Uso della tecnologia nella valutazione della fragilità e della funzione

Alberto Zucchelli

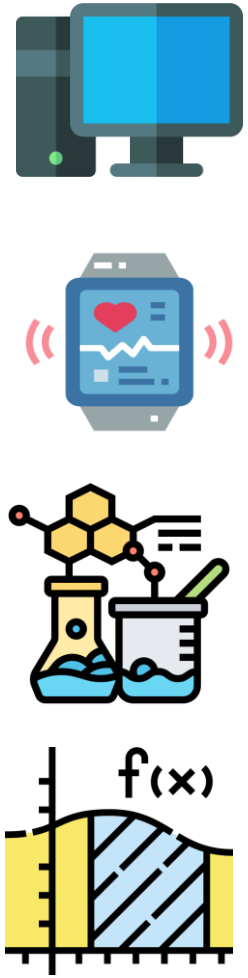
UNIVERSITÀ DEGLI STUDI DI BRESCIA

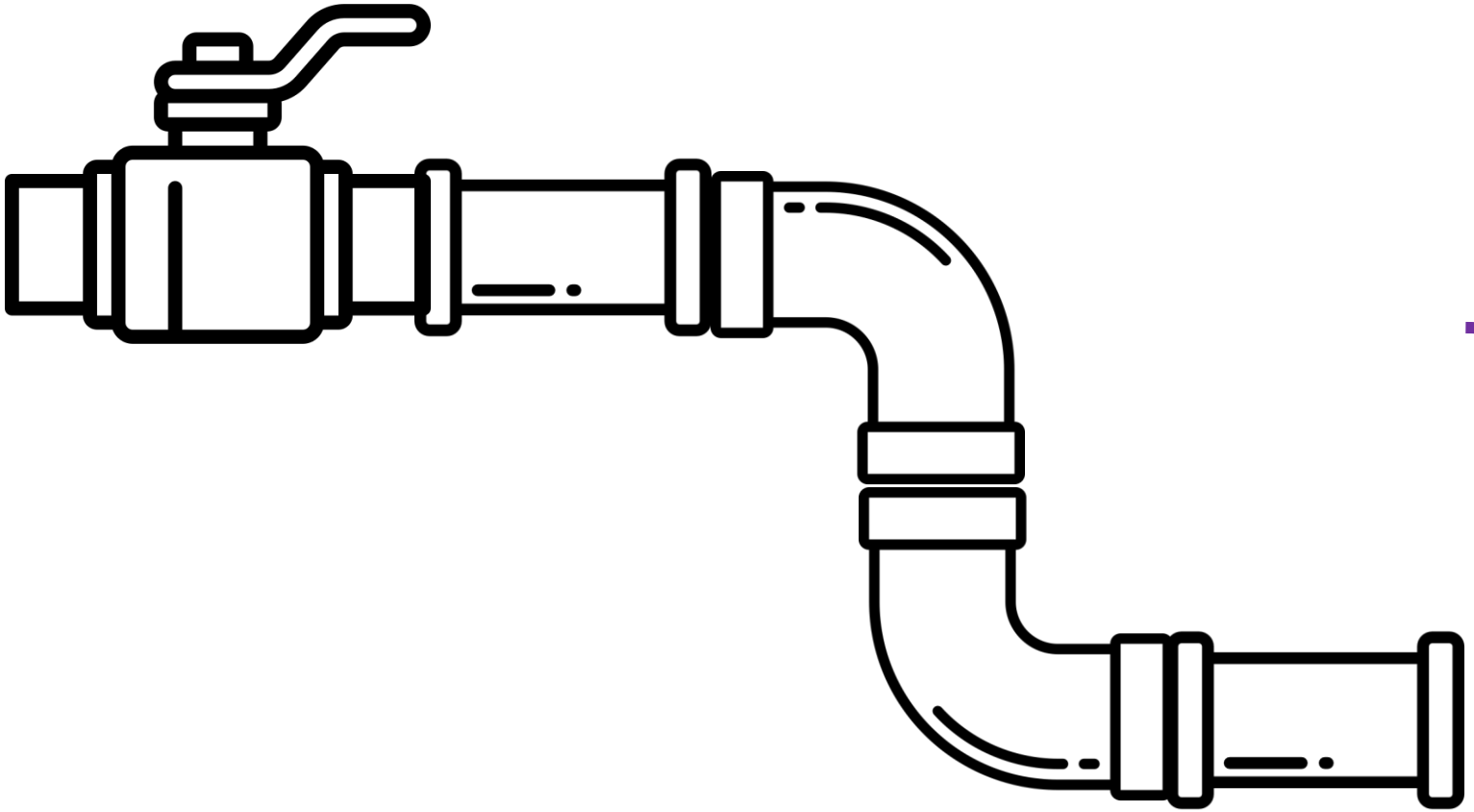
YOUNG EPIDEMIOLOGISTS SIGG

Karolinska Institutet

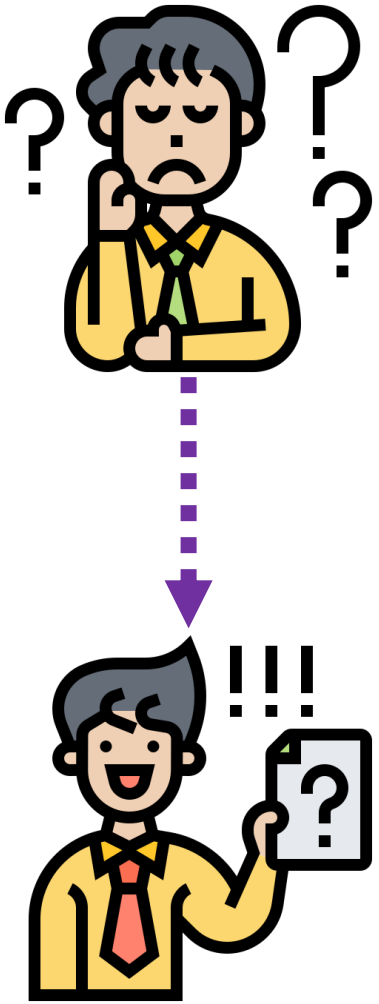
Che cosa è la tecnologia?

TECNOLOGIA





IMPLEMENTAZIONE



Un esempio di (potenziale) implementazione

In collaborazione con:

Direzione Generale della Programmazione Sanitaria Ministero della Salute

Società Italiana di Medicina Generale e delle Cure Primarie

Direzione del Dipartimento Malattie Cardiovascolari, Endocrino-Metaboliche e Invecchiamento Istituto Superiore di Sanità

a cura di
Davide L. Vetrano

LA MAPPA DELLA FRAGILITÀ IN ITALIA
Gradiente geografico e determinanti sociodemografici

