

# ICOPE PROGRAM FROM SCREENING TO INTERVENTION

---

■ Pr. B. FRAYSSE

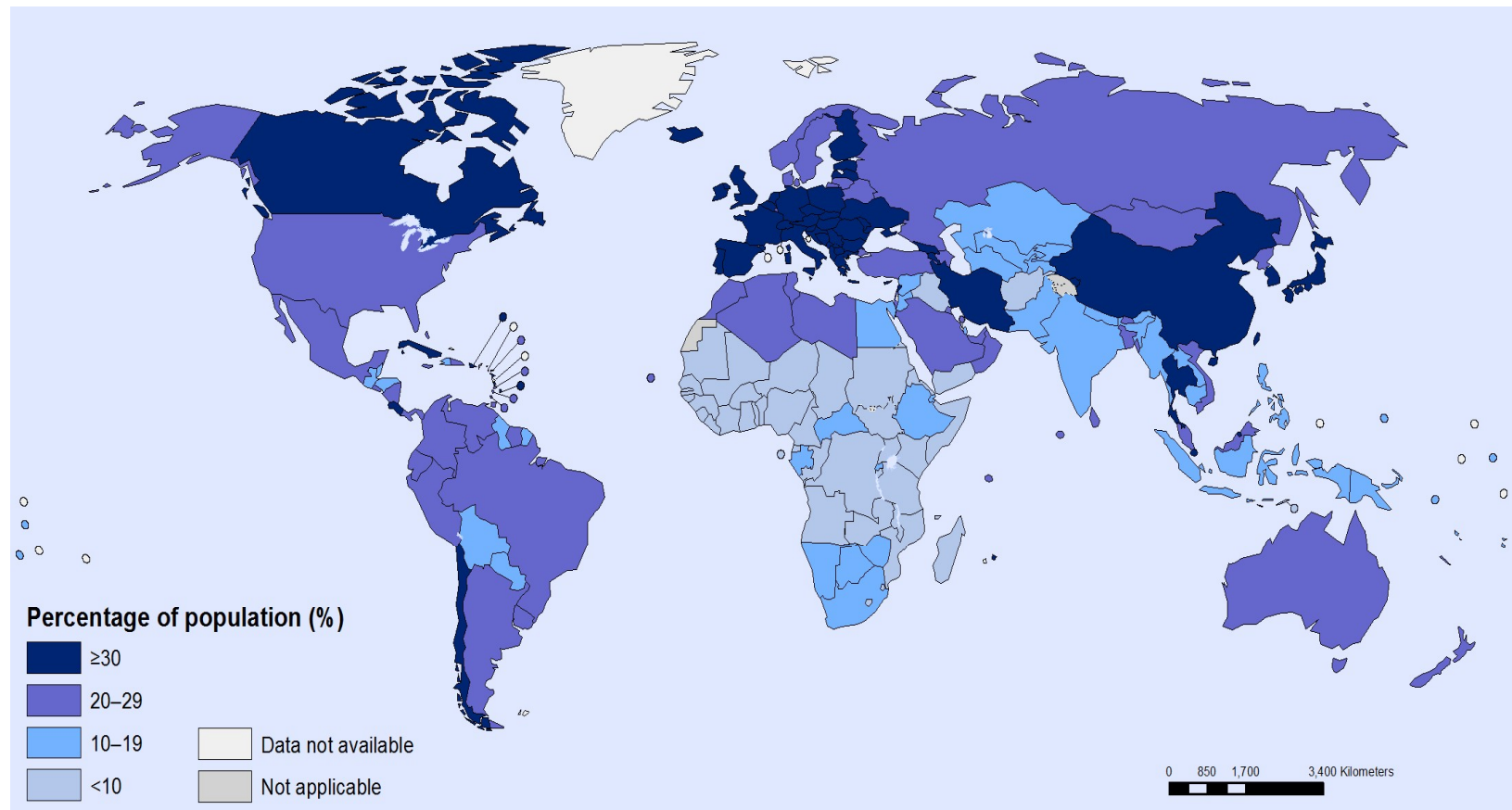


SHANGHAI

November 30<sup>th</sup> - December 4<sup>th</sup>, 2025

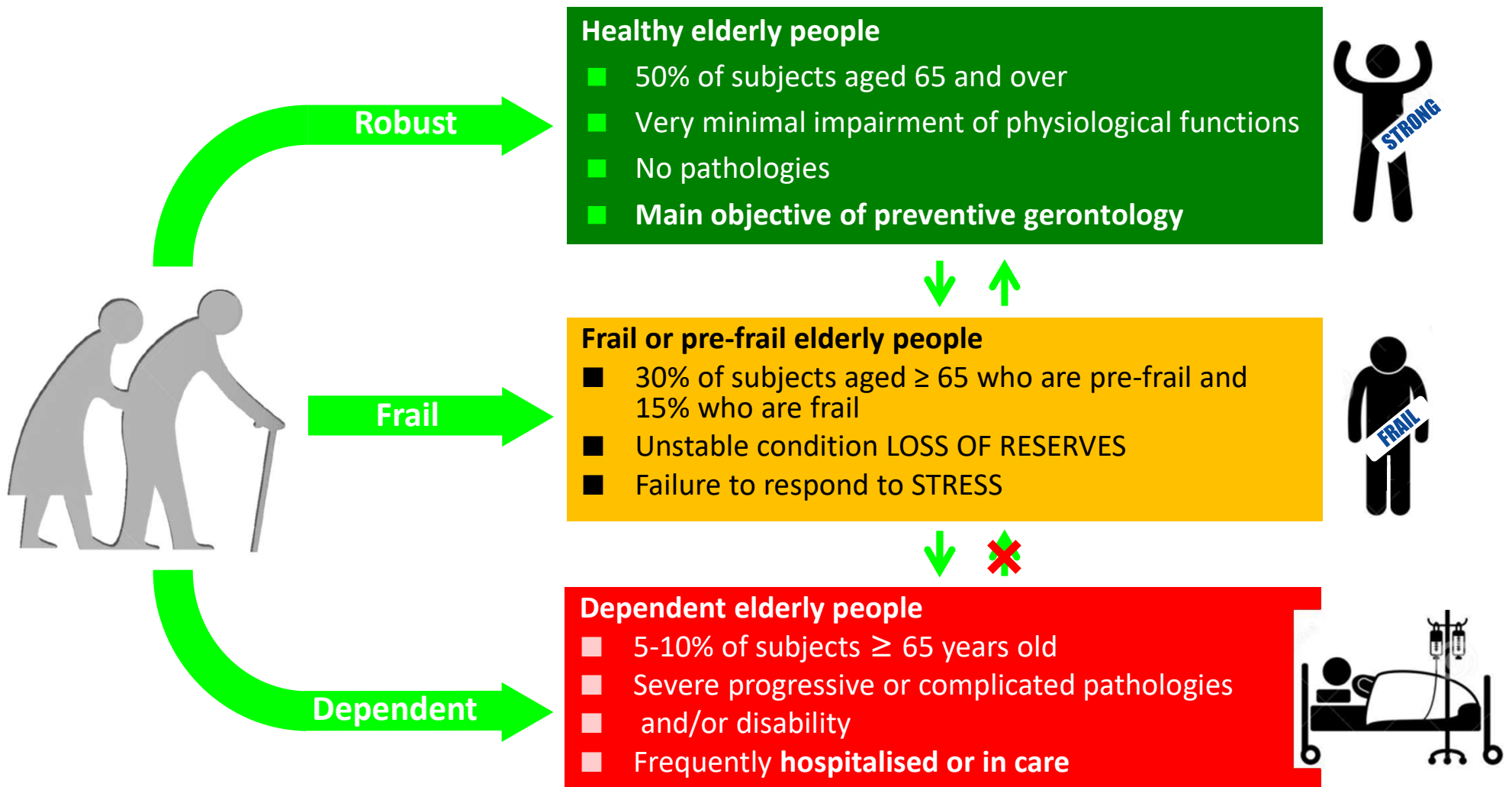
# GLOBAL DEMOGRAPHIC AGEING

## Estimated population aged 60 and over (2050)



**In 2050, 2 billion older persons aged 60 and over are expected (compared to 900 million in 2015)**

# THREE CATEGORIES OF ELDERLY PEOPLE



# DEFINITION OF FRAILITY

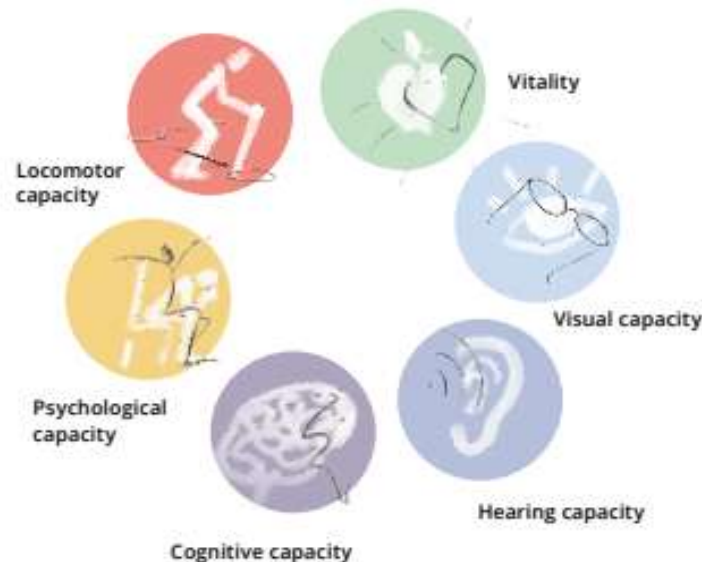
---

- Patients are considered **frail** if they meet three or more of these criteria.
- A model based on a **"physical" phenotype** according to FRIED (2001) :
  - 1 - Unintentional weight loss of more than 4.5 kg (or  $\geq 5\%$  of body weight) over the past year
  - 2 - Exhaustion felt by the patient
  - 3 - Slowed walking speed
  - 4 - Decreased muscle strength
  - 5 - Sedentary lifestyle

