

# Economic Impact of hearing loss: the different systems of hearing management



*Mark Laureyns*

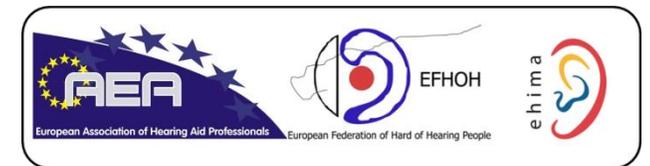
*European Association of Hearing Aid Professionals – Brussels - Belgium*

*CRS (Amplifon Centre for Research & Studies) – Milan - Italy*

*Thomas More University College – Audiology Dept – Antwerp - Belgium*



[www.aea-audio.org](http://www.aea-audio.org)



THOMAS  
MORE



IFOS WORLD COURSE ON  
HEARING REHABILITATION



## Self-Reported Hearing Loss

- Includes Awareness: *If you experience and report hearing problems – you're more unlikely to take action*
- Available for more countries – EuroTrak – JapanTrak – MarkeTrak
- Empowers people – your experience & your needs

+/- 10%

7 < >  
12%



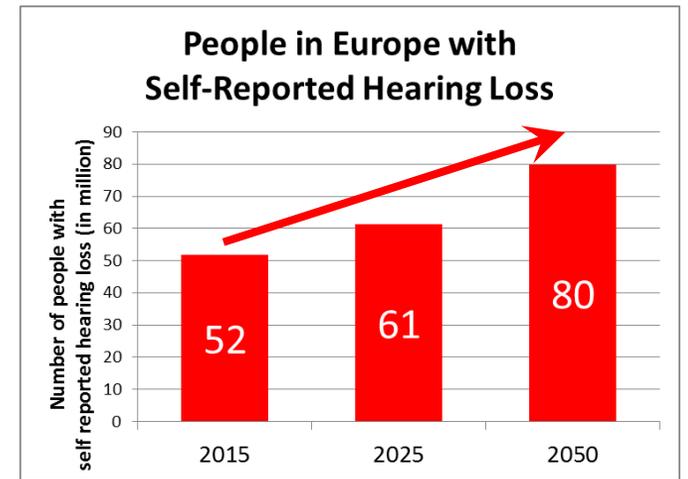
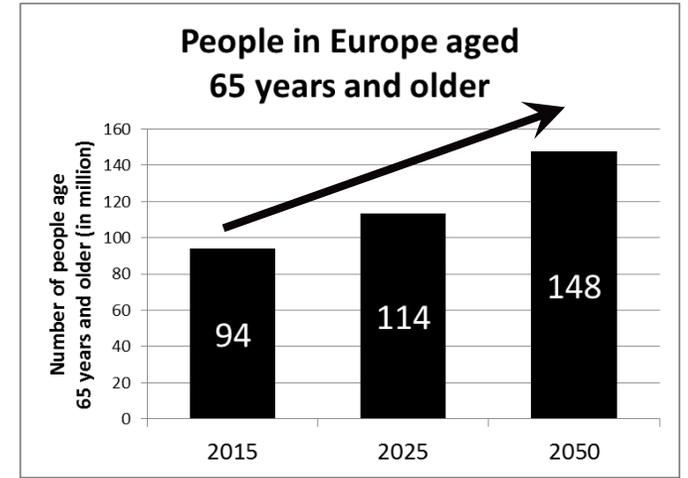
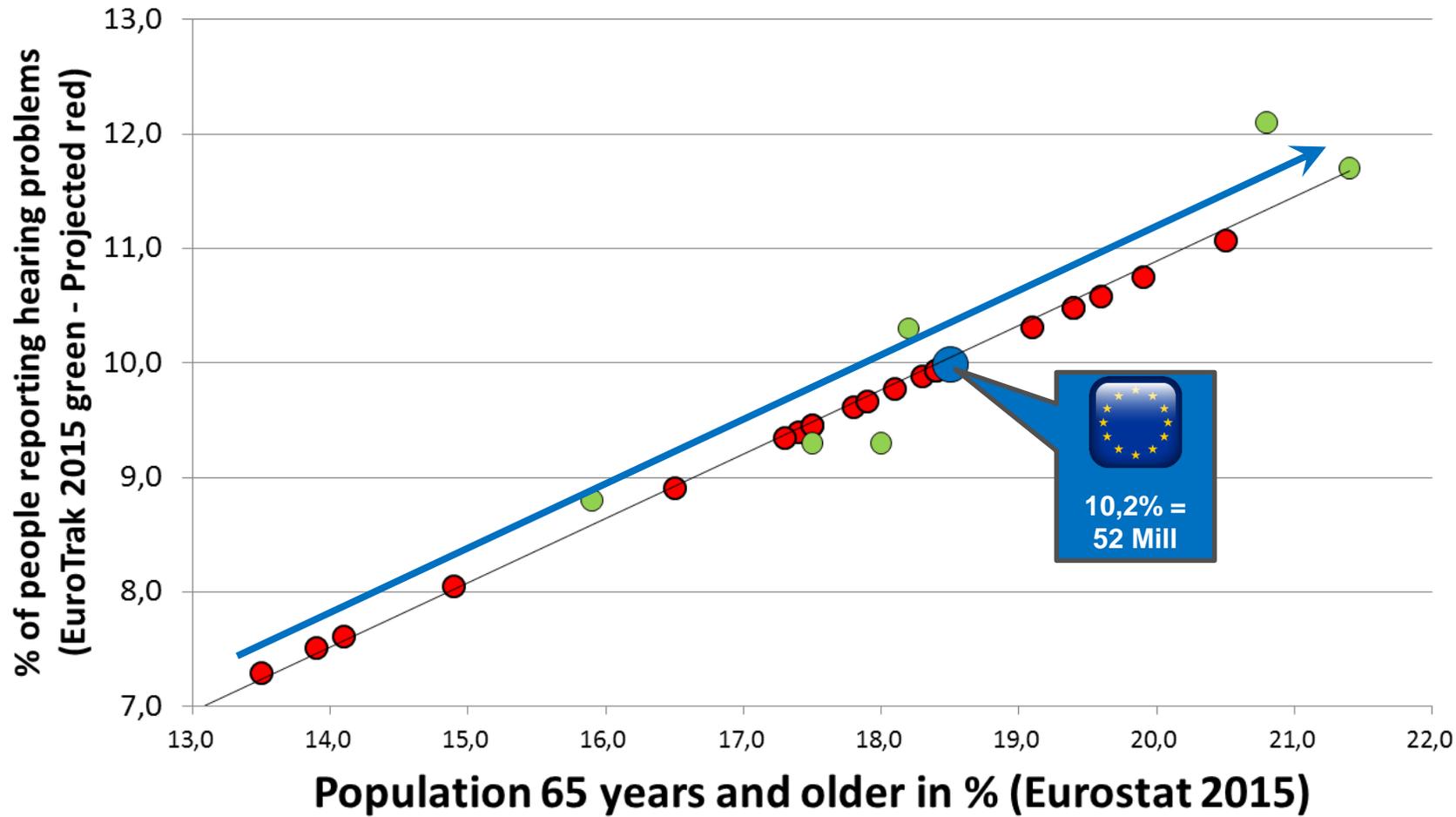
## Measured Hearing Loss

- The Audiogram: *Assess when you start to hear soft pure tones*
- Many different definitions of hearing loss: *Mild Hearing Loss – Disabling Hearing Loss – WHO – EC – ASHA ... Can leads to confusing numbers*

+/- 16%

3 < >  
27%

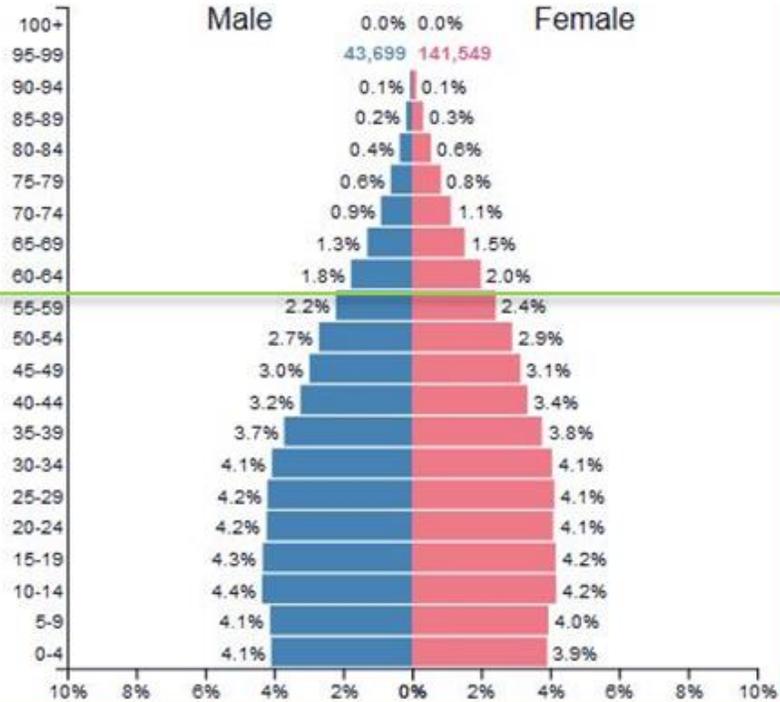
## % Self Reported Hearing Loss <> Population 65 years and older