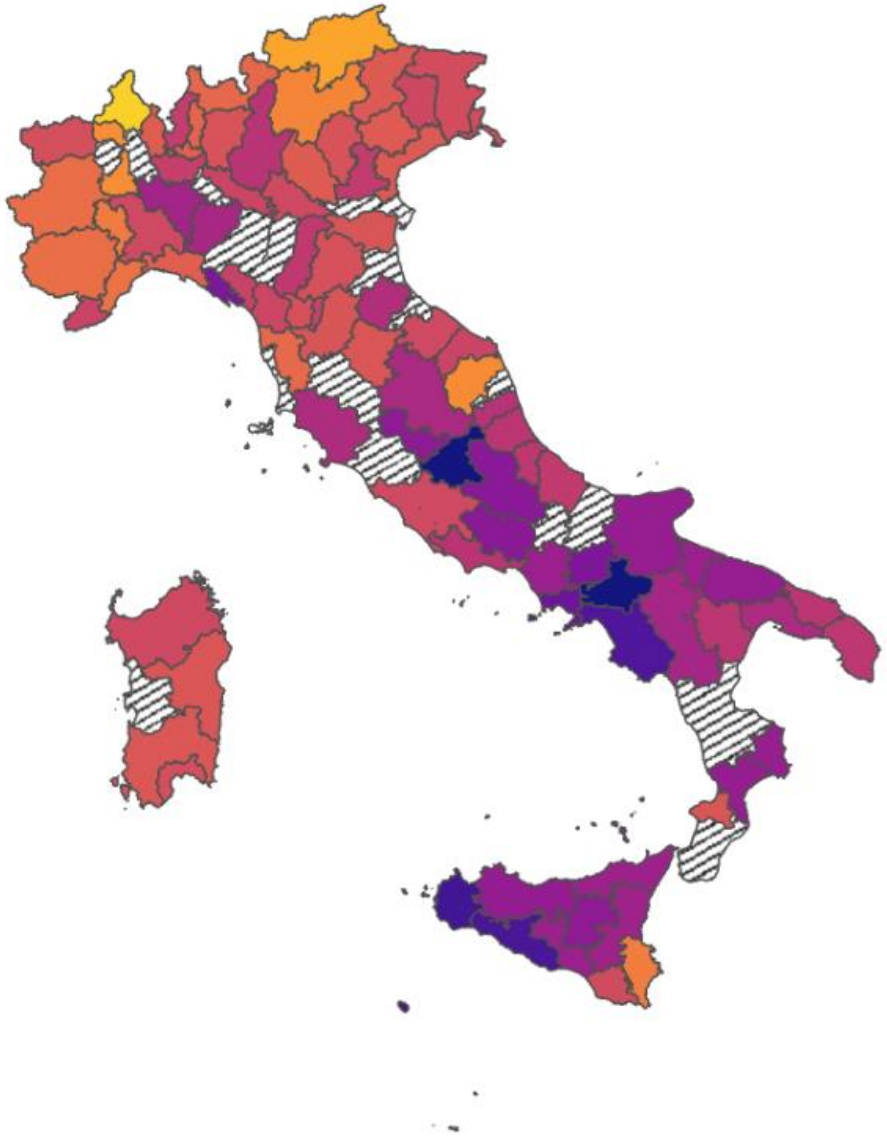
INDAGINE 2022

SIMG SOCIETÀ ITALIANA DI MEDICINA GENERALE E DELLE CURE PRIMARIE

ITALIA LONGEVA
PER L'INVECCHIAMENTO E LA LONGEVITÀ ATTIVA

HealthSearch