# W.H.O. I.C.O.P.E. (*Integrated Care for Older People*) DIGITAL PROGRAM

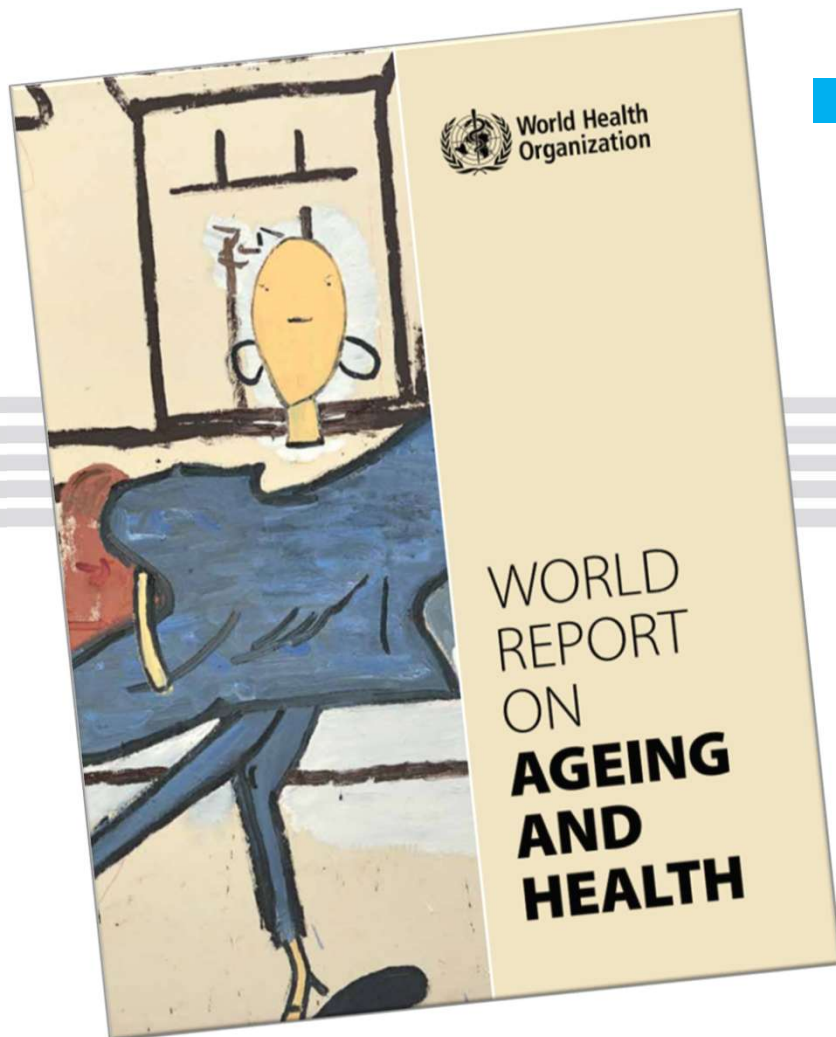
---

- Approach that emphasizes the optimization of intrinsic capacity (IC) as the key of “Healthy Aging” : **«*maintaining our functions, in order to be able to continue to do what we value*»**
- ICOPE care pathways is based on the assessment and monitoring at regular intervals of IC **six core domains**



