due to age and noise)

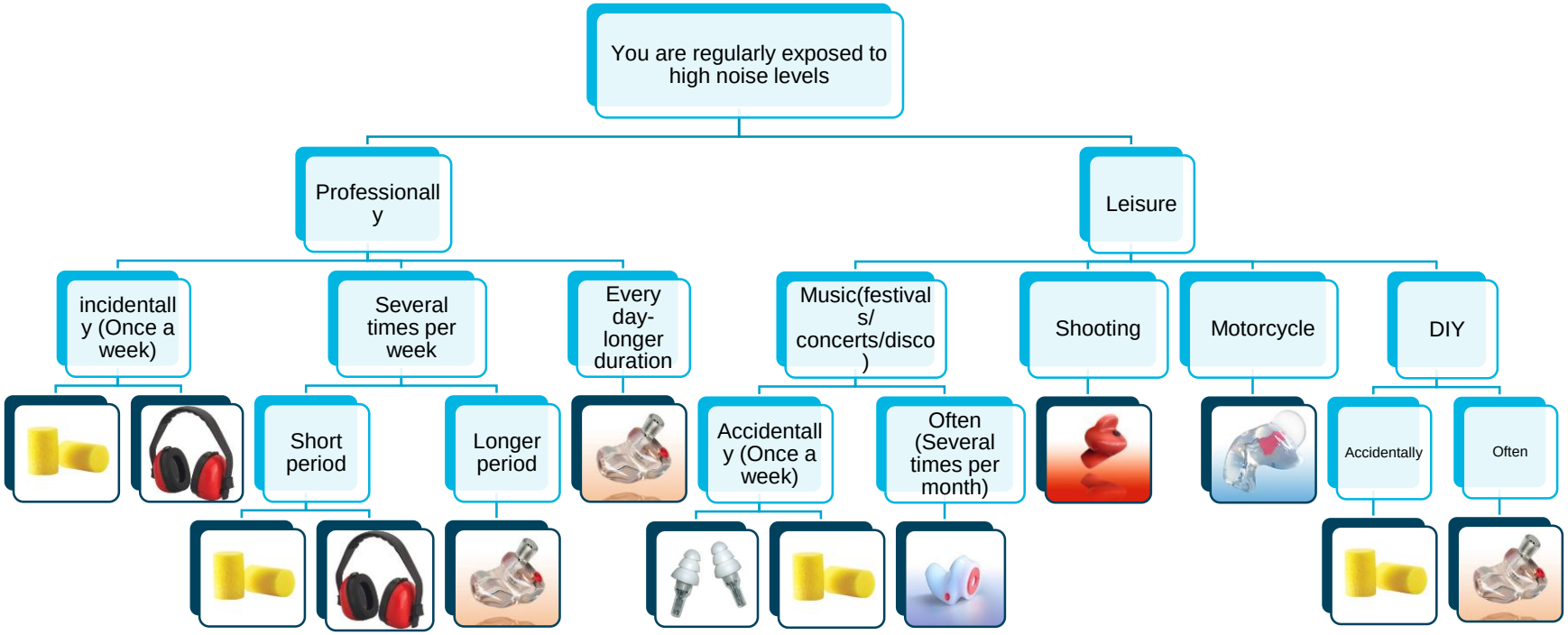
How big is the risk you will need a hearing aid at the age of 60(*)

