

AGE RELATED HEARING LOSS

Prof. Manuel Manrique

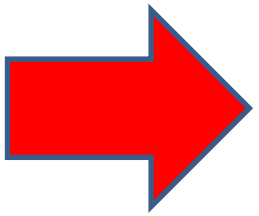
University Clinic of Navarre, Spain

Clínica Universidad de Navarra

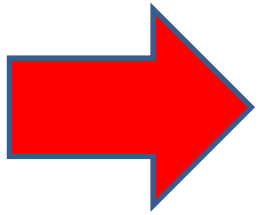
A&ExES

Universidad de Navarra

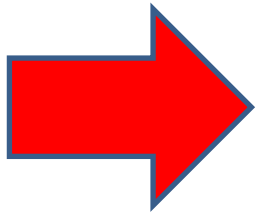
Some questions about "Hearing and Balance in Elderly Population"



Prevalence



Visibility

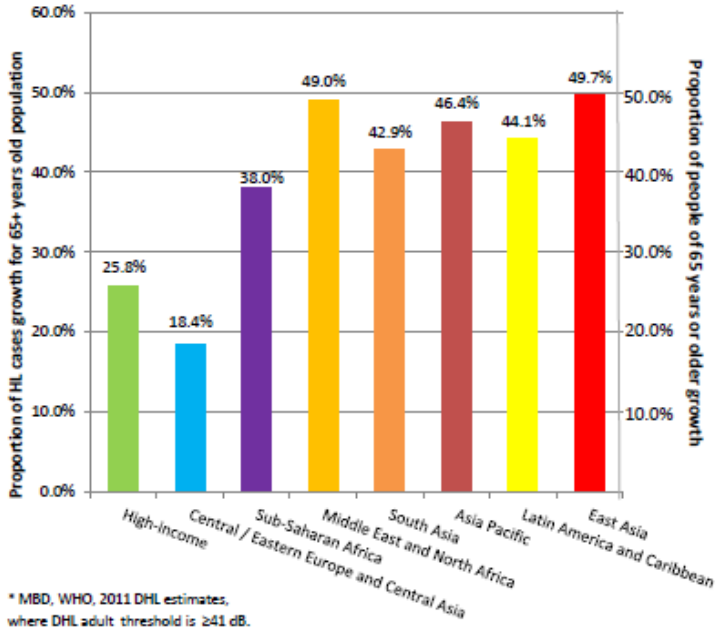


Impact

Prevalence of chronic disease in >65 years of age

Percentage increase in number of persons (65 years or older) with hearing loss from 2010-2020.*

Population of persons above 65 years old will increase from 2010-2020 in all regions with ranges going from 18.4% to 49.7%. Consequently, the number of persons with hearing loss will grow proportionately, due to population growth and ageing in all the selected regions.



*: projections for a ten year period (2010-2020) assuming no change in current prevalence rates.

1. Arthritis
2. High blood pressure
3. Hearing loss

Clínica Universidad de Navarra

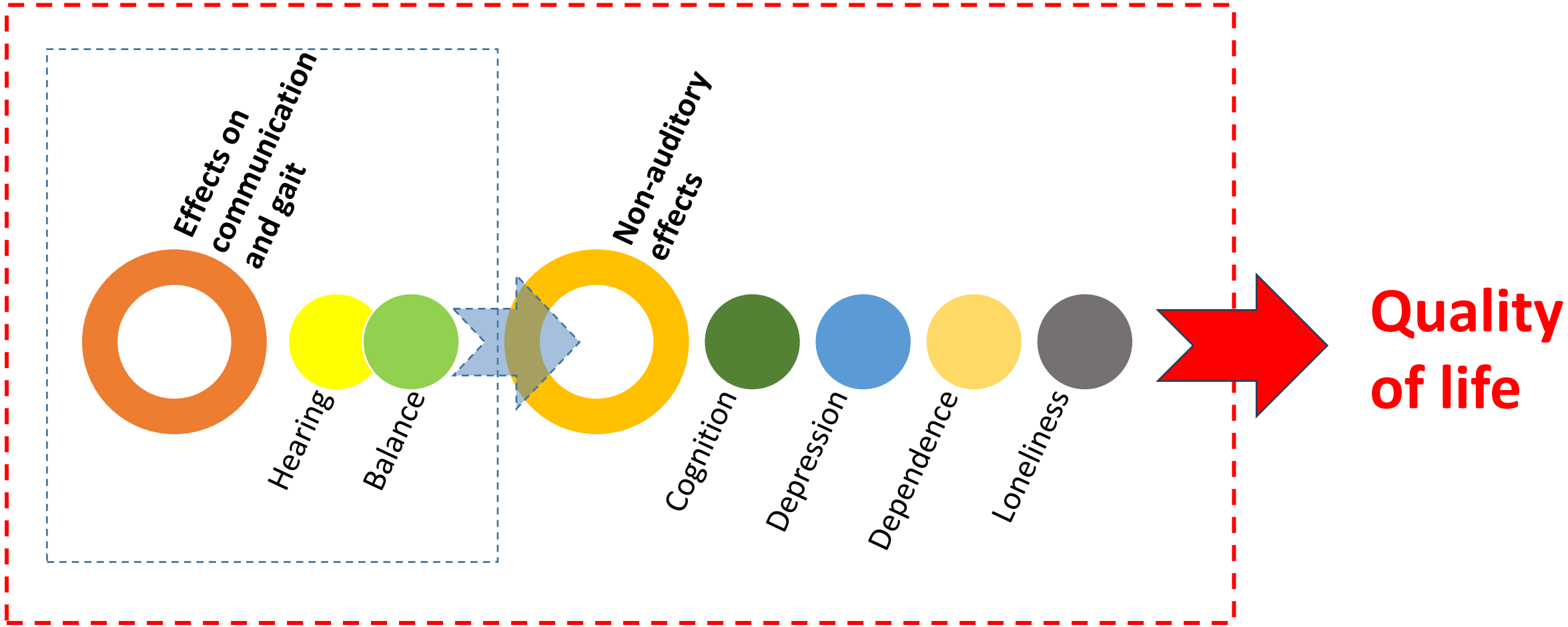
Universidad de Navarra

Prevalence | Visibility | Impact

Hearing loss: Invisible disability

Clínica Universidad de Navarra

Prevalence → Visibility → **Impact**



Clínica Universidad de Navarra

A&ExES

Universidad de Navarra

Hearing and Balance for Healthy Ageing Project

To detect and typify HL&BD

To evaluate the impact of HL&BD on the domains those have impact on overall well-being and healthy aging in the elderly