# OBJECTIVE OF WHO

---

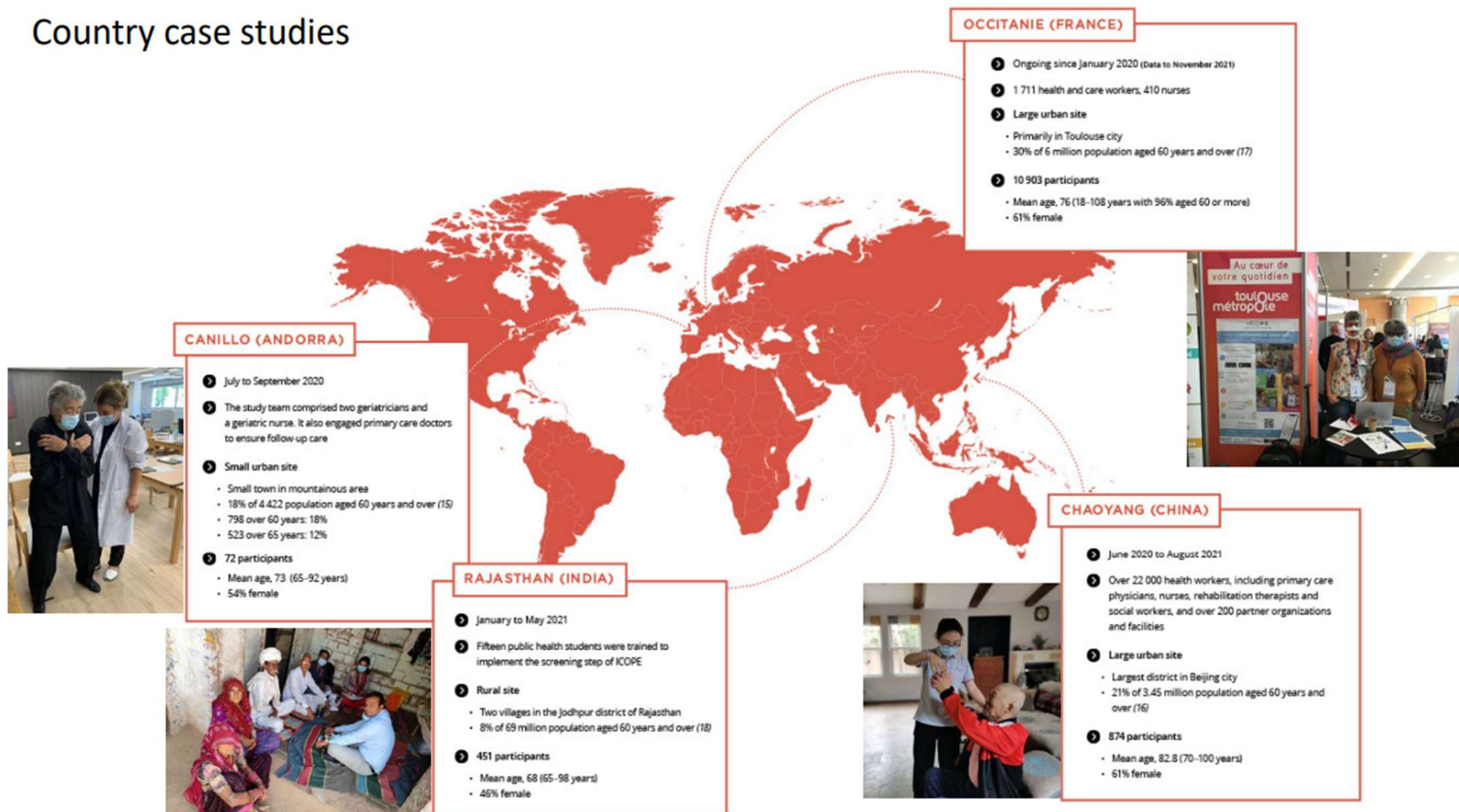


- To reduce the number of dependent subjects by 15 million by 2025



# INTERNATIONAL DEPLOYMENT 2020

## Country case studies





# TOOLS USED TO FACILITATE THE IMPLEMENTATION OF THE ICOPE PROGRAM

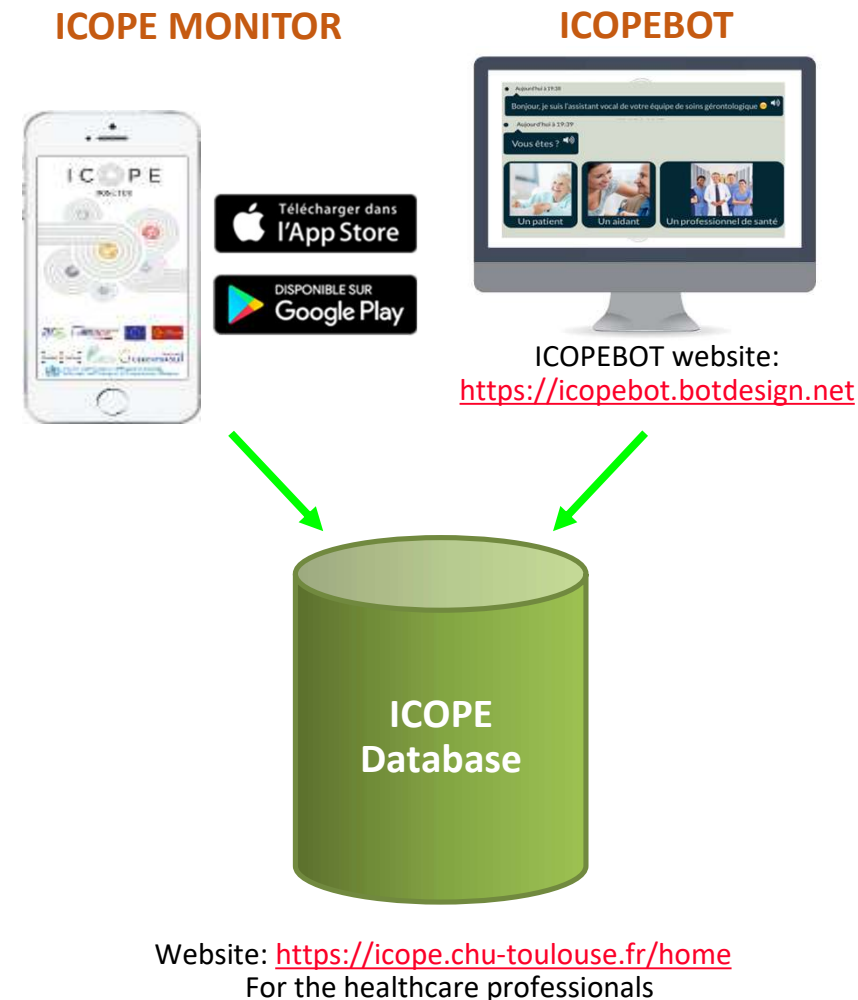
## ■ Two digital tools to perform Step1

- ICOPE MONITOR App: on smartphone or tablet
- Conversational robot ICOPEBOT: on computer, smartphone or tablet (<https://icopebot.botdesign.net>)

*These two tools can be used in professional mode and in self-assessment mode by the senior or the caregiver*

## ■ ICOPE Database

- Collection of all the data entered in the two digital tools Step1 (<https://icope.chu-toulouse.fr/home>)
- Accessible by healthcare professionals
- Allows patient follow-up



# 5 STEPS OF THE ICOPE PROGRAM

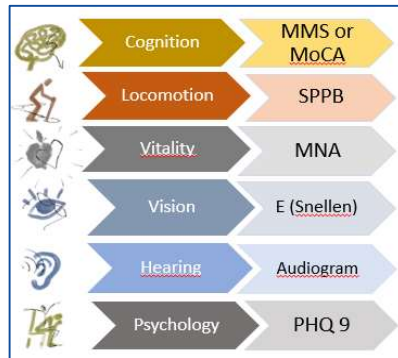
1

Screening

| Priority conditions associated with declines in intrinsic capacity | Tests  | Assess fully any domain with a checked circle                   |
|--|--|---|
| <b>COGNITIVE DECLINE</b><br>(Chapter 4)                            | 1. Remember three words: flower, door, rose (for example)  | <input type="radio"/> Wrong to either question or does not know |
|  | 2. Orientation in time and space: What is the full date today? Where are you now (home, clinic, etc)?  | <input type="radio"/> Cannot recall all three words             |
|  | 3. Recalls the three words?  |   |
| <b>LIMITED MOBILITY</b><br>(Chapter 5)                             | Chair rise test: Rise from chair five times without using arms. Did the person complete the chair rise within 14 seconds?  | <input type="radio"/> Yes <input type="radio"/> No              |