## South America ▼

2015

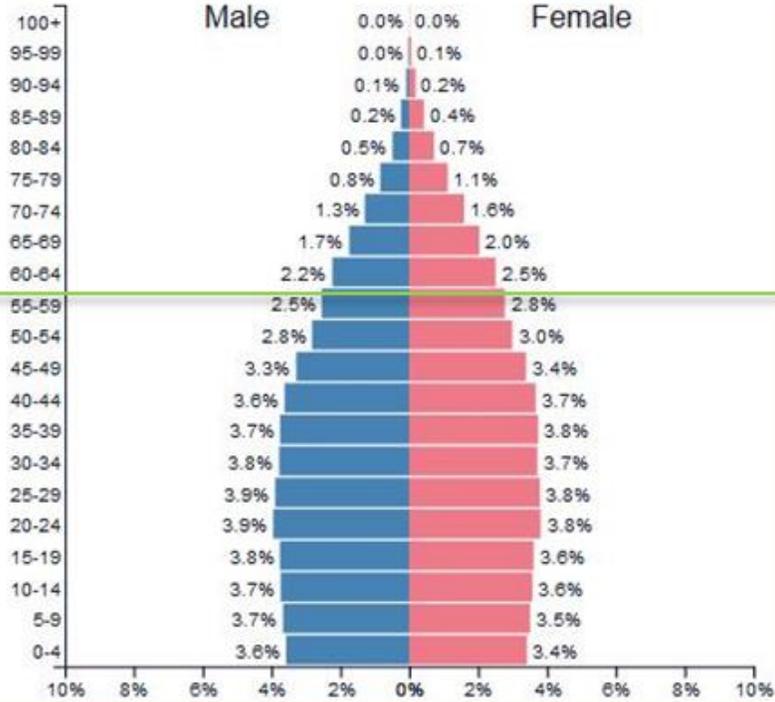
Population: 418,447,195



## South America ▼

2025

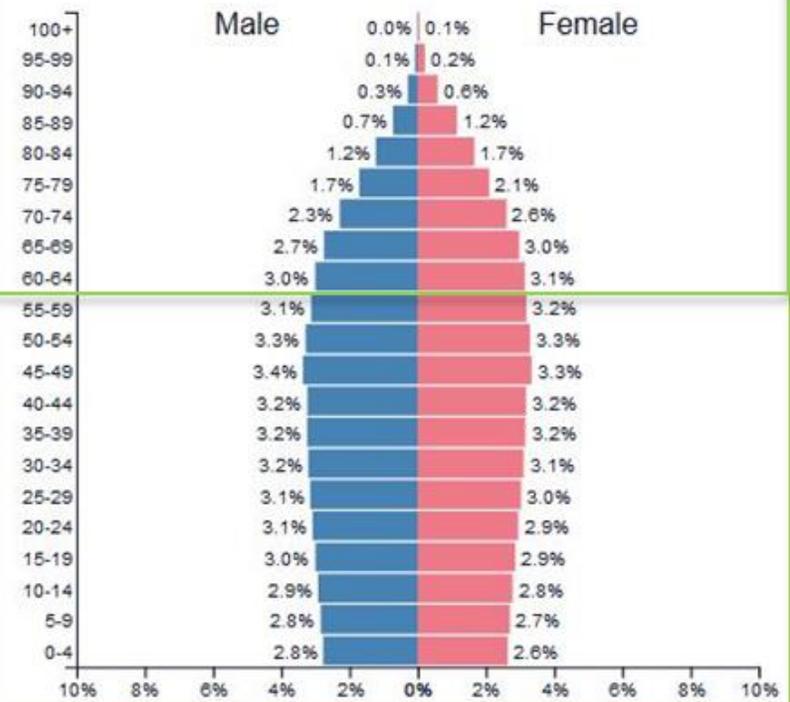
Population: 455,735,482

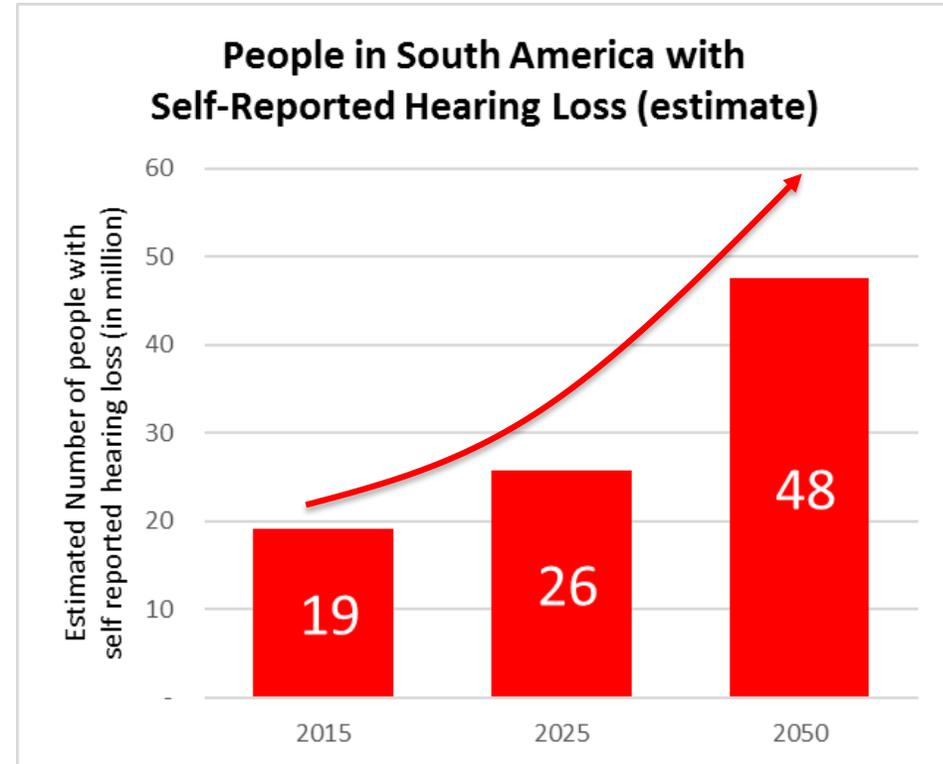
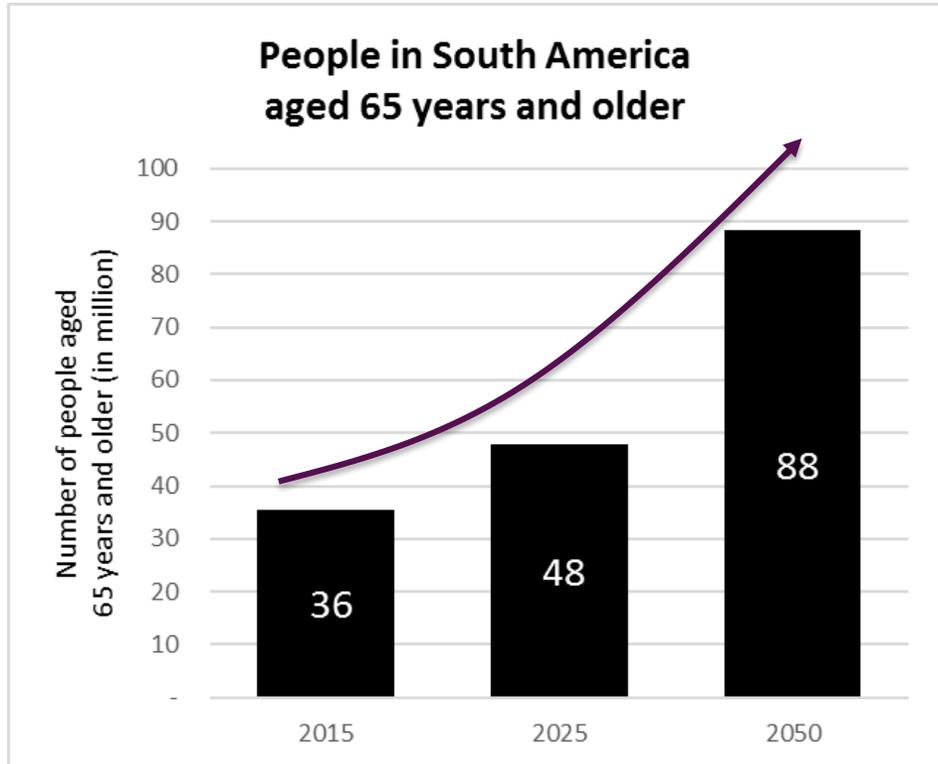
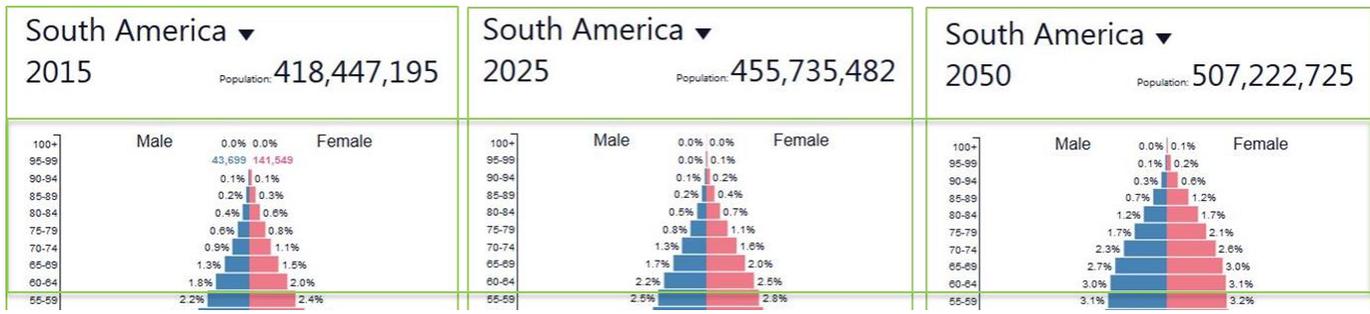