Istituto di Ricerca della Società Italiana di Medicina Generale (SIMG)

- 700 MMG sul territorio italiano
- PC-FI basato su 300,000+ individui 60+ seguiti per 5+ anni

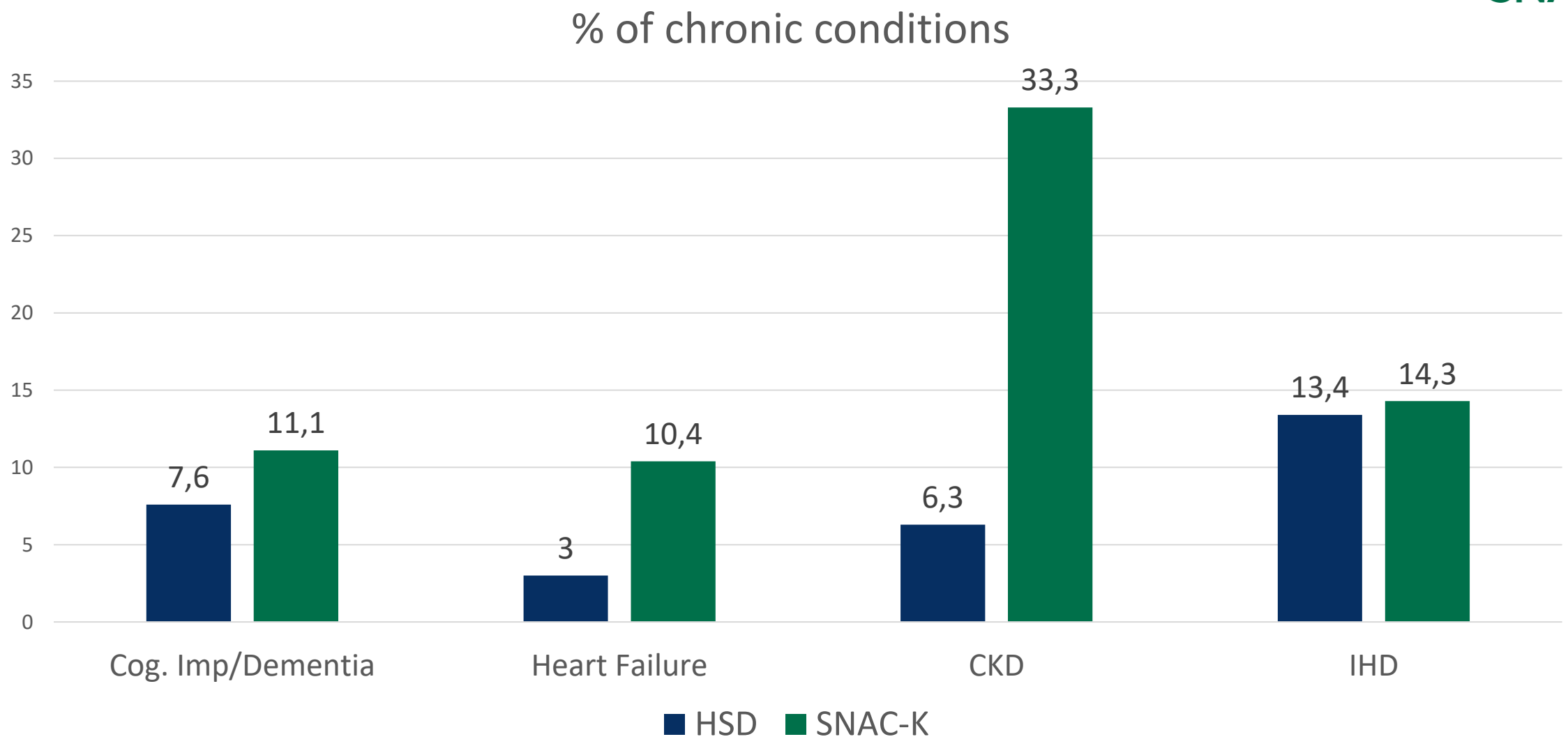


Fragilità moderata e grave (%)