87%

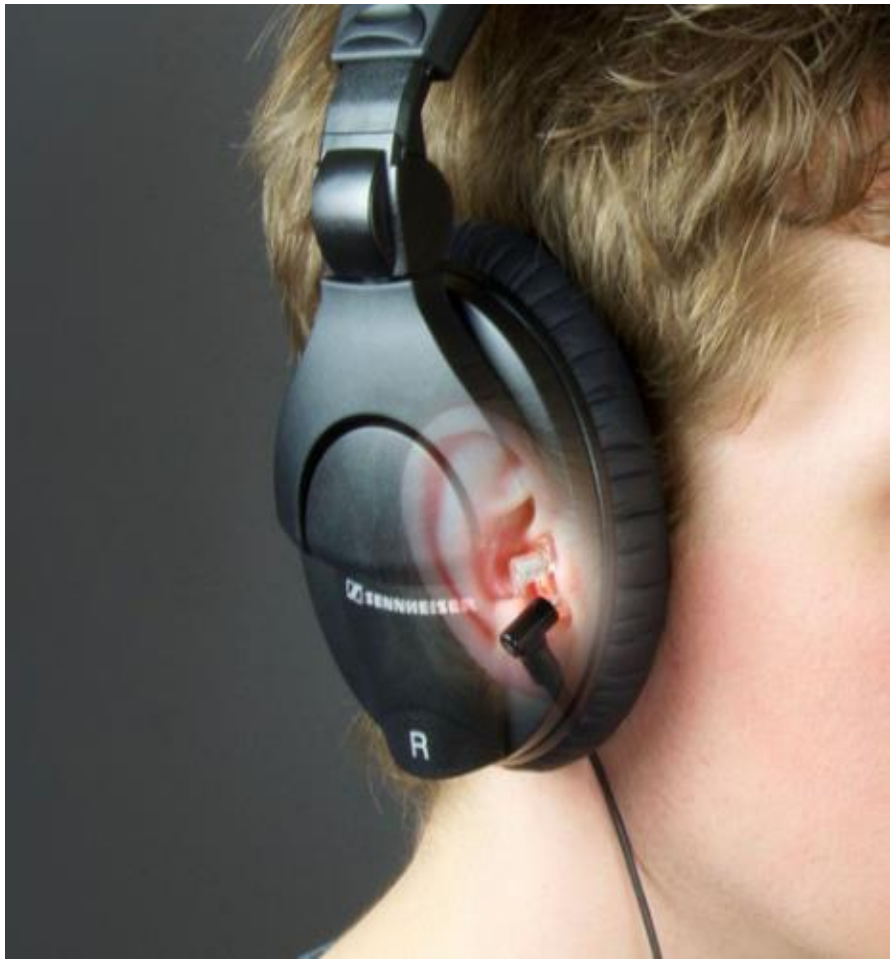
(*) a hearing loss of 40 dB makes you eligible for a hearing aid.

- Map the ***risk*** per ***person*** or ***group*** (ISO 1999)
- ***Motivate*** workers to wear HPD and change listening habits of music lovers