## South America ▼

2050

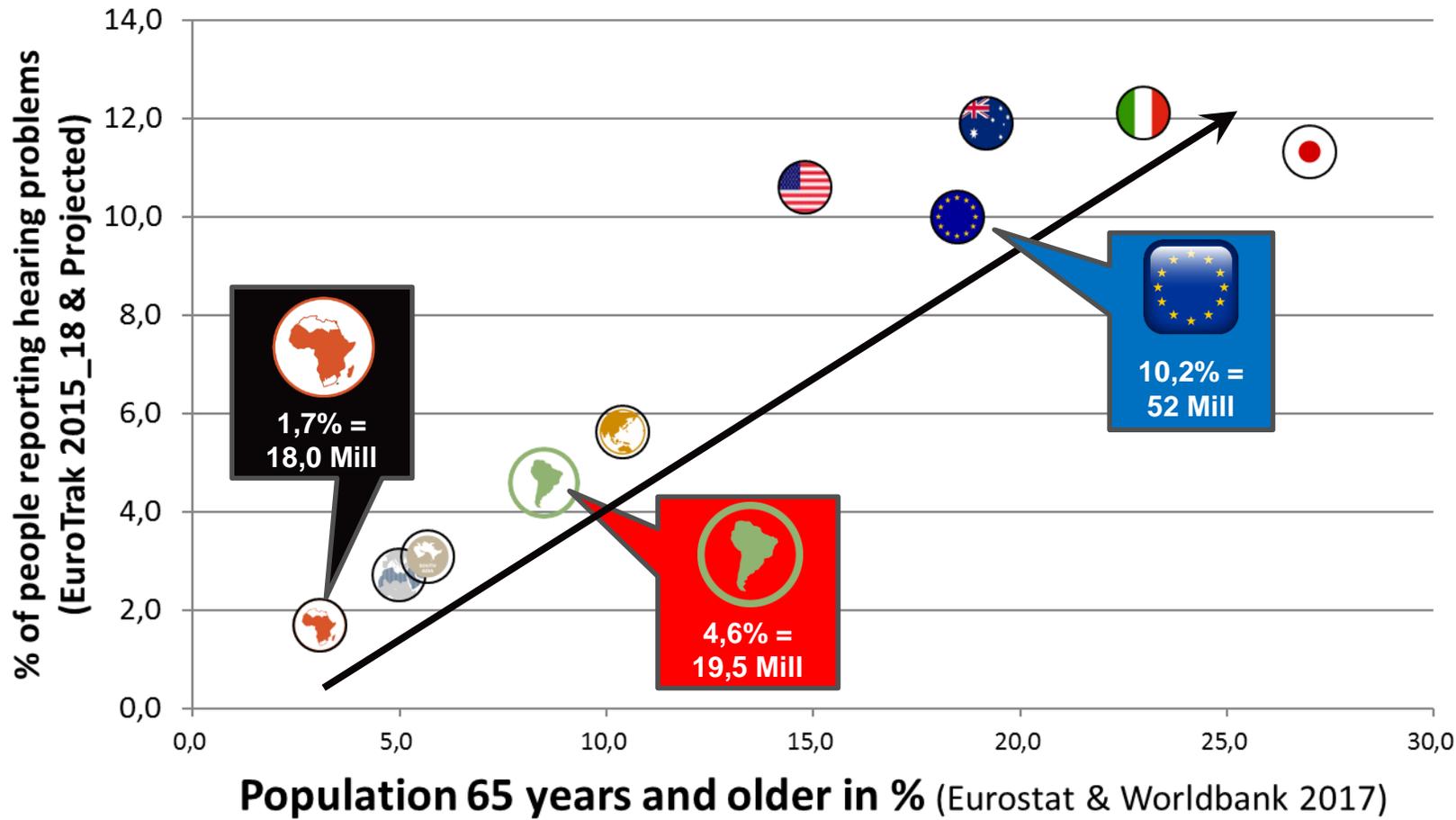
Population: 507,222,725



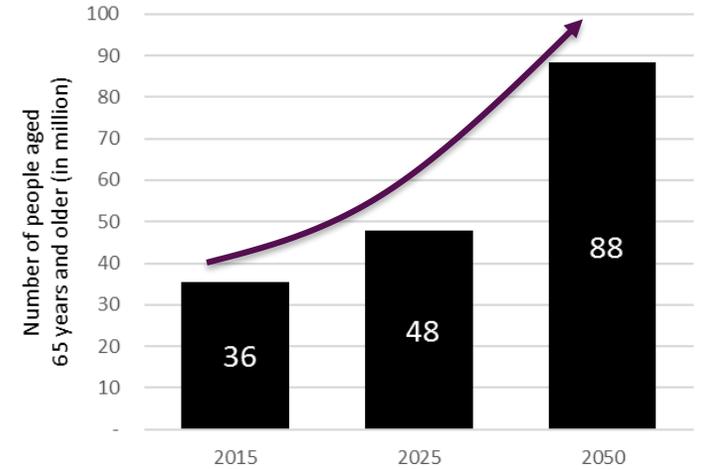


<https://www.populationpyramid.net/south-america/2017/>

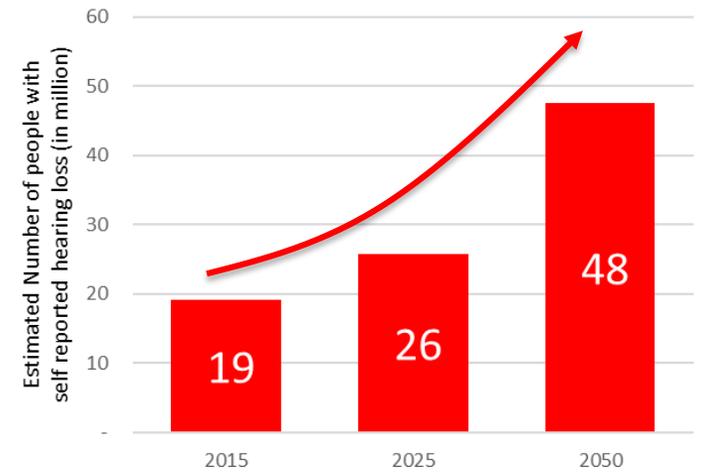
### % Self Reported Hearing Loss <-> Population 65 years and older



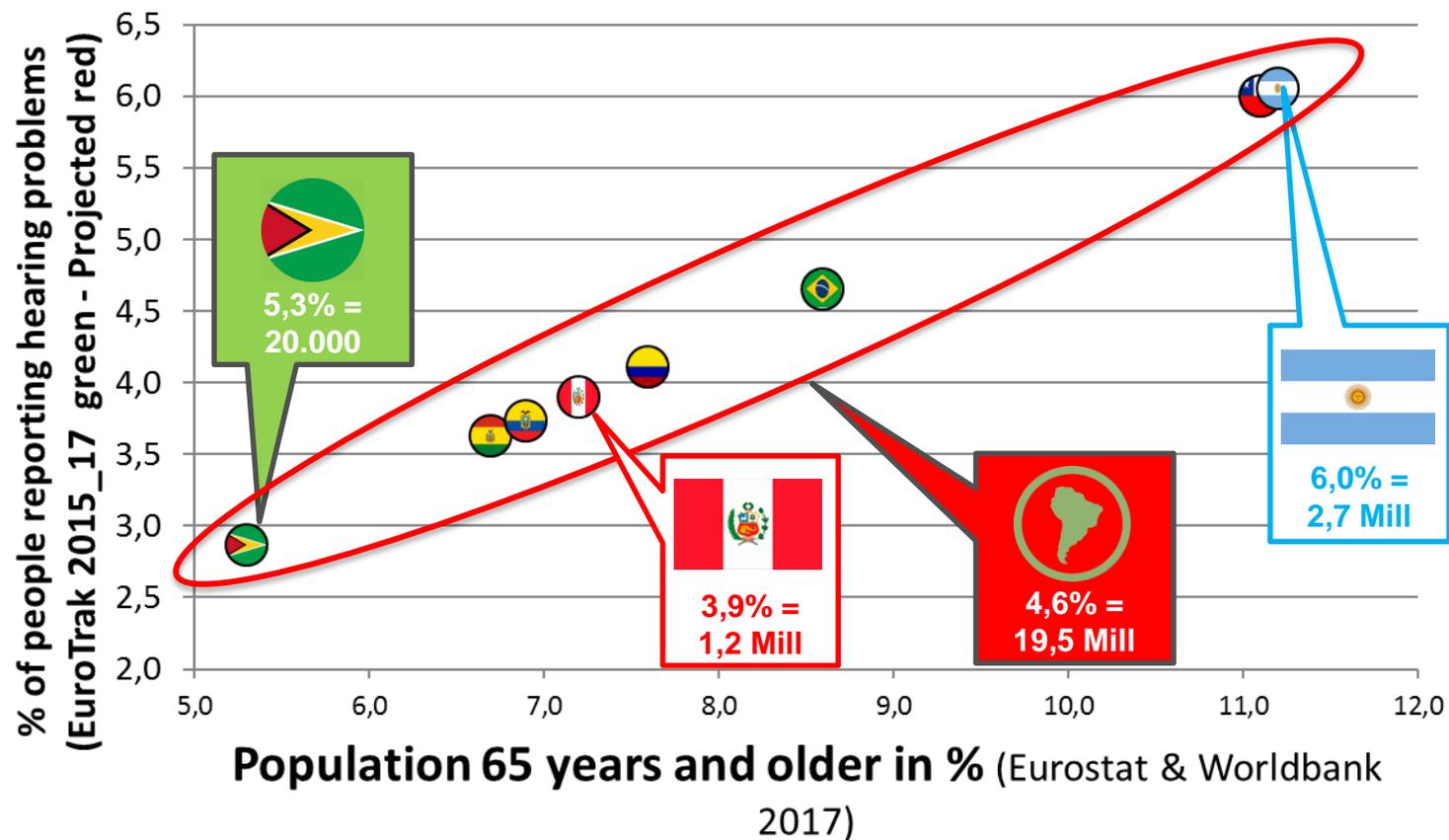
### People in South America aged 65 years and older