5 10 15 20 25 30 35

Health Search
Istituto di Ricerca della Società Italiana di Medicina Generale (SIMG)

SNAC-K



$$FI = \frac{n.\,\boldsymbol{deficits\ exhibited}\ by\ the\ subject}{n.\,\boldsymbol{deficits\ considered}\ by\ the\ researcher}$$

Signs, symptoms, Diseases, Cognitive and functional measures, Biomarkers, Instrumental examinations results, Low self reported quality of life

DATA-DRIVEN

- e clinica
- st zione
- fisiop

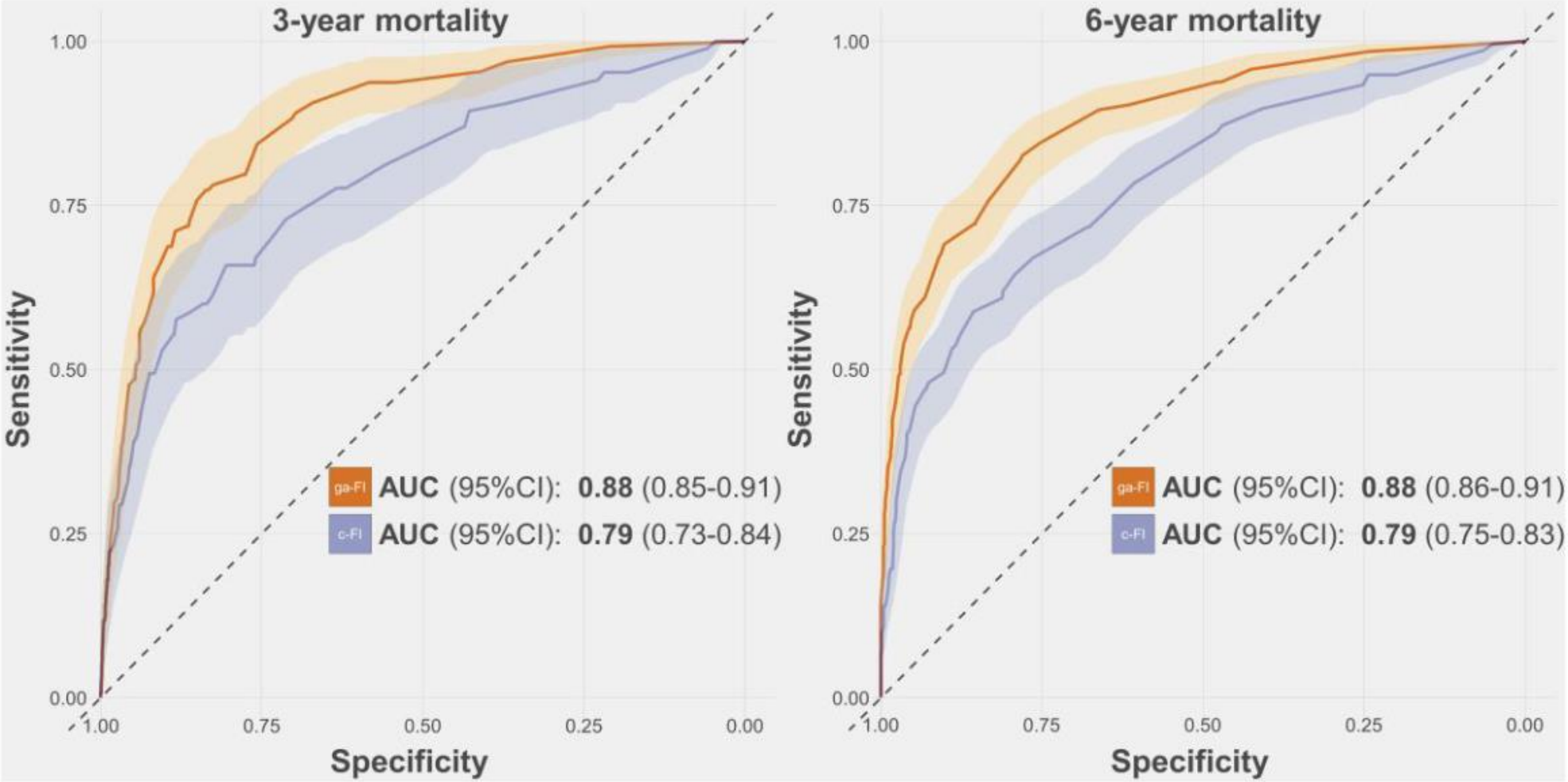
Dati da registro

www.aging-us.com AGING 2020, Vol. 12, No. 8

Research Paper

Using a genetic algorithm to derive a highly predictive and context-specific frailty index