To prove the positive impact of early intervention on HL&BD among the elderly

A&ExES

Clínica Universidad de Navarra

Universidad de Navarra

Hearing and Balance in Healthy Aging Project: Characterization of Hearing, Balance, and Other Associated Disorders in Three Population Groups Aged 55 and Over. De Lima J.P., Manrique-Huarte R., Ferran S., et al. Audiol Neurotol.2024.https://doi.org/10.1159/000536531

Acknowledgment

Clínica Universidad de Navarra

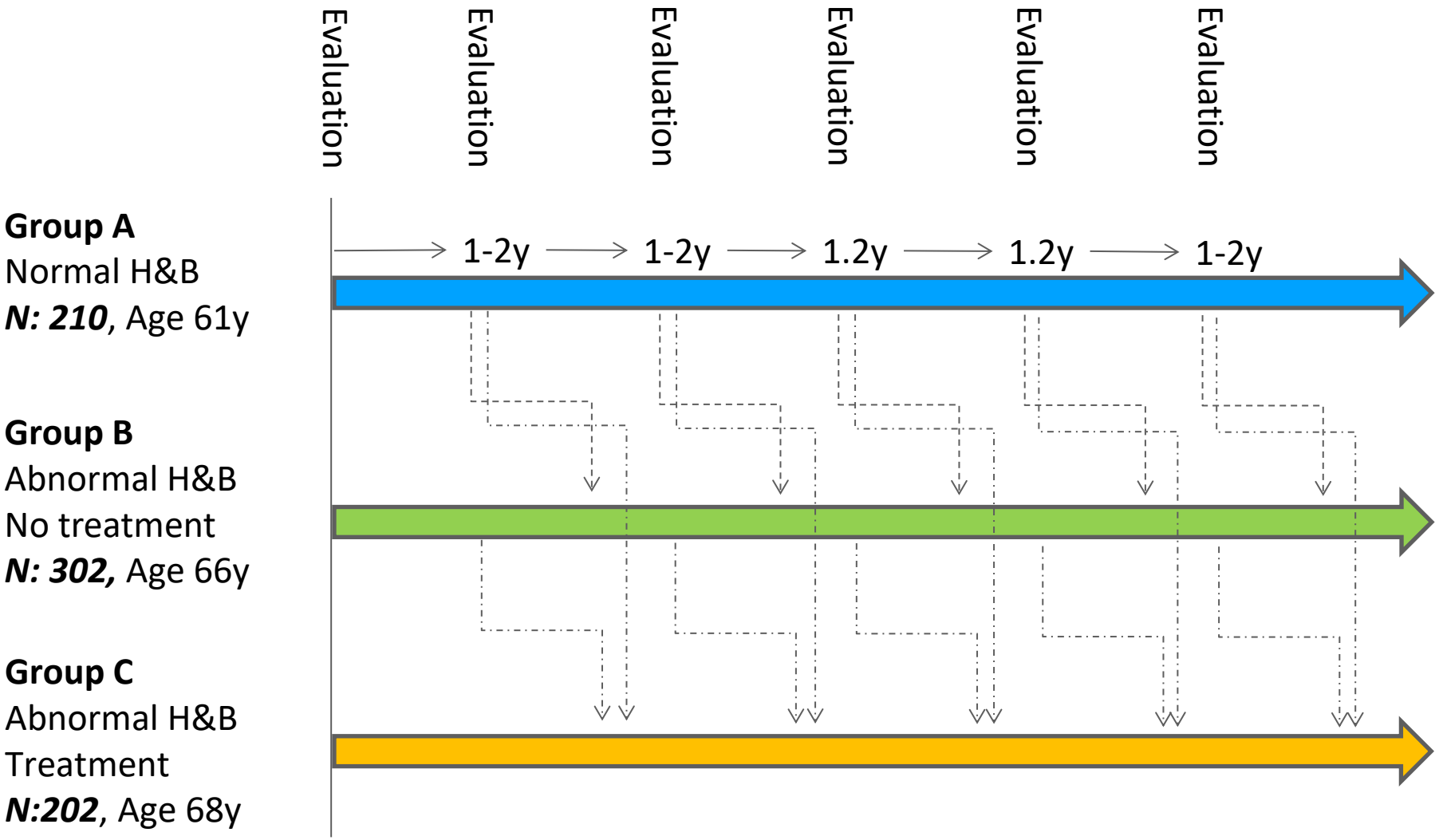
GAES-Amplifon y Cochlear AG

Clínica Universidad de Navarra

A&ExES

Universidad de Navarra

Study design A&ExES



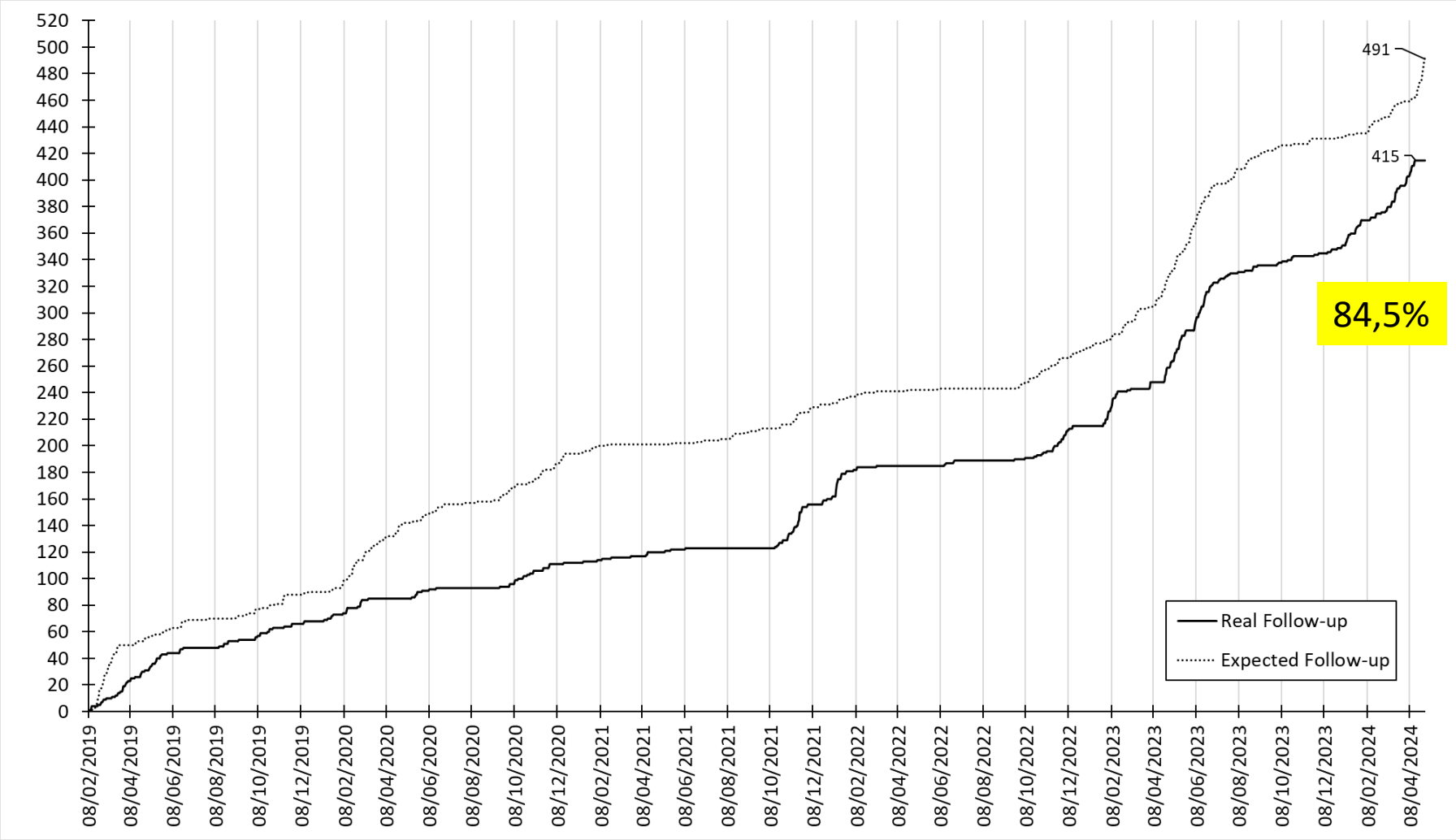
Clínica Universidad de Navarra

Universidad de Navarra

Methods

- **Hearing**
  - TA Tonal Audiometry
  - SA Speech Audiometry in quiet and noise
  - HHIE-S Shortened Hearing Handicap Inventory for de Elderly
  - Speech, Spatial and Qualities of Hearing Scale (SSQ-12)
- **Balance**
  - Time Up Go test (TUG)
  - Dizziness and Handicap Inventory (DHI)
- **Cognition**
  - Mini Mental State Examination (MMSE).
  - Digit Symbol Substitution Test (DSST)
  - Trail Making Test TMT)
- **Depression**
  - Geriatric Depression Scale (GDS-15)
- **Loneliness**
  - Long's scale
- **Dependence**
  - Instrumental Activities of Daily Living Scale (IADL)
- **Tinnitus**
  - Tinnitus Handicap Inventory (THI)
- **Nutrition-Phisical activity**
  - Mediterranean Diet Adherence Questionnaire
  - Physical Activity Level (PAL)
- **General Quality of life**
  - HUI3

Follow up (April 2024)