| <b>MALNUTRITION</b><br>(Chapter 6)                                 | 1. Weight loss: Have you unintentionally lost more than 3 kg over the last three months?   | <input type="radio"/> Yes <input type="radio"/> No              |
|  | 2. Appetite loss: Have you experienced loss of appetite?   | <input type="radio"/> Yes <input type="radio"/> No              |
| <b>VISUAL IMPAIRMENT</b><br>(Chapter 7)                            | Do you have any problems with your eyes: difficulties in seeing far, reading, watching television or currently under medical treatment (e.g. diabetes, high blood pressure)? | <input type="radio"/> Yes <input type="radio"/> No              |
| <b>HEARING LOSS</b><br>(Chapter 8)                                 | Hears whistles (whisper test) or Screening audiometry result is 35 dB or lower or Passes automated age-band-digits-in-noise test   | <input type="radio"/> Yes <input type="radio"/> No              |
|  | Over the past two weeks, have you been bothered by:<br>-Feeling down, depressed or hopeless?<br>-Little interest or pleasure in doing things?                                | <input type="radio"/> Yes <input type="radio"/> No              |

2

Assessment



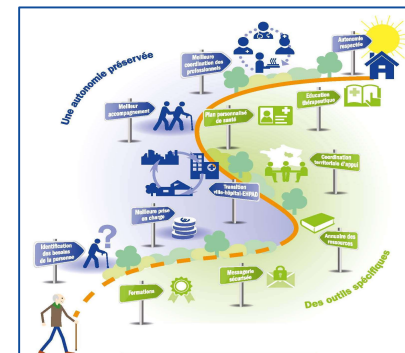
3

Personalized care plan



4

Monitoring  
Ensuring  
referral  
pathway



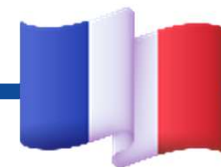
5

Engaging communities and supporting caregivers

# ICOPE MONITOR DATA

## JANUARY 2020 TO OCTOBER 2025

---



- Number of participants: **100,088**
- Number of professionals: **17,298**
- Average age 73.2 years, 62.8% women
- 84.5% have at least one alert in Stage 1
- Most affected functions: cognition (44.7%), **hearing (44.3%)**