Alberto Zucchelli[1,2], Alessandra Marengoni[1,3], Debora Rizzuto[1,4], Amaia Calderón-Larrañaga[1], Maurizio Zucchelli[5], Roberto Bernabei[6], Graziano Onder[7], Laura Fratiglioni[1,4], Davide Liborio Vetrano[1,6]



GeroScience
https://doi.org/10.1007/s11357-022-00669-2

ORIGINAL ARTICLE

Data-driven health deficit assessment improves a frailty index's prediction of current cognitive status and future conversion to dementia: results from ADNI

Andreas Engvig · Luigi A. Maglanoc · Nhat Trung Doan · Lars T. Westlye · Alzheimer's Disease Neuroimaging Initiative

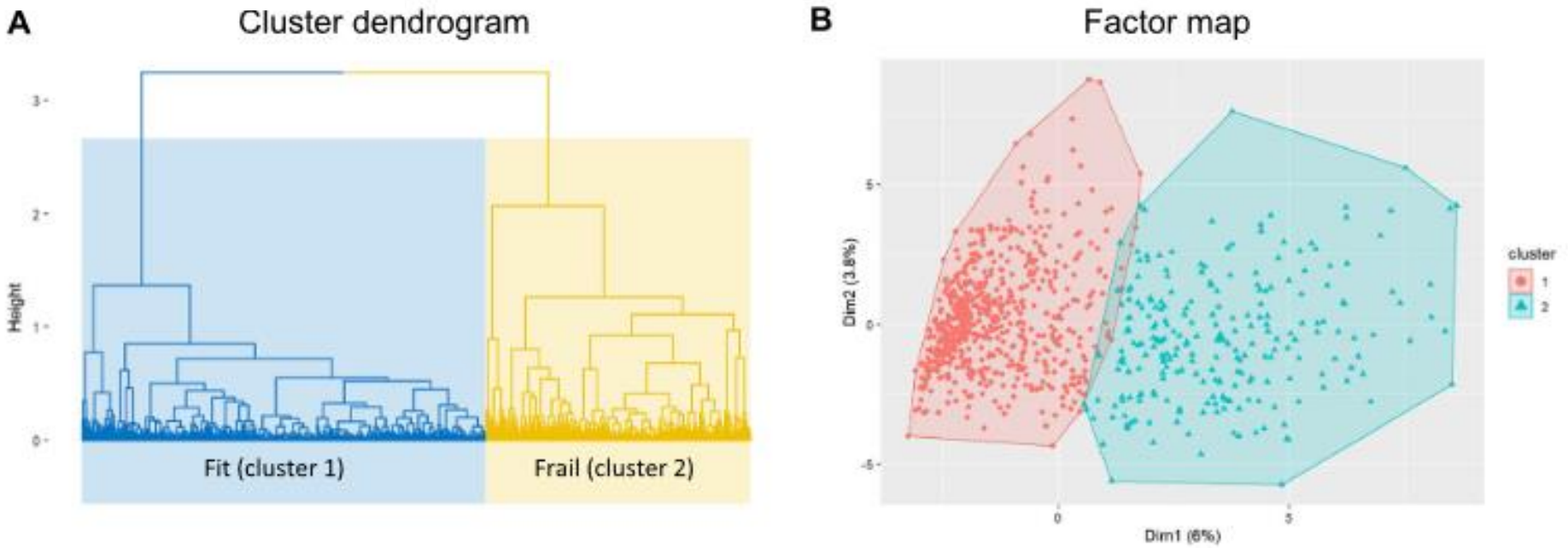
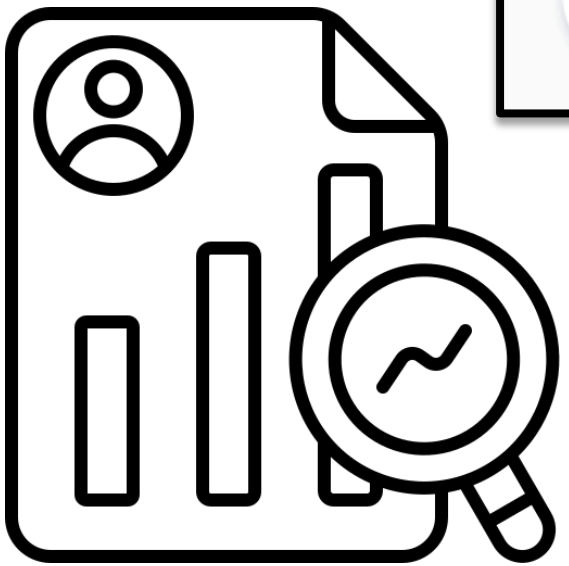