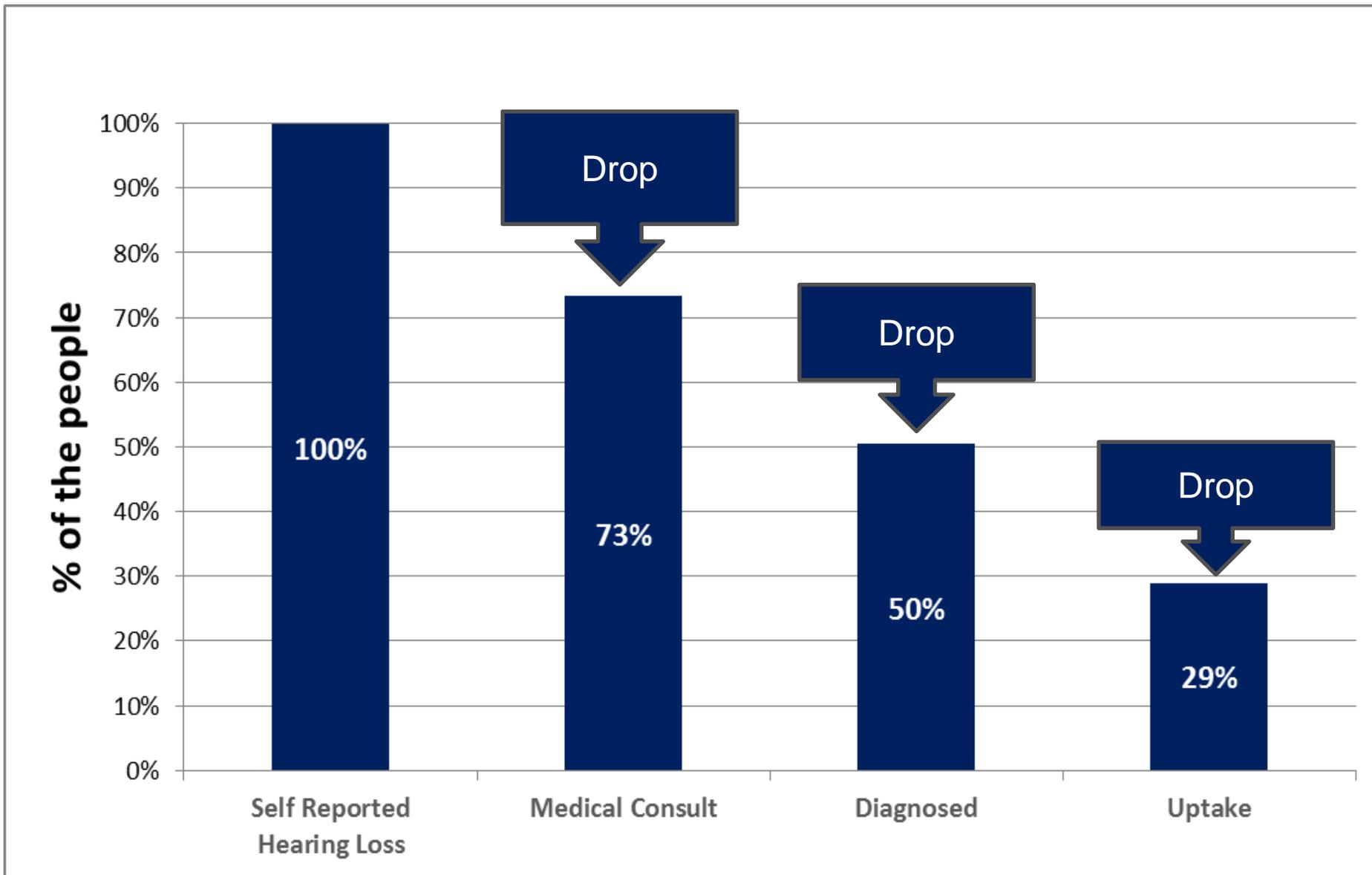
### People in South America with Self-Reported Hearing Loss (estimate)



## % Self Reported Hearing Loss <> Population 65 years and older



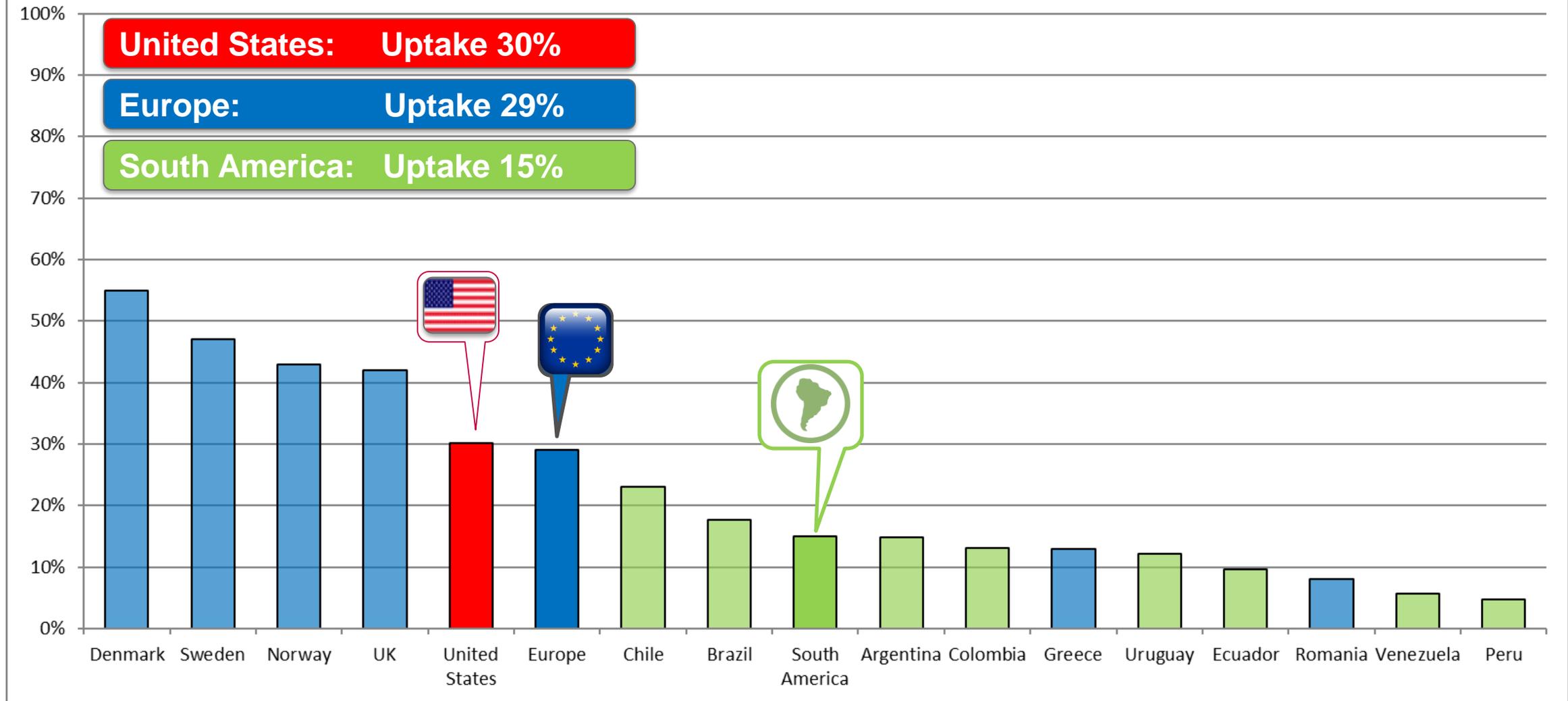
	%65+	N°65+ (mill)	HL%	HL_N° (mill)
Argentina	11,2%	5,0	6,0%	2,7
Bolivia	6,7%	0,7	3,6%	0,4
Brazil	8,6%	17,9	4,6%	9,7
Chile	11,1%	2,0	6,0%	1,1
Colombia	7,6%	3,8	4,1%	2,0
Ecuador	7,1%	1,2	3,8%	0,6
Guyana	5,3%	0,0	2,9%	0,0
Peru	7,2%	2,3	3,9%	1,2
Paraguay	6,4%	0,4	3,4%	0,2
Suriname	6,9%	0,0	3,7%	0,0
Uruguay	14,7%	0,5	7,9%	0,3
Venezuela	6,6%	2,1	3,6%	1,1



Source of basic data:  
EuroTrak 2015/18

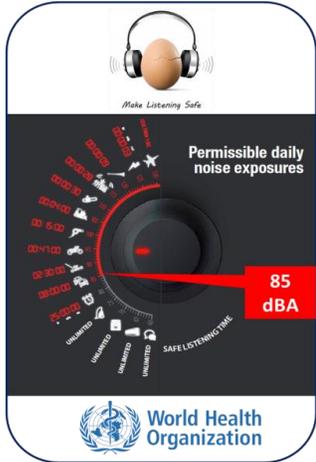


## Best Estimate - Uptake Hearing Aids (Self Reported Hearing Loss)



# Prevention

- Avoid Noise
- Promote safe listening
- Protect your ears
- Prevent and treat ear infections ...