# WHY ENT SHOULD BE ENGAGED IN THE PREVENTION OF FRAGILITY ?

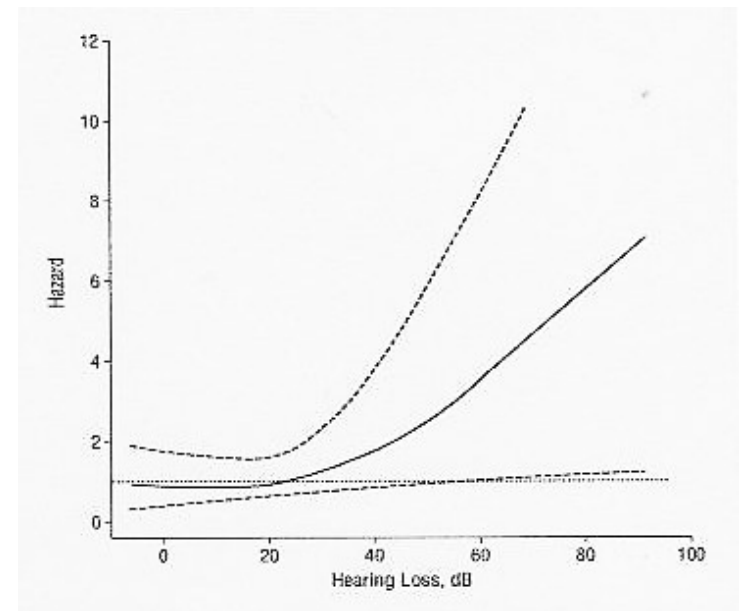
---



- Due to its prevalence and neurocognitive consequences
- Because there are compensatory measures that have a positive impact on cognitive and balance functions
- The importance of prevention and early intervention

# NEUROCOGNITIVE CONSEQUENCES

- Risk of dementia based on hearing loss multiplied by :
  - 1.89 for mild hearing loss,
  - 3 for moderate hearing loss,
  - 4.94 for severe hearing loss
- From 25 dB of hearing loss, the risk of dementia increases "logarithmically".



*Lin et al. Arch Neurol. 2011; 68: 214-20.*

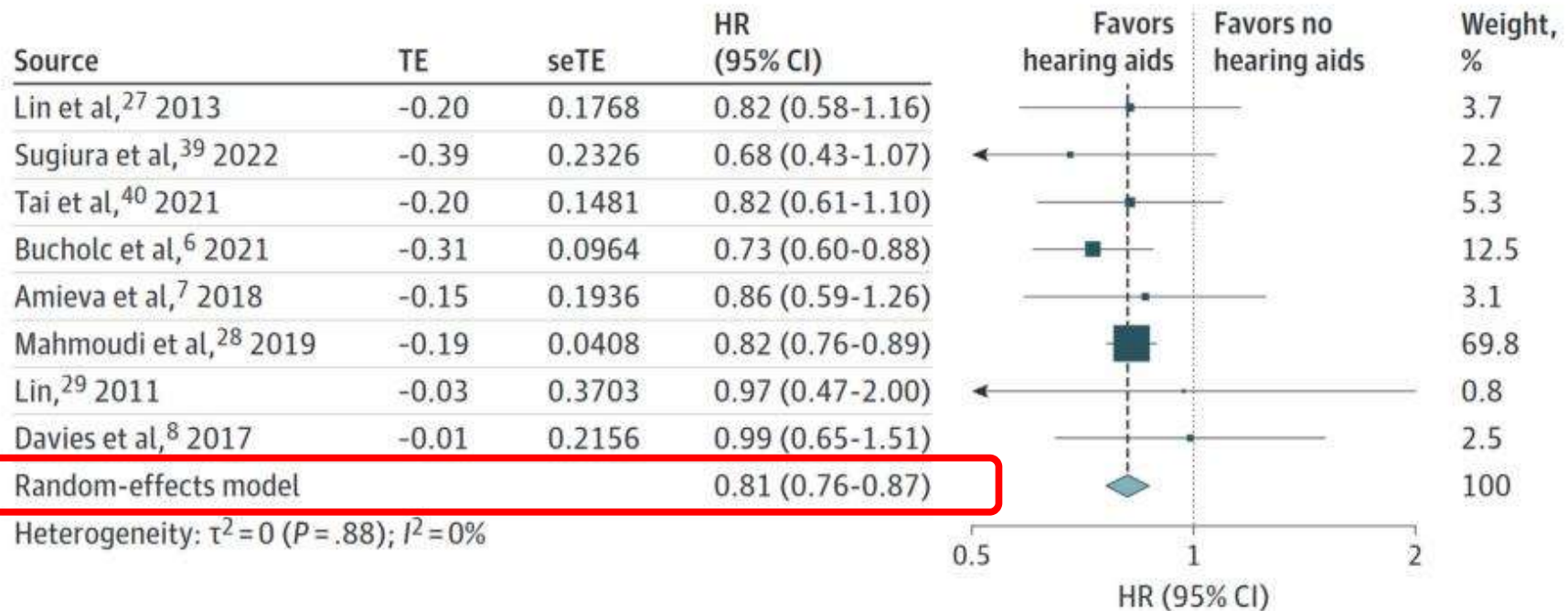
## Association of Hearing Aids and Cochlear Implants With Cognitive Decline and Dementia A Systematic Review and Meta-analysis

Brian Sheng Yeo, MBBS; Harris Jun Jie Muhammad Danial Song, MBBS; Emma Min Shuen Toh, MBBS; Li Shia Ng, MBBS, MMed, MRCS; Cyrus Su Hui Ho, MBBS, MRCPsych, MSc, MSc; Roger Ho, MBBS, MD, DPM, MMed; Reshma Aziz Merchant, MBChB, MRCP; Benjamin Kye Jyn Tan, MBBS(Hons); Woei Shyang Loh, MBBS