Fig. 2 **A** Dendrogram showing the hierarchical structure of the subject clustering solution. The blue part shows the first and largest cluster which we coined "fit" due to significantly lower frailty scores in this subgroup (c.fr. Table 3) compared with the second, smaller cluster (yellow), coined "frail". **B** Scatterplot showing subjects and their cluster belonging based on the two first principal components (PC, "Dim1", "Dim2") from factor analysis of mixed data (FAMD). The percentages denote explained variance of each PC

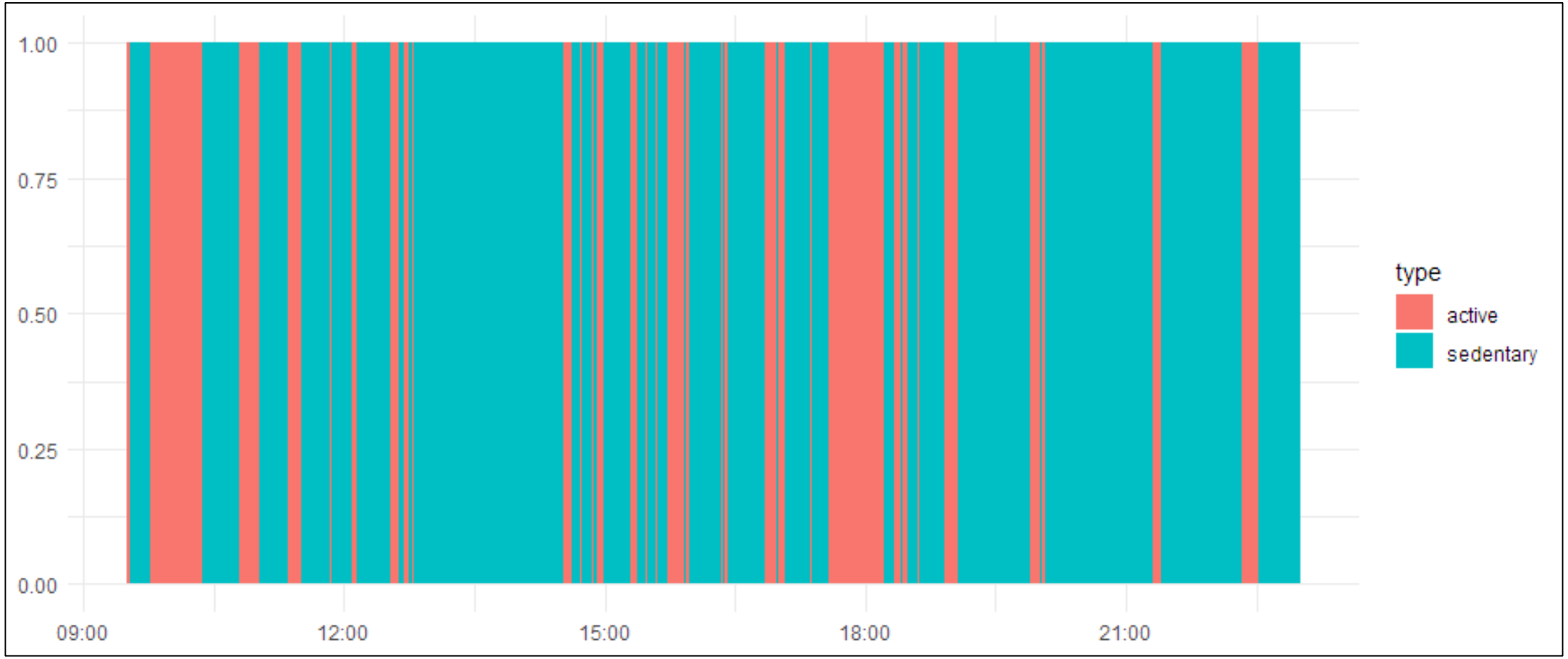
Strumenti per la valutazione della attività e della funzione fisica