**DIRECTIVE 2001/95/EC**

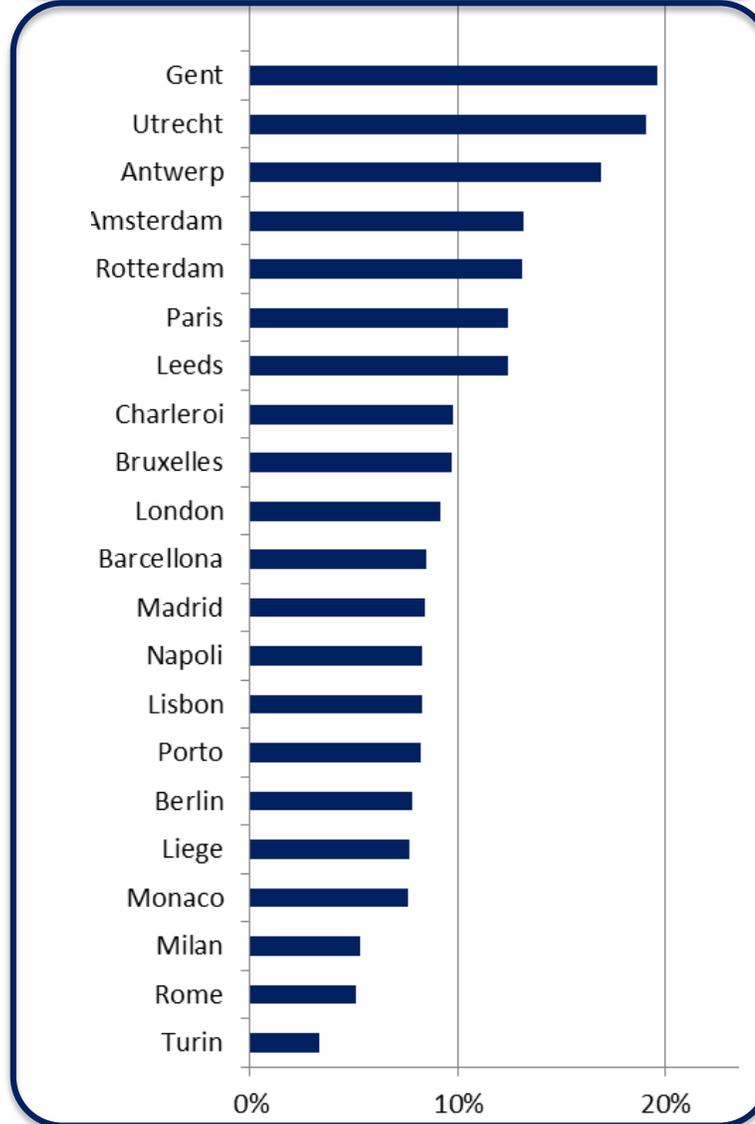
Safety requirements to be met by European standards for personal music players



From MP3 players towards Smart Devices



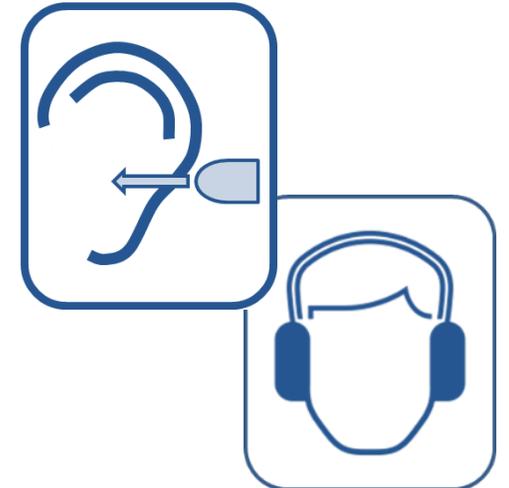
Do you use earplugs when you know that that sound level is so loud it can create hearing loss?



**DIRECTIVE 2003/10/EC**

**85 dBA**

**Hearing Protection Required**



# Awareness

- **Hearing Screening**
  - National paediatric screening
  - School children screening
  - Adult screening (from 50 years onwards)
- **Information Campaigns**



## Newborn and infant hearing screening

CURRENT ISSUES AND GUIDING PRINCIPLES FOR ACTION



Identify hearing loss early through screening of:

- newborns
- school children
- adults above 50 years

## EU NETWORK OF EXPERTS ON NEWBORN SCREENING



## ACTION FOR HEARING LOSS



Make a Sound Investment



**Get your hearing checked !**

**"Action for Hearing Loss – Make A Sound Investment"**  
Hosts: MEP Helga Stevens (Belgium/Flanders, ECR) and MEP Roberta Metsola (Malta, EPP)

It will only take 3 minutes  
4 teams of audiologists will test your hearing  
They will give you a full report and extra information on how good your hearing is

Wednesday the 1<sup>st</sup> of March 2017 – | P1A002 | 09:00-11:00h

## Adult Hearing Screening: Can we afford to wait any longer?

Brian Lamb OBE, Sue Archbold PhD

Report and research supported by a grant from Advanced Bionics.  
The report is the work of the authors.



IFOS WORLD COURSE ON HEARING REHABILITATION

## Intervention

- Rehabilitation
- Hearing Systems & ALD's
  - Hearing Aids
  - Cochlear Implants
- Professional Hearing Care



World Health  
Organization



**\$750**  
billion<sup>1</sup>  
annually

## Why do we need to invest in Hearing Care?

The cost of untreated hearing loss!

### Communication

- Spoken language
- Ability to communicate

### Education

- Increased need for assistance
- Fewer learning opportunities

### Employment

- Higher unemployment rates
- Lower wages

### Social and emotional

- Social exclusion
- Dependence and dementia

## Intervention

- Rehabilitation
- Hearing Systems & ALD's
  - Hearing Aids
  - Cochlear Implants
- Professional Hearing Care



## Communication

- Spoken language
- Ability to communicate

## Education

- Increased need for assistance
- Fewer learning opportunities

## Why do we need to invest in Hearing Care?

Communication and Education

## Otolaryngology–Head and Neck Surgery

### Quality of Life in Children with Hearing Impairment *Systematic Review and Meta-analysis*

Lauren Roland, MD, MSCI, Caroline Fischer, Kayla Tran, more...

First Published April 26, 2016 | Review Article | 

<https://doi.org/10.1177/0194599816640485>

### Conclusion:

Our analysis reveals that decreased QOL in children with HL is detected in distinct domains of the PedsQL. These domains “school activities and social interactions” are especially important for development and learning.

## Intervention

- Rehabilitation
- Hearing Systems & ALD's
  - Hearing Aids
  - Cochlear Implants
- Professional Hearing Care



## Why do we need to invest in Hearing Care?

### Employment

*The Laryngoscope*  
Lippincott Williams & Wilkins, Inc., Philadelphia  
© 2000 The American Laryngological,  
Rhinological and Otolological Society, Inc.

SPECIAL COMMUNICATION

## Employment

- Higher unemployment rates
- Lower wages

## Redefining the Survival of the Fittest: Communication Disorders in the 21st Century

Robert J. Ruben, MD, FACS, FAAP

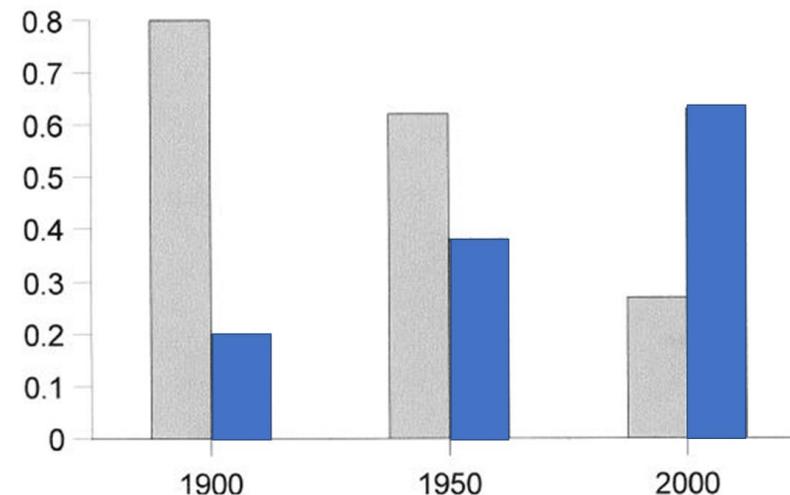


Fig. 1. Change in occupations in the United States from 1900 to 2000. Light grey bars indicate manual labor jobs, blue bars indicate communication jobs.