JAMA Neurol. 2023;80(2):134-141. doi:10.1001/jamaneurol.2022.4427

137.484 patients

Figure 2. Longitudinal Association of Hearing Aid Use and Any Cognitive Decline



Risque < de 19%

# DICHOTIC TEST PREDICTIVE OF DEMENTIA

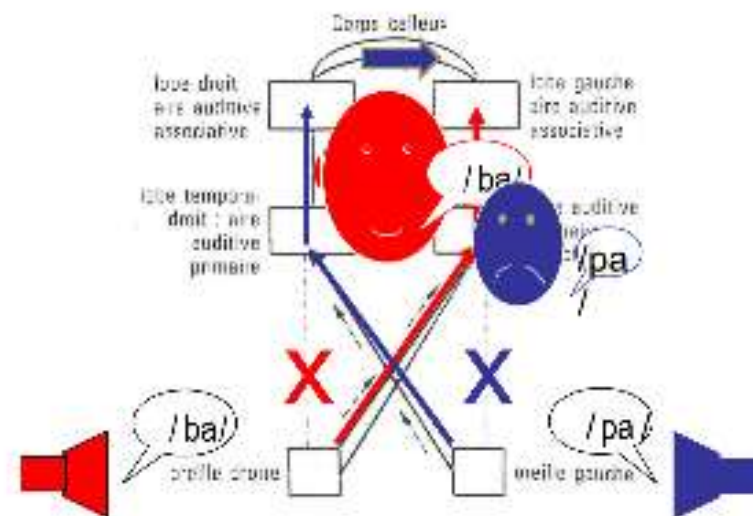
Research

JAMA Otolaryngology-Head & Neck Surgery | [Original Investigation](#)

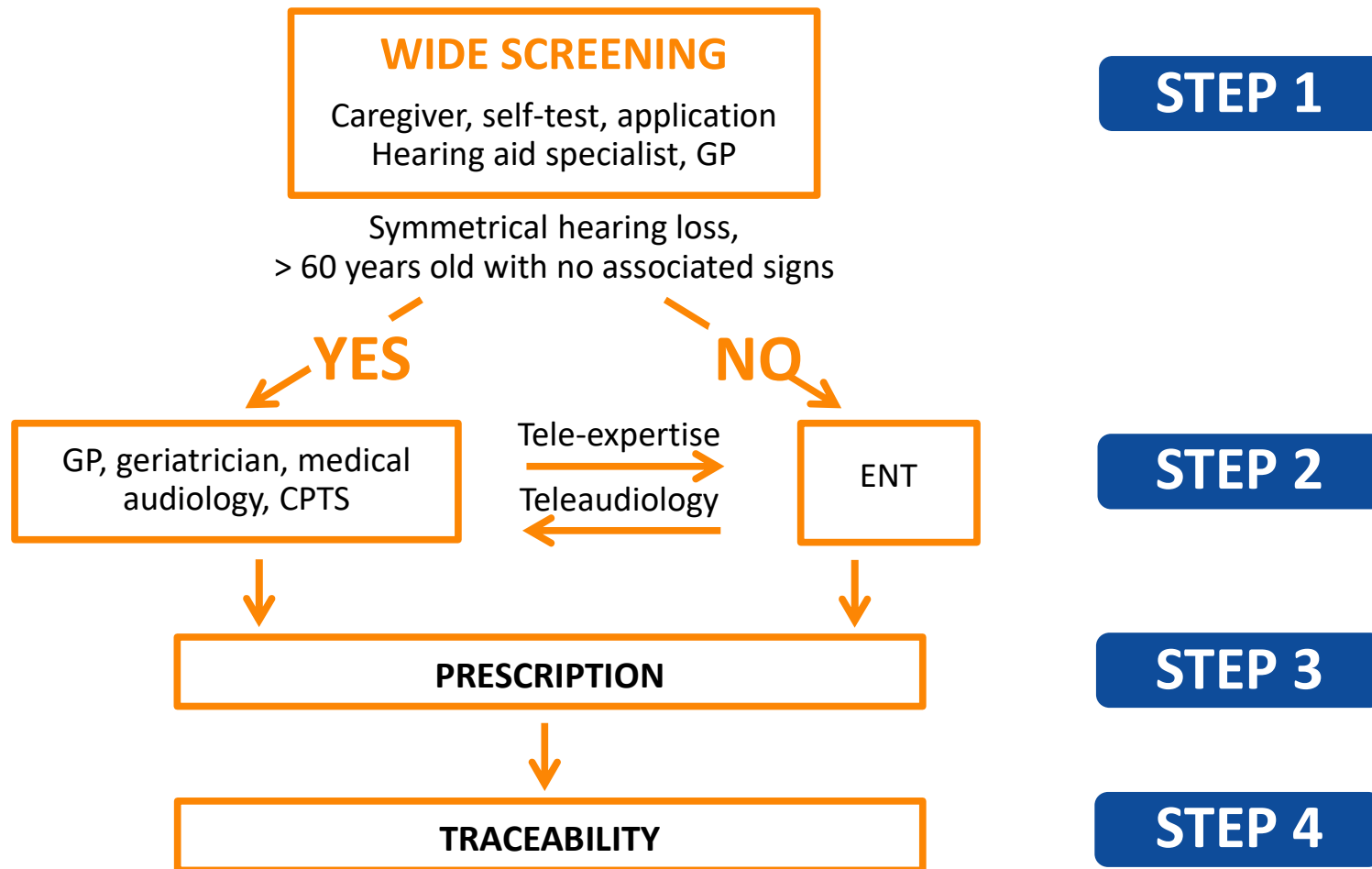
## Association of Performance on Dichotic Auditory Tests With Risk for Incident Dementia and Alzheimer Dementia