Real world



Quantitative

SNAC-K


1.00
0.75
0.50
0.25
0.00
09:00
12:00
15:00
18:00
21:00
type
active
sedentary

THE GERONTOLOGICAL SOCIETY OF AMERICA®

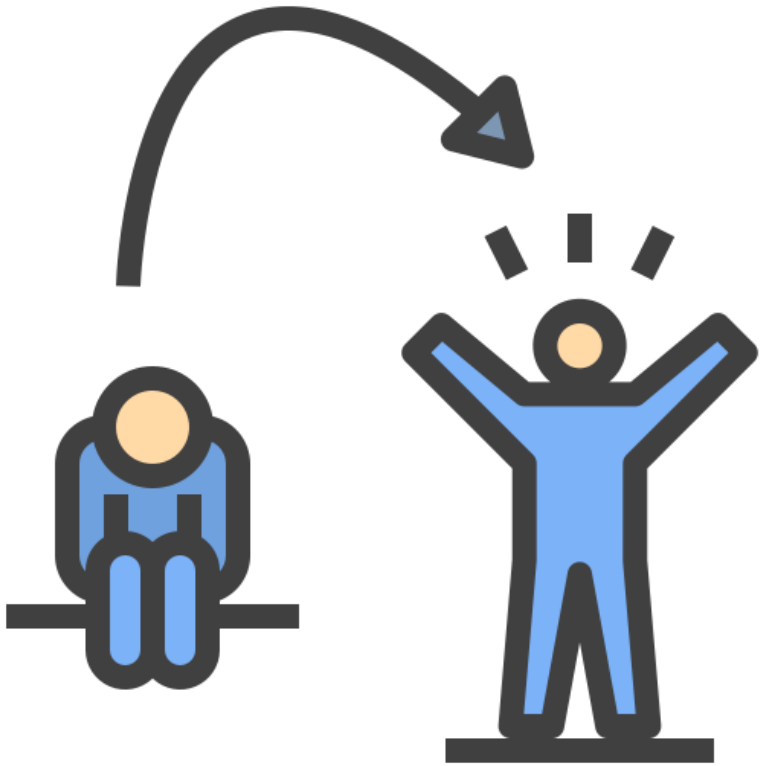
Journals of Gerontology: Medical Sciences
cite as: *J Gerontol A Biol Sci Med Sci*, 2022, Vol. 77, No. 9, 1882–1889
https://doi.org/10.1093/gerona/glab278
Advance Access publication September 25, 2021