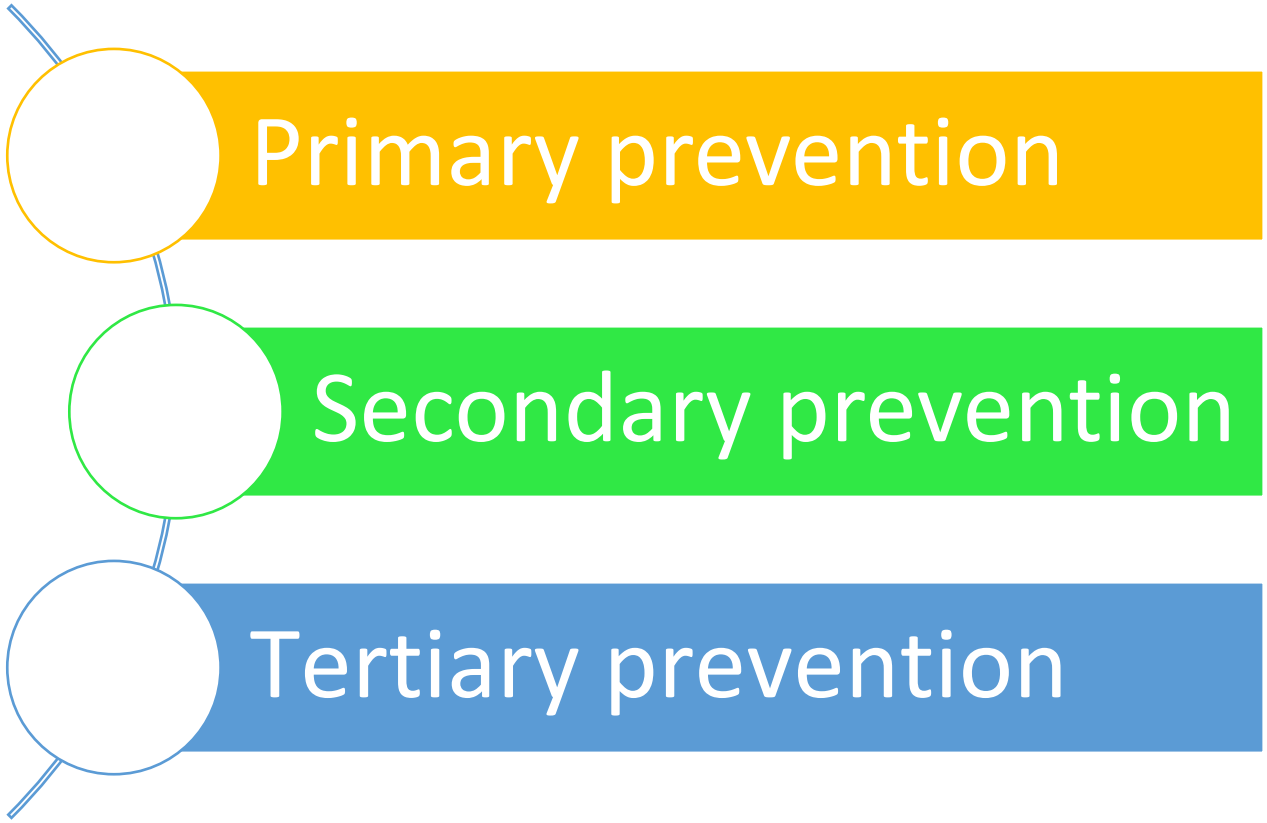


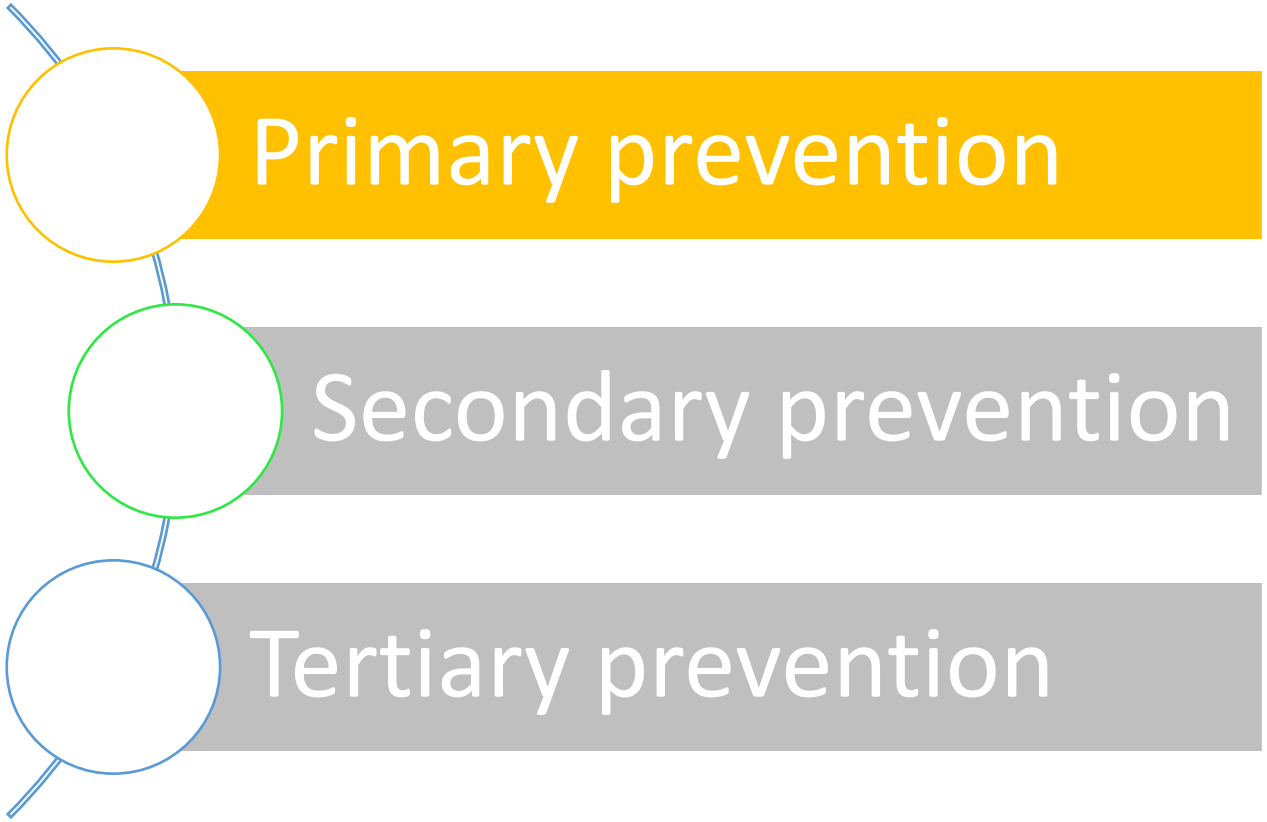
Clínica Universidad de Navarra

A&ExES

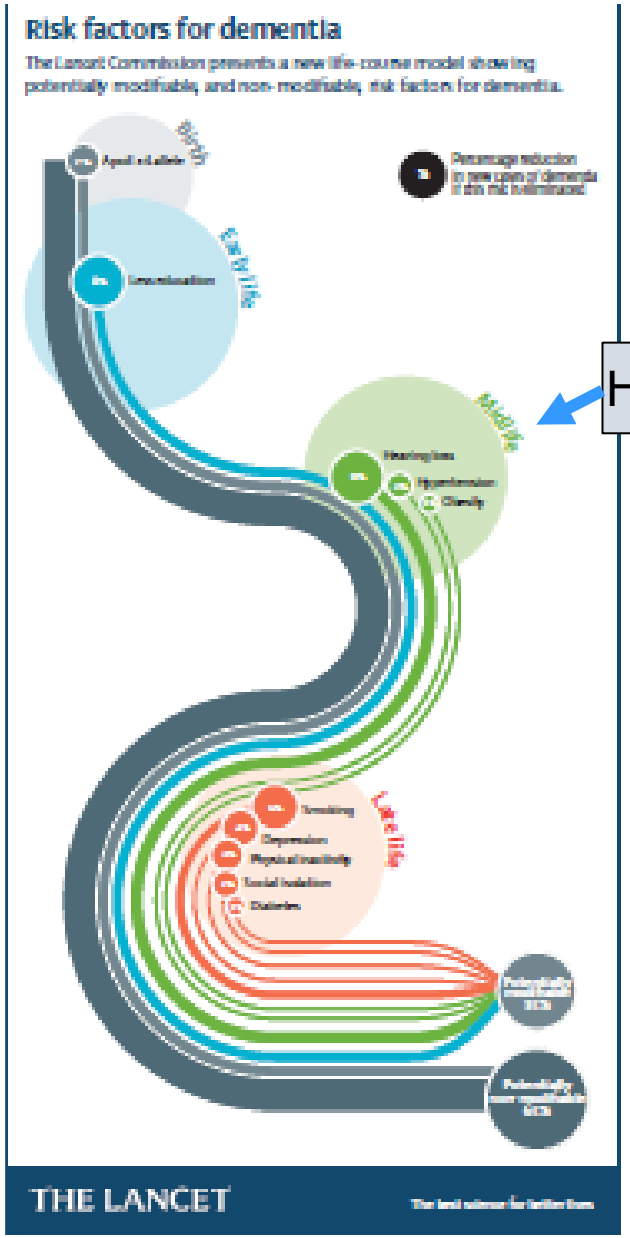
Universidad de Navarra

HEARING LOSS TREATMENT





Primary prevention is to prevent disease or injury before it ever occurs



- Modifiable risk factor carrying greatest population risk
- Reduce new dementia cases by 9.1%

Lancet Commission on Dementia, July 2017

Hearing loss

Factors influencing the onset of hearing loss: gender, age, ototoxic and noise exposure, smoking, cardiovascular disease, diabetes, inflammation, genes, obesity

Universidad de Navarra

A&ExES

Clínica Universidad de Navarra

Primary prevention

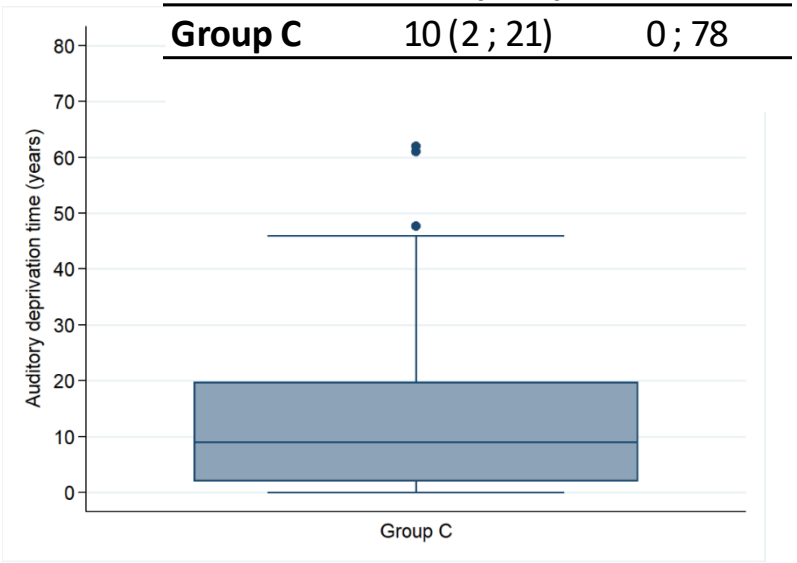
Secondary prevention

Tertiary prevention

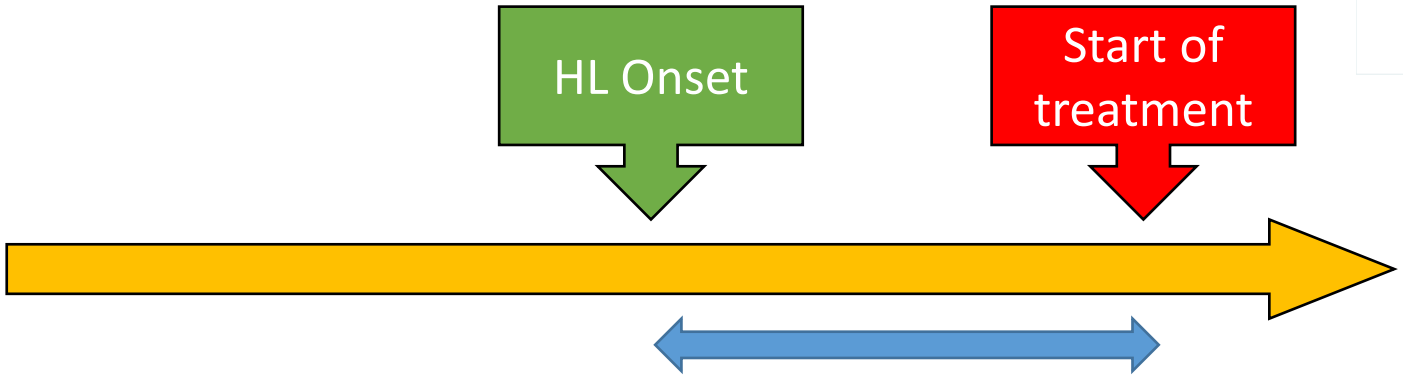