Adeeb Mohammed; Laura E. Gibbons, PhD; George Gates, MD; Melissa L. Anderson, MS;  
Susan M. McCurry, PhD; Wayne McCormick, MD, MPH; James D. Bowen, MD; Thomas J. Grabowski, MD;  
Paul K. Crane, MD, MPH; Eric B. Larson, MD, MPH

### DICHOTIC TEST



# ICOPE HEARING PATHWAY



1

## Screening



Whisper test

Hearing  
impairment

2

## In-depth assessment\*



Video Otoscopy\*

AudioPod®



CPD AUDI training  
Medical Otology

*\*Innovations*

# AUDIOPOD AUDIOMETRY



Enabling management of "simple" cases in primary care

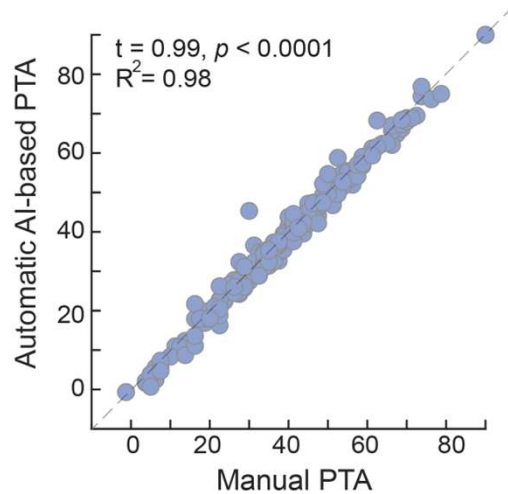
AudioPod® → Fully **automated** audiometer\* using AI (machine learning)

- Audiological assessments for **diagnostic purposes tonal and speech audiometry**
- **CE marking**
- Scientific publications :
  - **Performance equivalent** to a conventional audiometer & validated in adults  
*Performance and reliability evaluation of an improved machine learning-based pure-tone audiometry with automated masking.* Wallaert N et al, World J Otorhinolaryngol - Head Neck Surg, 2024
  - **Simple, fast to use & high test-retest reliability**  
*Performance and Reliability Evaluation of an Automated Bone-Conduction Audiometry Using Machine Learning.* Wallaert N et al, Trends in Hearing, 2024

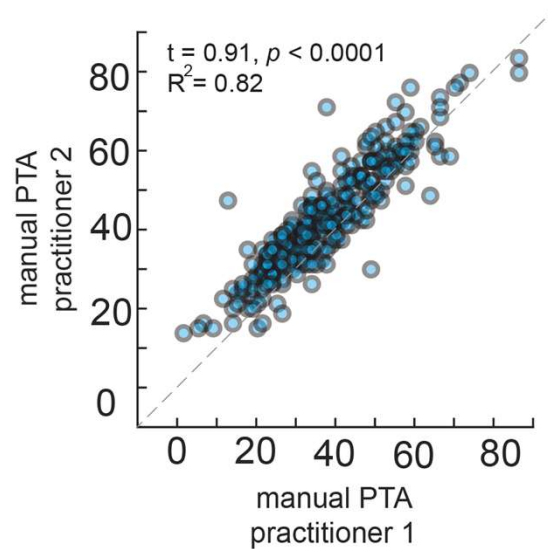


# RELIABILITY, REPRODUCIBILITY & REPEATABILITY

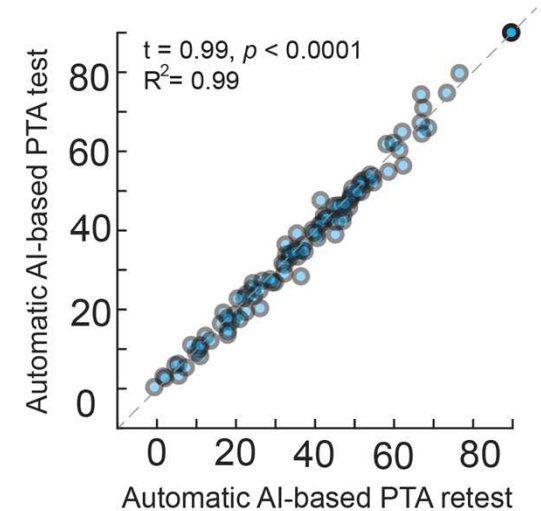
**Automatic manual comparison**  
98% variance explained