People with untreated Hearing Loss have a significant disadvantage in communication jobs!

## Intervention

- Rehabilitation
- Hearing Systems & ALD's
  - Hearing Aids
  - Cochlear Implants
- Professional Hearing Care



## Employment

- Higher unemployment rates
- Lower wages

People with untreated Hearing Loss experience significantly more listening effort ... this increases the risk of “burnout” in communication jobs

## Why do we need to invest in Hearing Care?

### Employment

AJA

Research Article

## Relation Between Listening Effort and Speech Intelligibility in Noise

Melanie Krueger,<sup>a</sup> Michael Schulte,<sup>a</sup> Melanie A. Zokoll,<sup>a</sup> Kirsten C. Wagener,<sup>a</sup> Markus Meis,<sup>a</sup> Thomas Brand,<sup>b</sup> and Inga Holube<sup>c</sup>

Hearing Research 351 (2017) 68–79



Contents lists available at ScienceDirect

Hearing Research

journal homepage: [www.elsevier.com/locate/heares](http://www.elsevier.com/locate/heares)



Research Paper

Impact of stimulus-related factors and hearing impairment on listening effort as indicated by pupil dilation



Barbara Ohlenforst<sup>a, d, \*</sup>, Adriana A. Zekveld<sup>a, b, c</sup>, Thomas Lunner<sup>c, d, e</sup>, Dorothea Wendt<sup>d, f</sup>, Graham Naylor<sup>g</sup>, Yang Wang<sup>a, d</sup>, Niek J. Versfeld<sup>a</sup>, Sophia E. Kramer<sup>a</sup>



## Intervention

- Rehabilitation
- Hearing Systems & ALD's
  - Hearing Aids
  - Cochlear Implants
- Professional Hearing Care



## Why do we need to invest in Hearing Care?

### Employment

## Employment

- Higher unemployment rates
- Lower wages

**ACTION ON  
HEARING  
LOSS**

### **HIDDEN DISADVANTAGE**

Why people with hearing loss are still losing out at work

By Laura Arrowsmith

36% of the people who retired early in the UK, did so because of their hearing loss!

## Hearing Loss in the Workplace

- 3.7m working age people with hearing loss in the UK.
- 4,000 member responses and 27 in depth case studies.
- Less than half people told their colleagues, only 37% told their employer.
- 14% changed jobs as a result of their hearing loss.
- 36% who retired early did so directly because of their hearing loss.

**ACTION ON  
HEARING  
LOSS**

A national charity since 1911

A research report  
into hearing loss  
in the workplace  
By Laura Matthews

**ACTION ON  
HEARING  
LOSS**

**UNLIMITED  
POTENTIAL?**

## Intervention

- Rehabilitation
- Hearing Systems & ALD's
  - Hearing Aids
  - Cochlear Implants
- Professional Hearing Care



## Social and emotional

- Social exclusion
- Dependence and dementia



Hearing Loss is the modifiable risk factor for Dementia with the highest impact!

Hearing Care  
= Prevention

## Why do we need to invest in Hearing Care?

### Dependence and dementia

www.thelancet.com Published online July 20, 2017 [http://dx.doi.org/10.1016/S0140-6736\(17\)31363-6](http://dx.doi.org/10.1016/S0140-6736(17)31363-6)

## Dementia prevention, intervention, and care

Gill Livingston, Andrew Sommerlad, Vasiliki Orgeta, Sergi G Costafreda, Jonathan Huntley, David Ames, Clive Ballard, Sube Banerjee, Alistair Burns, Jiska Cohen-Mansfield, Claudia Cooper, Nick Fox, Laura N Gitlin, Robert Howard, Helen C Kales, Eric B Larson, Karen Ritchie, Kenneth Rockwood, Elizabeth L Sampson, Quincy Samus, Lon S Schneider, Geir Selbæk, Linda Teri, Naaheed Mukadam

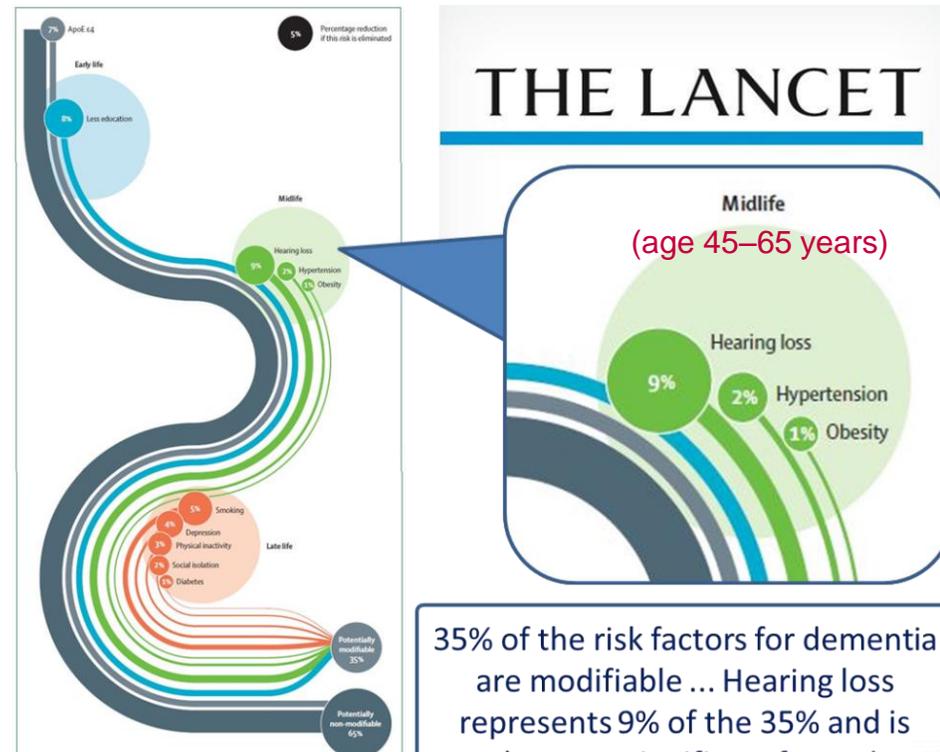


Figure 4: Life course model of contribution of modifiable risk factors to dementia. Numbers are rounded to nearest integer. Figure shows potentially modifiable or non-modifiable risk factors.

35% of the risk factors for dementia are modifiable ... Hearing loss represents 9% of the 35% and is the most significant factor!

## Intervention

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- Hearing Systems & ALD's
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- Professional Hearing Care



## Social and emotional

- Social exclusion
- Dependence and dementia

Cognition is significantly poorer for subjects with hearing loss

## Why do we need to invest in Hearing Care?

### Dependence and dementia

### Self-Reported Hearing Loss, Hearing Aids, and Cognitive Decline in Elderly Adults: A 25-Year Study

*Hélène Amieva, PhD, Camille Ouvrard, MSc, Caroline Giulioli, MSc, Céline Meillon, MSc, Laetitia Rullier, PhD, and Jean-François Dartigues, MD, PhD*



JAGS 63:2099–2104, 2015

Hearing

$p = 0,01^{**}$

Cognition

This team follows a cohort of 3777 subjects in Bordeaux for 25 years (they started in 1989 and will end in 2015). Every two years they run a full evaluation done by a psychologist.

- **Cognition (MMS & other) significantly poorer for subjects with hearing loss** ( $p < 0,01$  – adjusted for age, gender and educational level)

## Intervention

- Rehabilitation
- Hearing Systems & ALD's
  - Hearing Aids
  - Cochlear Implants
- Professional Hearing Care



## Social and emotional

- Social exclusion
- Dependence and dementia

Hearing Impaired Hearing Aid Users did not present Cognitive Decline ( $p=0,08$ )

## Why do we need to invest in Hearing Care?

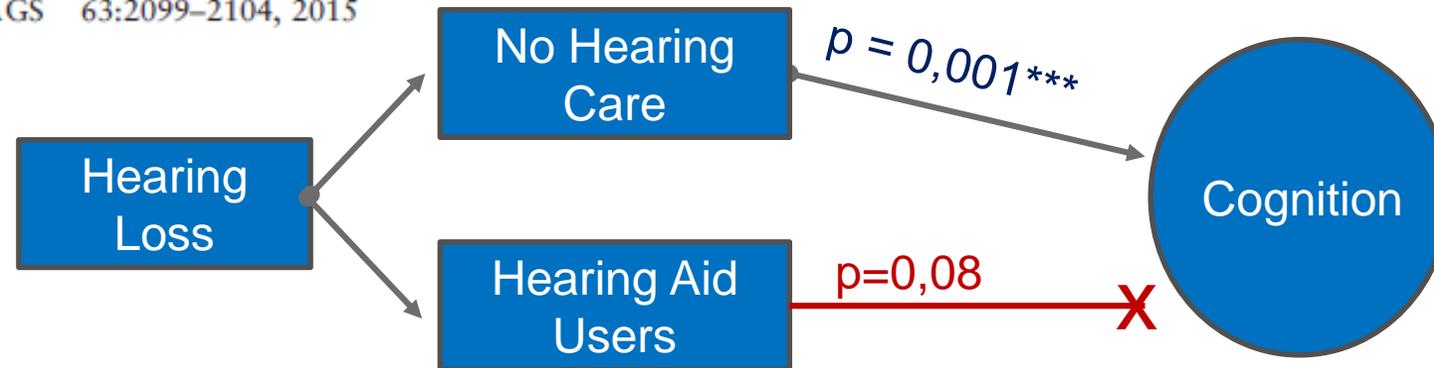
### Dependence and dementia

### Self-Reported Hearing Loss, Hearing Aids, and Cognitive Decline in Elderly Adults: A 25-Year Study

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JAGS 63:2099–2104, 2015



- They also find a long term positive effect of hearing aids – For the hearing impaired subjects not using hearing aids there was a clear Cognitive Decline ( $p < 0,001$ ) and **Hearing Impaired Hearing Aid Users did not present Cognitive Decline** ( $p=0,08$ )