Secondary prevention is to reduce the impact of a disease or injury that has already occurred. This is done by detecting and treating disease or injury as soon as possible

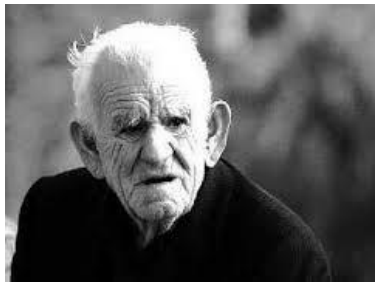
SECONDARY PREVENTION

	median (p25; p7	min ; max
Group C	10 (2 ; 21)	0 ; 78



Time to treatment





- I manage
- My friends abandoned the hearing aids
- CI? I'm older
- I don't want stigmas
- "For what you have to hear"
- "I'll be back next year"

Clínica Universidad de Navarra

A&ExES

Universidad de Navarra

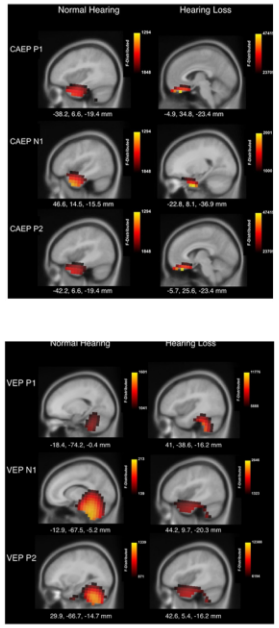
Hearing

Effects of Time to treatment

Correlation with time to treatment

	Group C
Correct disylabic words 65 dBs	
Rho	-0.003
Sig	0.980
HINT	
Rho	0.018
Sig	0.865
HUI3	
Rho	-0.051
Sig	0.619
DSST	
Rho	-0.299
Sig	0.003
TRAIL B time	
Rho	0.225
Sig	0.025