**Current clinical practice**  
82% variance explained



**iAudiogram**  
99% variance explained

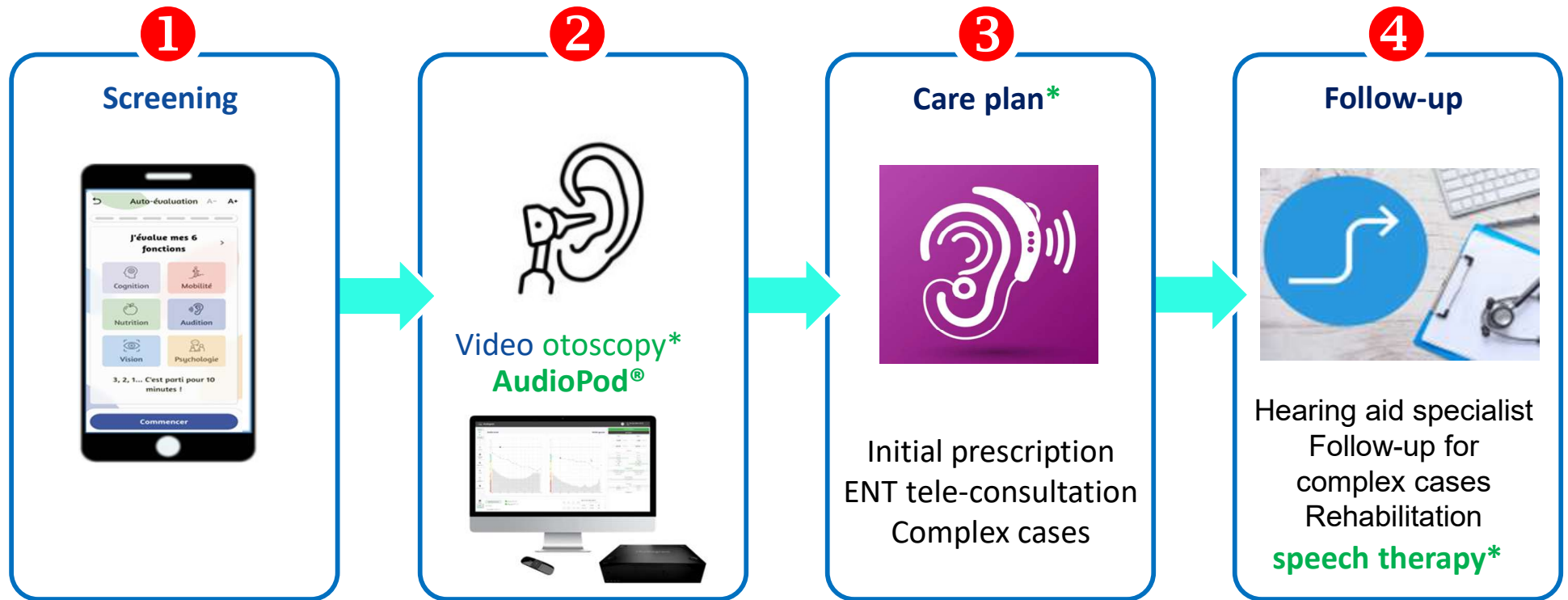


Wallaert et al. (2024a) Marin et al. (2025) Wallaert et al. (2024b)

Mean difference =  $4.84 \pm 10.37$  ( $p < 0.05$ )  
Difference in absolute values =  $8.15 \pm 8.03$  dBHL

Mean difference =  $-0.30 \pm 4.38$  (NS :  $p > 0.05$ )  
Difference in absolute values =  $2.94 \pm 3.26$  dBHL

# PROPOSED INNOVATION COMPARED TO EXISTING PRACTICES : ICOPE HEARING PATHWAY



**5**  
Identification of key players in the hearing care sector: multi-professional collaboration\*

*\*Innovations*

# EVALUATION OF THE EFFECTIVENESS OF THE PROGRAM



**1,600 participants**  
60 years and older



**20 CPTS**  
4 regions



**3 years**  
18 months of inclusion  
Minimum follow-up of 18 months

**10 CPTS** **N = 800**

**Randomisation**

**10 CPTS** **N = 800**

## INTERVENTION GROUP

ICOPE screening followed by

Training  
Hearing assessment  
Initial prescription / ENT Referral  
Speech therapy rehabilitation  
Hearing care pathway

## CONTROL GROUP

ICOPE screening then

Usual care

## PRIMARY END POINT

Time to fitting for patients with hearing impairment at ICOPE stage 1, during at least 18 months of follow-up

# SCIENTIFIC PUBLICATIONS ON ICOPE

nature aging

Article

<https://doi.org/10.1038/s43587-025-00861-x>


## Reference centiles for intrinsic capacity to monitor clinical health outcomes in real-world primary care cohorts

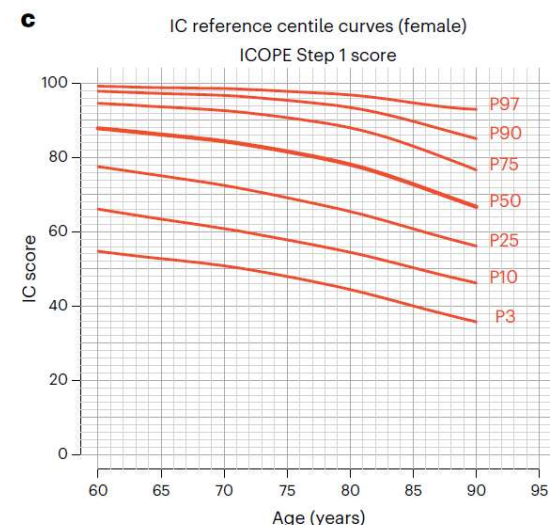
Received: 8 November 2024

Accepted: 31 March 2025

Published online: 13 May 2025

 Check for updates

Philippe de Souto Barreto<sup>1,2,3,7</sup> , Wan-Hsuan Lu<sup>1,3,7</sup>, Neda Tavassoli<sup>1</sup>,  
Fatemeh Nourhashemi<sup>1,2,3</sup>, Renato Gorga Bandeira de Mello<sup>4,5</sup>,  
Eduardo Ferriolli<sup>6</sup>, Sophie Guyonnet<sup>1,2</sup>, Yves Rolland<sup>1,2,3</sup>,  
Maria Eugenia Soto Martin<sup>1,2</sup>, Bruno Vellas<sup>1,2,3</sup> & IHU HealthAge INSPIRE/Open  
Science study group\*



> *Lancet Healthy Longev.* 2022 Jun;3(6):e394-e404. doi: 10.1016/S2666-7568(22)00097-6.  
Epub 2022 Jun 9.

## Implementation of the WHO integrated care for older people (ICOPE) programme in clinical practice: a prospective study

Neda Tavassoli<sup>1</sup>, Philippe de Souto Barreto<sup>2</sup>, Caroline Berbon<sup>3</sup>, Celine Mathieu<sup>3</sup>,  
Justine de Kerimel<sup>3</sup>, Christine Lafont<sup>3</sup>, Catherine Takeda<sup>3</sup>, Isabelle Carrie<sup>3</sup>, Antoine Piau<sup>2</sup>,  
Tania Jouffrey<sup>3</sup>, Sandrine Andrieu<sup>4</sup>, Fatemeh Nourhashemi<sup>2</sup>, John R Beard<sup>5</sup>,  
Maria Eugenia Soto Martin<sup>2</sup>, Bruno Vellas<sup>2</sup>



92 y.o.



Johanna QUASS – 91 y.o.



106 y.o.



Robert MARCHAND - 105 y.o.



Diane FRIEDMAN – 100 y.o.



**Thank you for your attention**