## Intervention

- Rehabilitation
- Hearing Systems & ALD's
  - Hearing Aids
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- Professional Hearing Care



## Social and emotional

- Social exclusion
- Dependence and dementia

IADL scale : *phone, shopping, housekeeping, meals, laundry, domestic finances, transports, medication*

IADL Independence significantly lower for subjects with hearing loss

## Why do we need to invest in Hearing Care?

### Dependence and dementia



THE GERONTOLOGICAL SOCIETY OF AMERICA\*

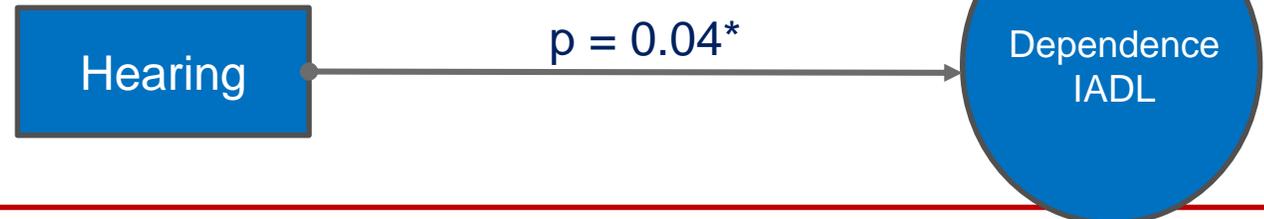
Journals of Gerontology: Medical Sciences  
cite as: J Gerontol A Biol Sci Med Sci, 2018, Vol. 00, No. 00, 1-7  
doi:10.1093/gerona/gbx250  
Advance Access publication January 03, 2018



Research Article

### Death, Depression, Disability, and Dementia Associated With Self-reported Hearing Problems: A 25-Year Study

Hélène Amieva, PhD, Camille Ouvrard, PhD, Céline Meillon, MSc, Laetitia Rullier, PhD, and Jean-François Dartigues, MD, PhD



This team follows a cohort of 3777 subjects in Bordeaux for 25 years (they started in 1989 and will end in 2015. Every two years they run a full evaluation done by a psychologist. b

- **IADL Independence significantly lower for subjects with hearing loss** (p 0,01 – adjusted for age, gender and educational level)

Lawton Instrumental Activities of Daily Living (IADL) Scale

## Intervention

- Rehabilitation
- Hearing Systems & ALD's
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- Professional Hearing Care



## Social and emotional

- Social exclusion
- Dependence and dementia

IADL scale : *phone, shopping, housekeeping, meals, laundry, domestic finances, transports, medication*

Hearing Impaired Hearing Aid Users did not present decreased IADL (Independence)

## Why do we need to invest in Hearing Care?

### Dependence and dementia



THE GERONTOLOGICAL SOCIETY OF AMERICA\*

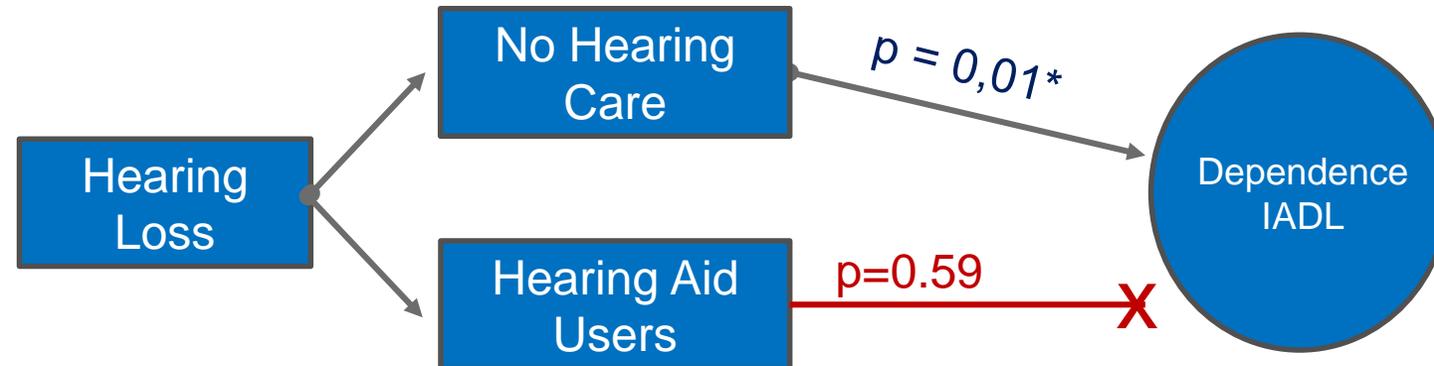
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- They also find a long term positive effect of hearing aids – For the hearing impaired subjects not using hearing aids there was a clear decrease of IADL Independence ( $p < 0,001$ ) and **Hearing Impaired Hearing Aid Users did not present decreased IADL** ( $p=0,59$ )

Lawton Instrumental Activities of Daily Living (IADL) Scale

## Intervention

- Rehabilitation
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  - Hearing Aids
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## Why do we need to invest in Hearing Care?

### Cost-effectiveness of interventions

Global costs of unaddressed hearing loss  
and cost-effectiveness of interventions

A WHO  
Report,  
2017

Use of hearing aids is shown to be cost-effective, especially use is continuous and accompanied by audiological rehabilitation.  
(WHO report – 2017)



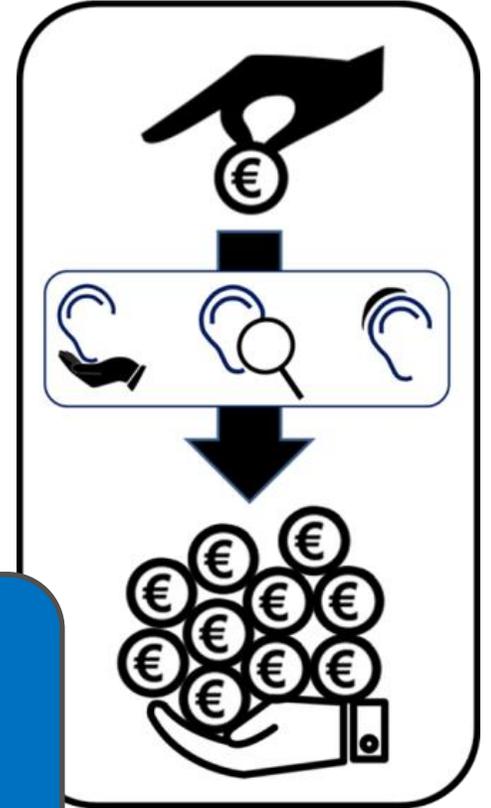
World Health  
Organization

Cochlear implants are shown to be most cost-effective when fitted unilaterally and at an early age.  
(WHO report – 2017)

Interventions in Hearing Care  
(Hearing Aids & Cochlear Implants) have a return on investment of 10 to 1  
(L. Hartmann – 2017)

### SOCIO-ECONOMIC ASPECTS OF HEARING CARE

Laurence Hartmann, Health Economist  
Conservatoire national des arts et métiers Paris