LA DEPRIVACIÓN AUDITIVA TIENE UN IMPACTO NEGATIVO EN LA COGNICION



- Hearing loss
- ↑ Listening effort (↑ Frontal cortex activity)
- Re-allocation of cortical processing in response to auditory stimuli, likely as a compensatory effect of HL
- Frontal regions are involved in the cognition and processing of complex auditory stimuli in older adults
- ↑ Cognitive load in HL listeners may provide evidence for the taxation of the reserve of cognition processes
- ↓ Cognition

J Cambell, A Sharma. Plos one , 2014

Clínica Universidad de Navarra

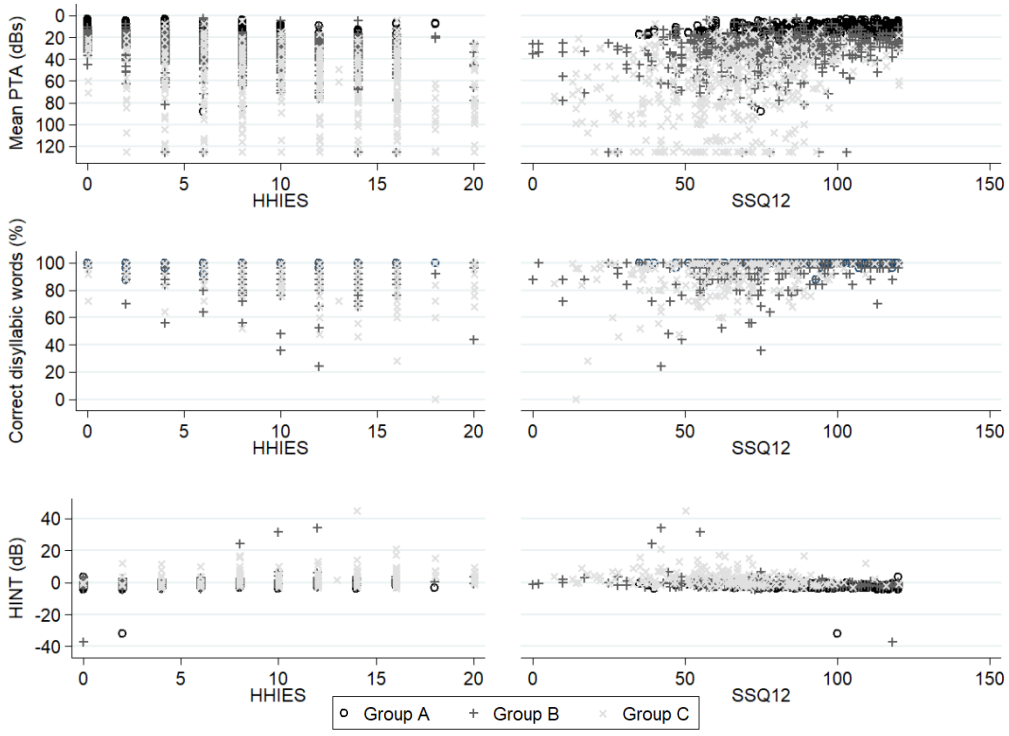
A&ExES

Universidad de Navarra

Secondary prevention

Early HL detection in elderly population

- Could the HHIE-S and SSQ-12 questionnaires be used in a hearing screening program in elderly people?
  - Correlation HHIE-S and PTA p<0.001
  - Correlation HHIE-S and SA p<0.001
  - Correlation HHIE-S and HINT p<0.001
  - Correlation SSQ12 and PTA p<0.001
  - Correlation SSQ12 and SA p<0.001
  - Correlation SSQ-12 and HINT p<0.001