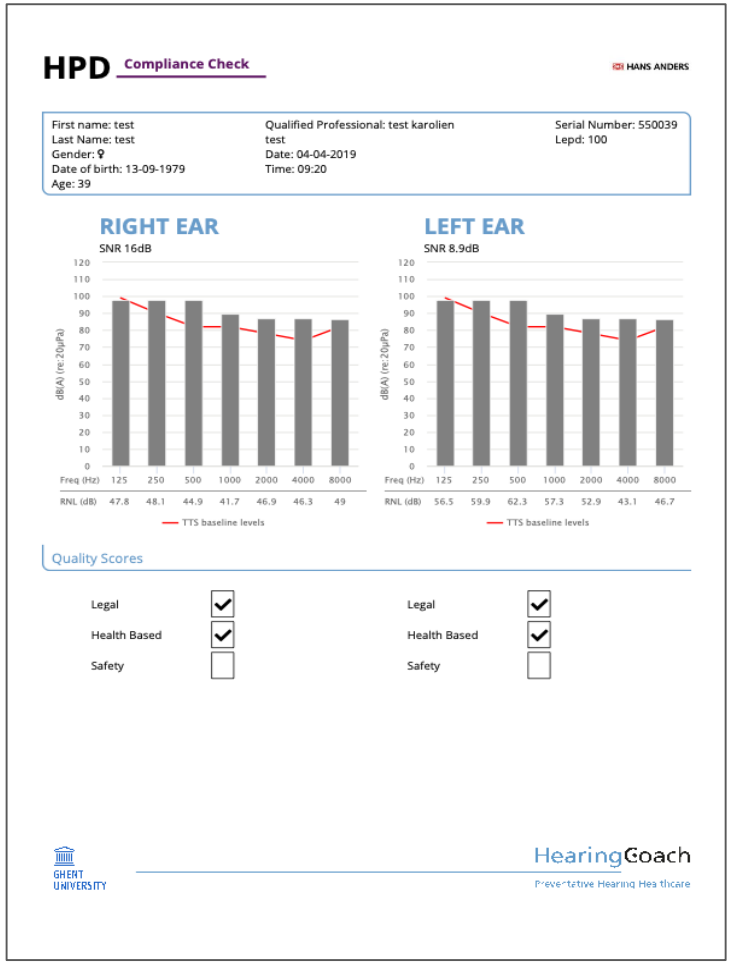
Selection HPD + training



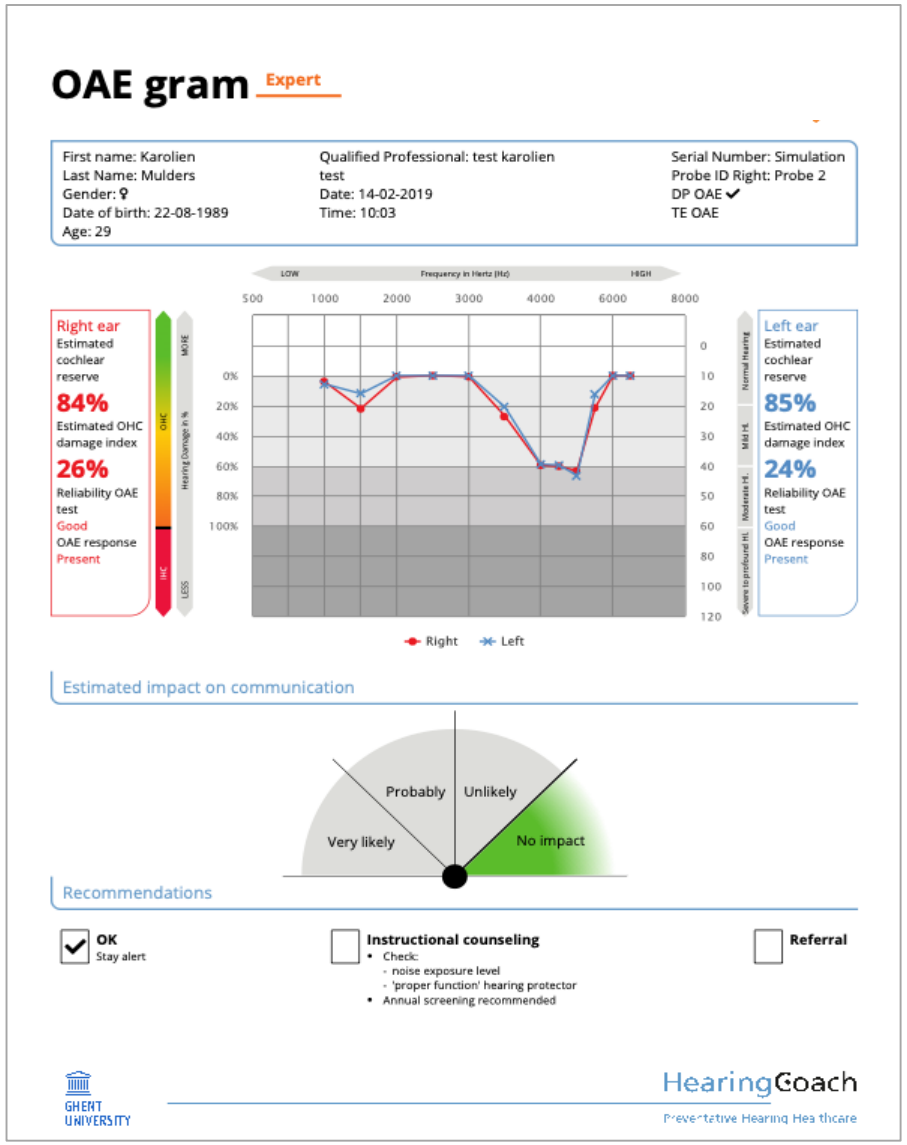
Microphone in Real Ear (MIRE)



Compliance Check



OAEs: 'State of the Art'



Interpretation of OAE's

1. OAE-Gram is an algorithm used to analyse and interpret the measurements.
2. The Outer Hair Cell (OHC) -Damage – Index- is an overall weight average expressed in percentages
3. Makes it easy to understand results.
4. 0 % = no damage at level of OHC
5. 100 % = total destruction at level of OHC

Behavior change

Raise Awareness

- Information (group)

Change of behaviour

- Involve worker
  - In risk assessment (dose badges)
  - Selection of PHP (comfort, hygiene, design, …)
- Take away obstacles
  - Minimize interference (communication, productivity, …)
  - Make sure PHP function properly
- Enhance self-efficacy
  - Physical feedback :visualize ‘sense of urgency’ - OHC-scan!!
  - Verbal feedback : individual coaching much more efficient (> < group)
- Hearing healthcare online

The Approach

- Risk assessment on the entire company
- Conduct OAE's scans to get scientific proof of damage
- Report to management on results and then decide
- Depends on results and damage index and budget
- Focus on employees being "flagged"
- Monitor the rest

HearingCoach®

Preventative
hearing healthcare

More than just an ear plug

Thank You