## Intervention

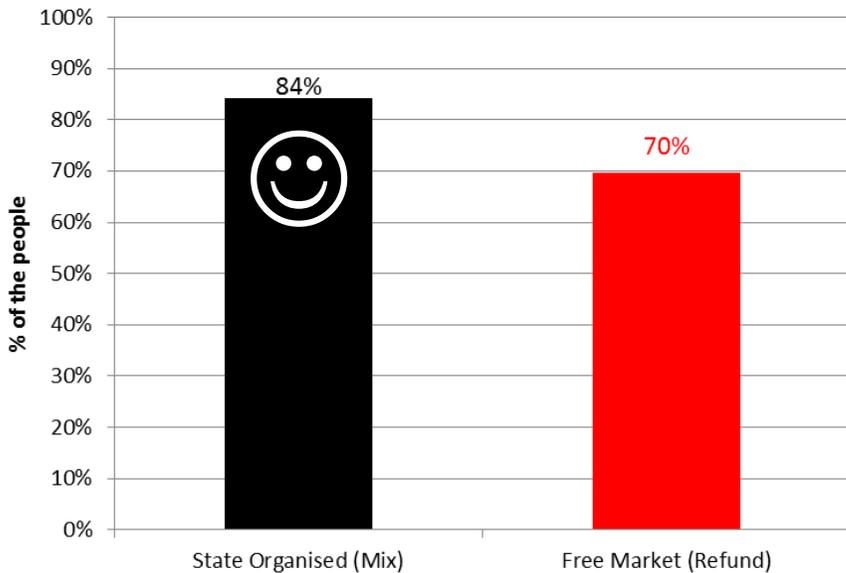
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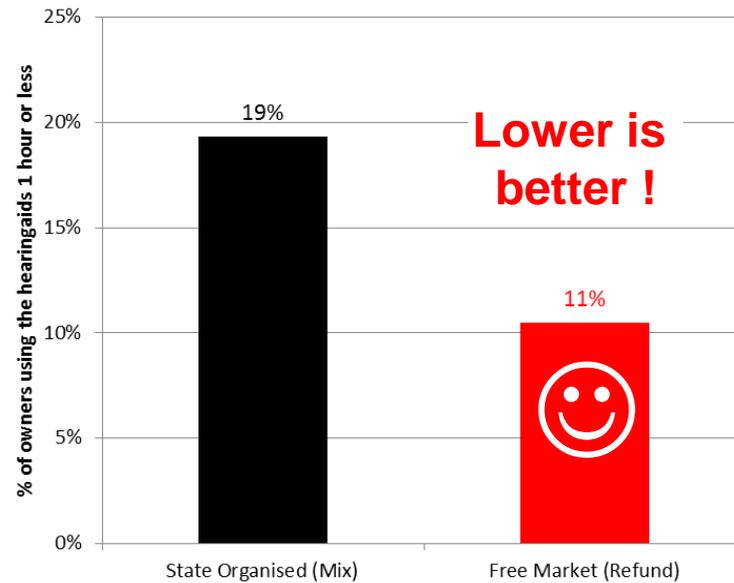
## State Organised versus Free Market Hearing Care?

State Organised (Mix): Denmark – UK – Sweden – Norway  
Free Market (Refund): France – Switzerland – Germany - Italy

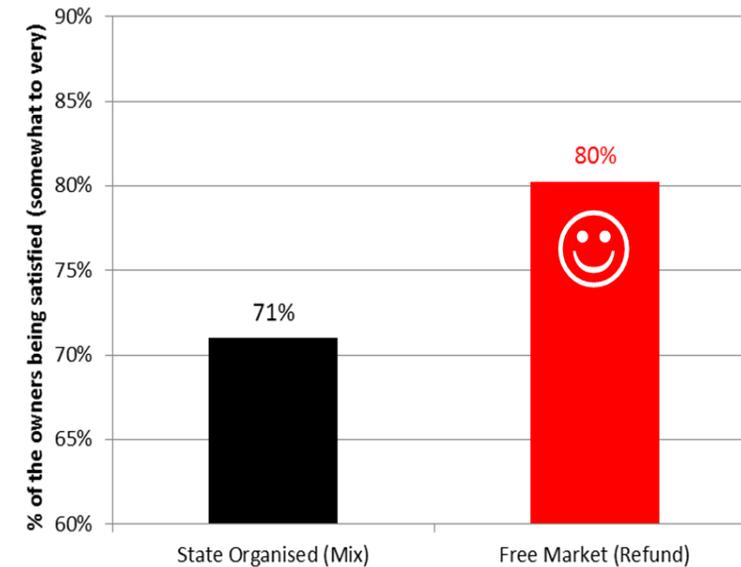
### HI Uptake Hearing Care Recommended



### Hearing Aid Use 1h or less



### Hearing Care Satisfaction



**State Organised Systems lead to more people having hearing aids**

**Free Market Systems lead to more active use of hearing aids**

**Free Market Systems lead to higher satisfaction with hearing care**

## Intervention

- Rehabilitation
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  - Hearing Aids
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- Professional Hearing Care



## State Organised versus Free Market Hearing Care?

State Organised (Mix): Denmark – UK – Sweden – Norway  
 Free Market (Refund): France – Switzerland – Germany - Italy

Getting our numbers right on hearing loss

Published on Tuesday, 28 February 2017 13:52

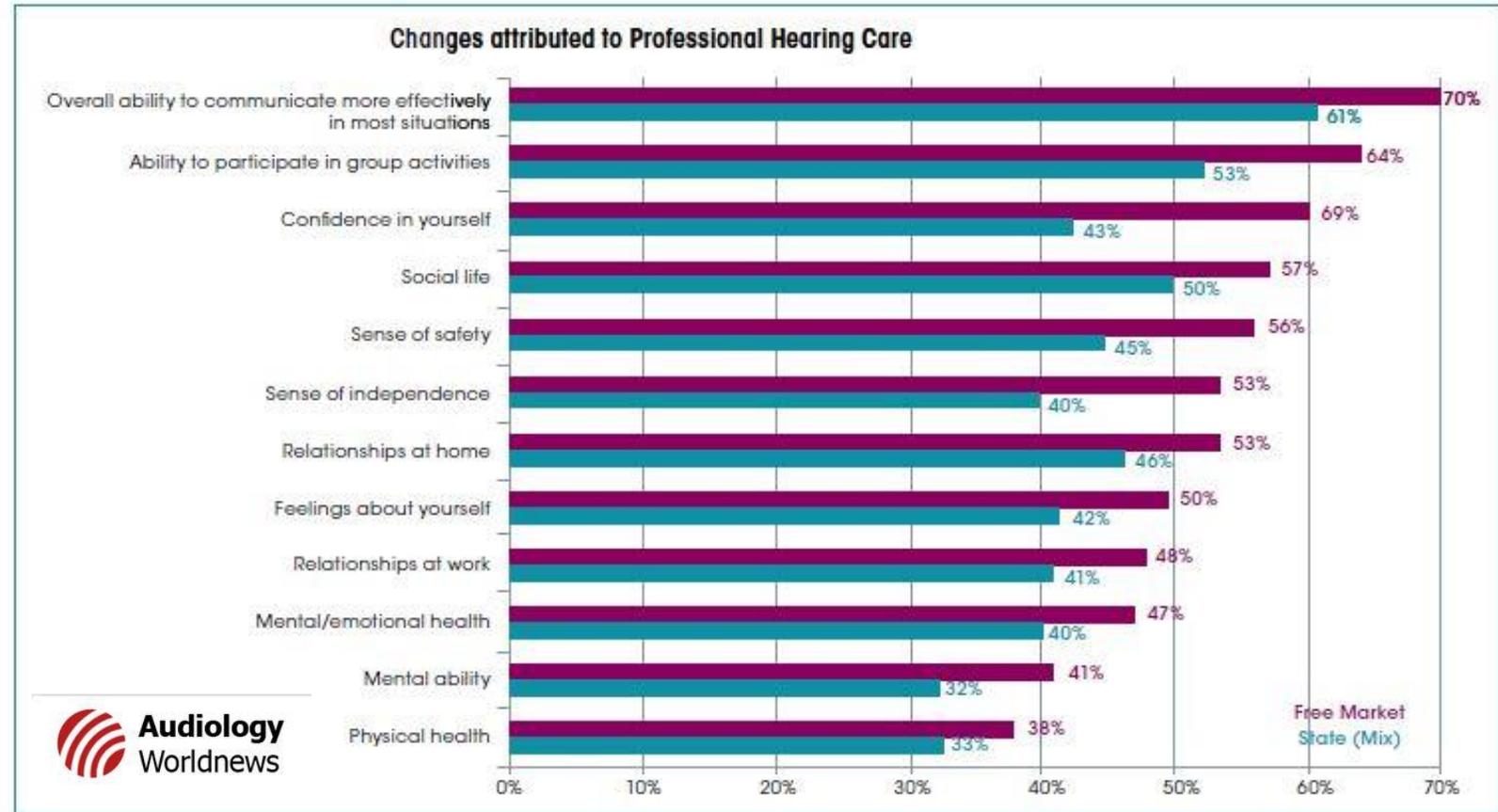
Involvement of the user  
 Freedom of choice  
 Selection to cover real needs

Easy Access to Quality Hearing Care  
 Avoid long waiting lists  
 Continued Quality Service

Take the time and listen to the user  
 Counselling and empathy  
 Combine psychology & technology



Source of basic data:  
 EuroTrak 2012 - 2018



▲ Fig5: The percentage of people indicating better or significantly better results for all the aspects mentioned attributed to the use of hearing aids (professional hearing care) – Source of basic data: EHIMA-Anovum EuroTrak

## Prevention

- Avoid Noise
- Promote safe listening
- Protect your ears
- Prevent and treat ear infections ...



- A lot of standards and laws are in place or in development
- But we need to change behaviour !
- Basis for the Safe Listening WHO action
- All hearing care professionals need to be promoters

## Awareness

- Hearing Screening
  - National paediatric screening
  - School children screening
  - Adult screening (from 50 years onwards)
- Information Campaigns



- Paediatric Screening needs to get the highest priority
- School screening can also be organised as self-test
- Adults screening is the new challenge ... also here self-test could be a very cost-effective intervention
- WHO – World Hearing Day – is a great opportunity!

## Intervention

- Rehabilitation
- Hearing Systems & ALD's
  - Hearing Aids
  - Cochlear Implants
- Professional Hearing Care



- Hearing care is cost-effective. 10 to 1 return on investment
- Education and Language development is improved
- Finding and Keeping a job is improved
- Hearing Care has to be seen as modifying a high risk factor for Dementia and Dependence