Clínica Universidad de Navarra

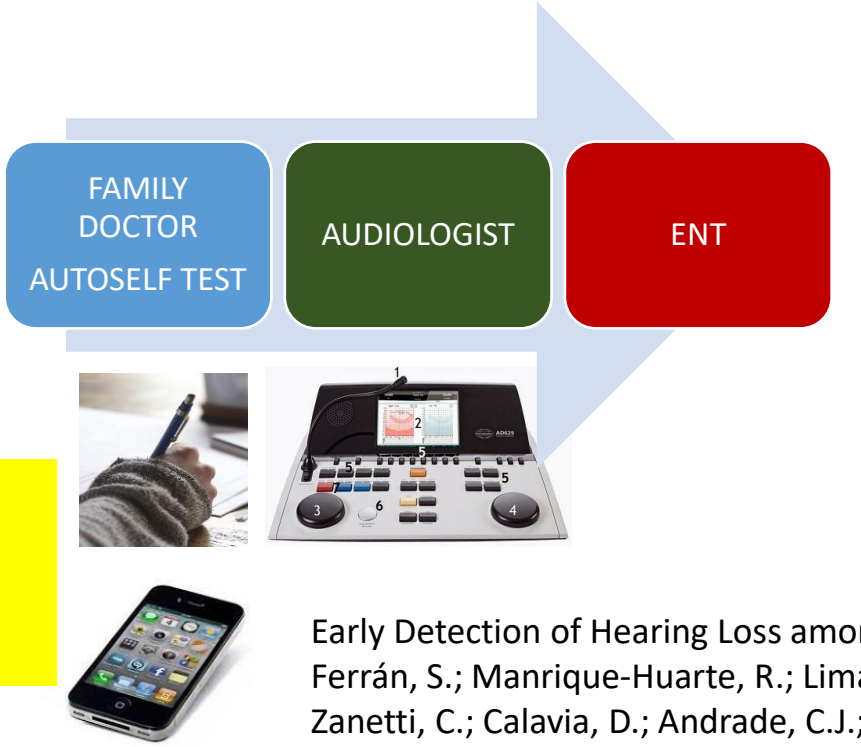
A&ExES

Universidad de Navarra

Secondary prevention

Early HL detection and early treatment in adult population

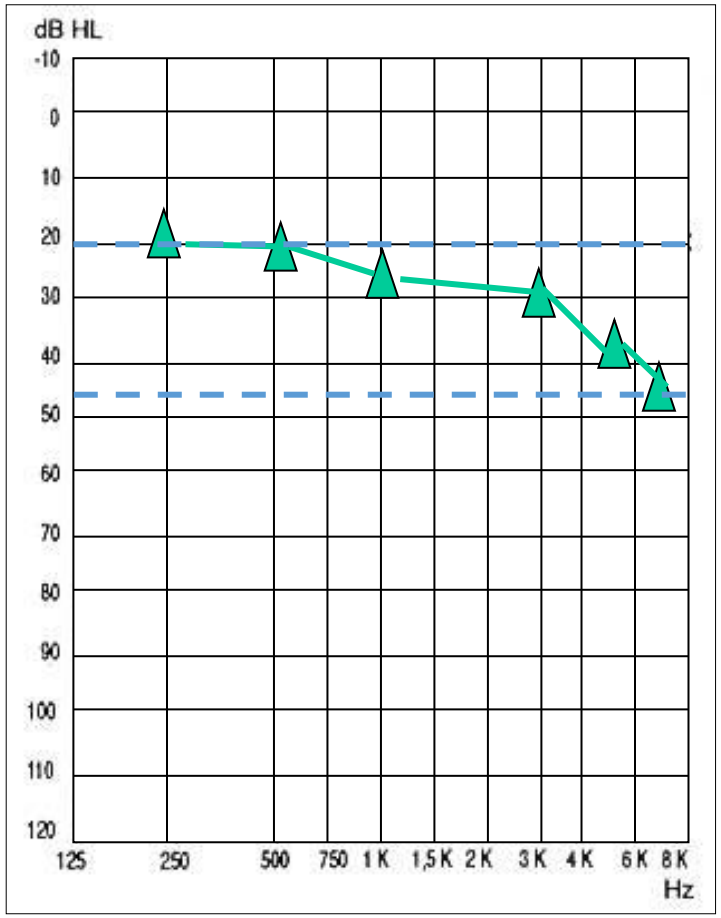
- Design of an adult hearing screening program



HHIE-S or SSQ12 or PTA 4 kHz APPS

Early Detection of Hearing Loss among the Elderly
Ferrán, S.; Manrique-Huarte, R.; Lima, J.P.; Rodríguez-Zanetti, C.; Calavia, D.; Andrade, C.J.; Terrasa, D.; Huarte, A.; Manrique, M. Life 2024.
https://doi.org/10.3390/life14040471

- Early treatment of hearing loss in adults



Clínica Universidad de Navarra

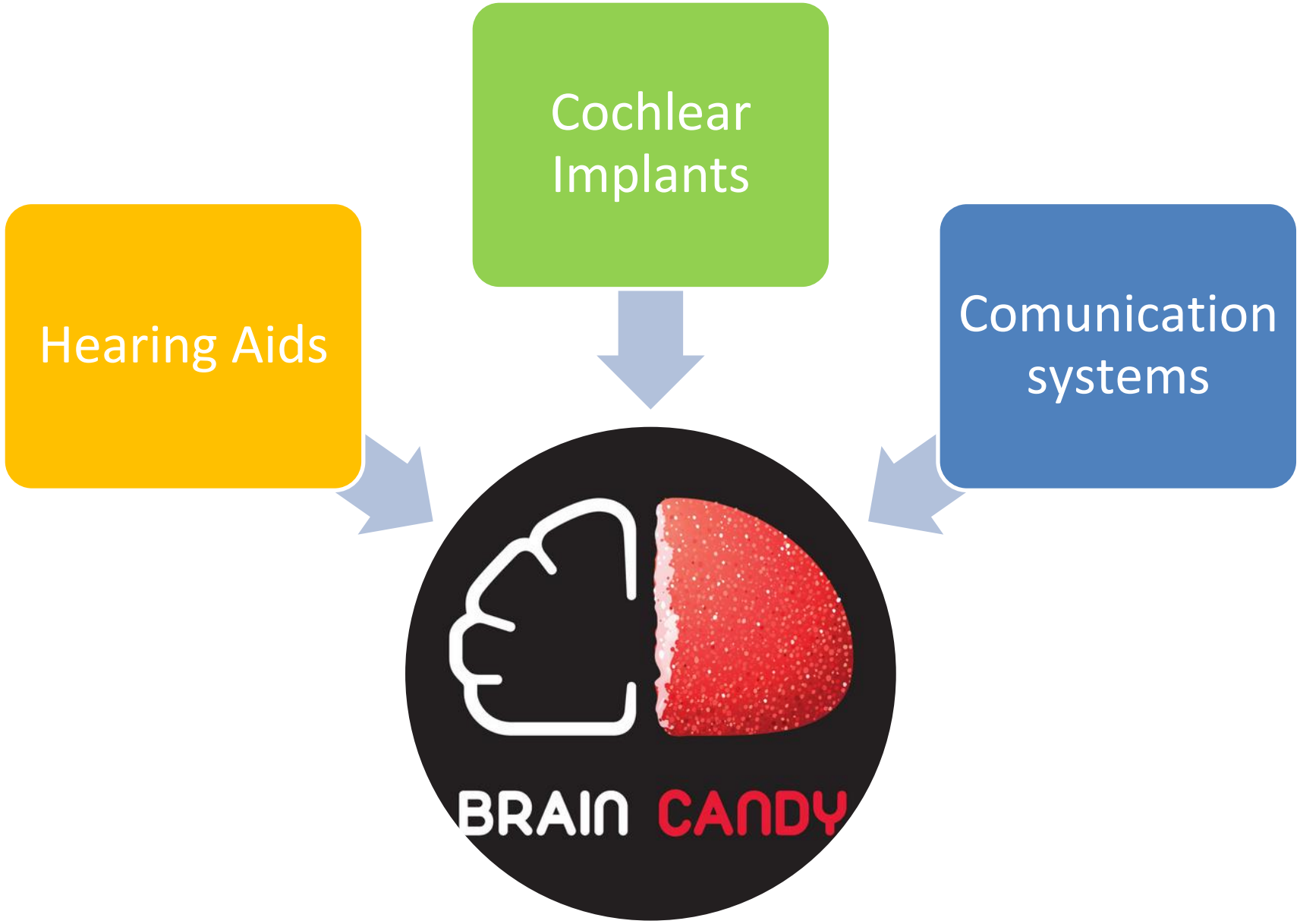
A&ExES

Primary prevention

Secondary prevention

Tertiary prevention

Tertiary prevention aims to soften the impact of an ongoing illness or injury that has lasting effects



Clínica Universidad de Navarra

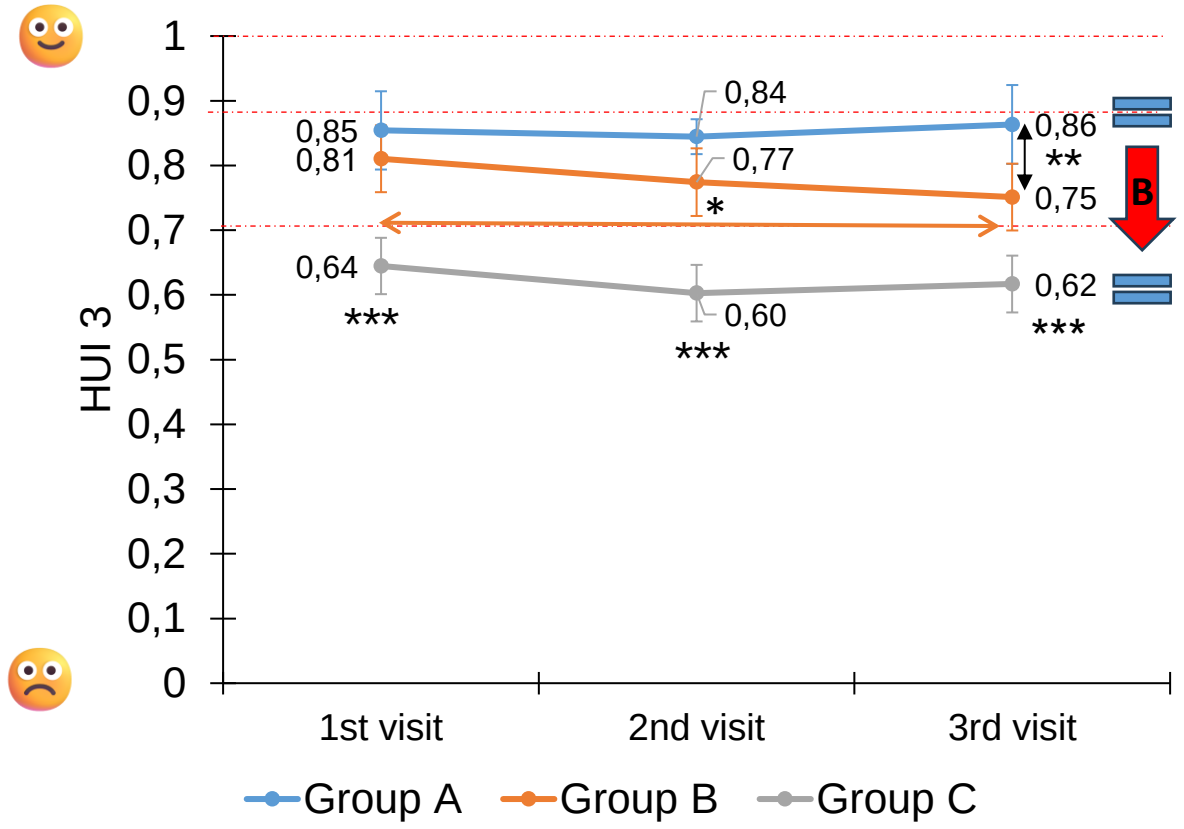
A&ExES

Universidad de Navarra

General Health Condition

Health Utility Index Mark 3*

Questionnaires



No disability	1
Mild disability	0.89-0.99
Moderate	0.70-0.88
Severe	Less 0.70

(Feng Y. et al, 2009)

Clínica Universidad de Navarra

A&ExES

Universidad de Navarra

CONCLUSIONS

Hearing and balance for healthy ageing

PRELIMINARY CONCLUSIONS

Primary prevention

- FACTORS INFLUENCING THE ONSET OF HEARING LOSS HAVE BEEN DETECTED: GENDER, AGE, EXPOSURE TO NOISE, SMOKING, CARDIOVASCULAR DISEASE, TOBACCO, DIABETES.

PRELIMINARY CONCLUSIONS

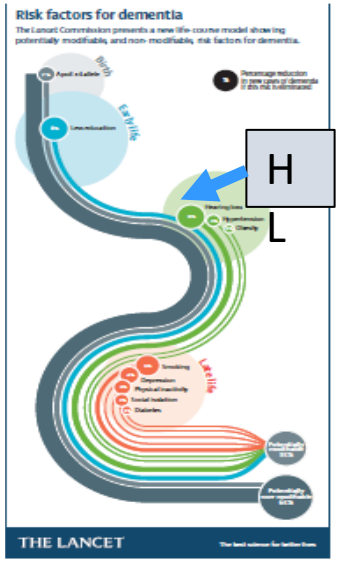
Secondary prevention

- HL IS “AN INVISIBLE DISABILITY”

- SCREENING PROGRAMS MUST BE IMPLEMENTED. WE IDENTIFIED INSTRUMENTS TO IMPLEMENT A HEARING SCREENING IN THE ELDERLY:
  - Questionnaires: HHIE and SSQ12
  - Tonal audiometry in 4 KHz

- AUDITORY DEPRIVATION HAS A NEGATIVE IMPACT ON COGNITIVE OUTCOMES.

Reduce new dementia cases by 9.1%



Clínica Universidad de Navarra

A&ExES

Universidad de Navarra

PRELIMINARY CONCLUSIONS

Tertiary prevention

Hearing and BD interventions
- Neurocognitive and QoL impact

- PATIENTS TREATED HAVE A VERY POSITIVE IMPACT ON ALL SPHERES.

- TREATMENT OF HEARING LOSS IN THE ELDERLY IMPROVES THEIR QUALITY OF LIFE

Clínica Universidad de Navarra

A&ExES

Universidad de Navarra

A&ExES

Clínica Universidad de Navarra

Thank you very much for your attention!

Universidad de Navarra