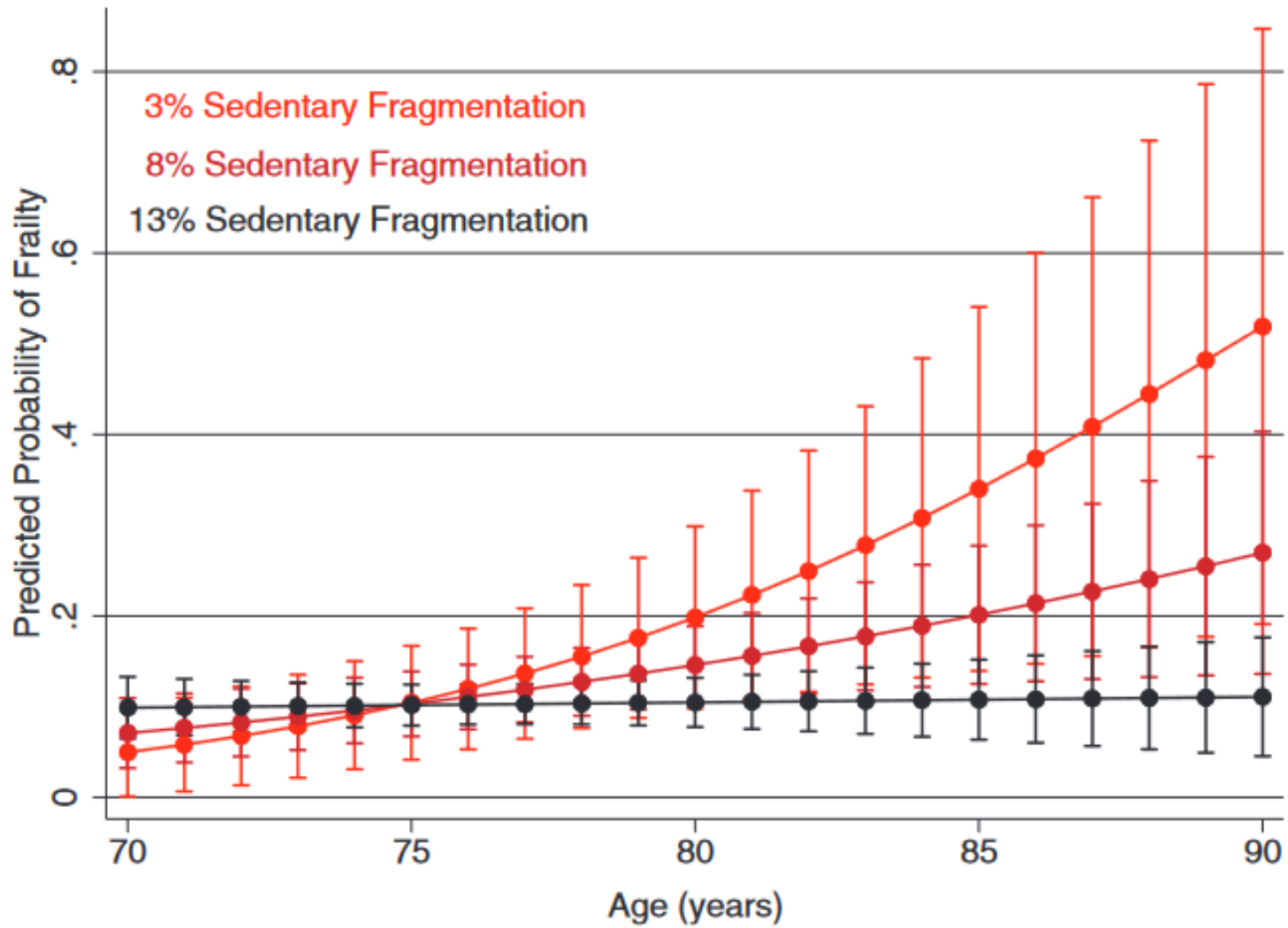
OXFORD

Research Article

Objectively Measured Patterns of Daily Physical Activity and Phenotypic Frailty

Amal A. Wanigatunga, PhD, MPH,[1,2] Yurun Cai, PhD,[1] Jacek K. Urbanek, PhD,[3] Christine M. Mitchell, ScM,[1,4] David L. Roth, PhD, MA,[2,3] Edgar R. Miller, MD, PhD,[4,5] Erin D. Michos, MD, MHS,[4,6] Stephen P. Juraschek, MD, PhD,[7] Jeremy Walston, MD,[3] Qian-Li Xue, PhD,[2,3] Lawrence J. Appel, MD, MPH,[1,4] and Jennifer A. Schrack, PhD, MS[1,2]

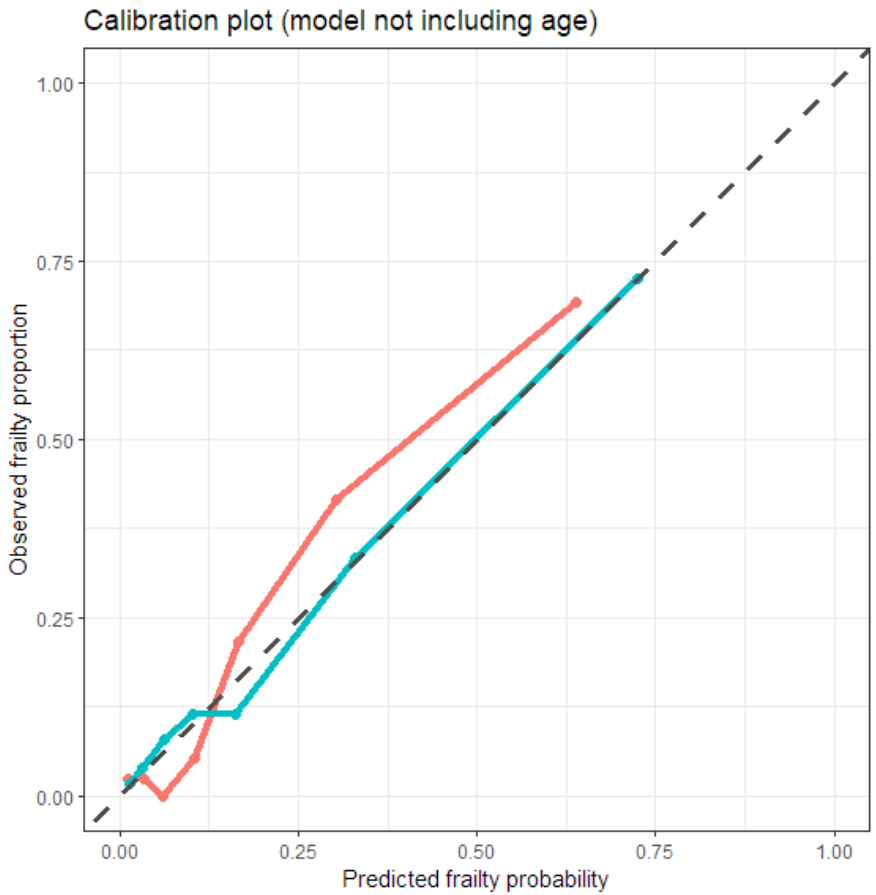


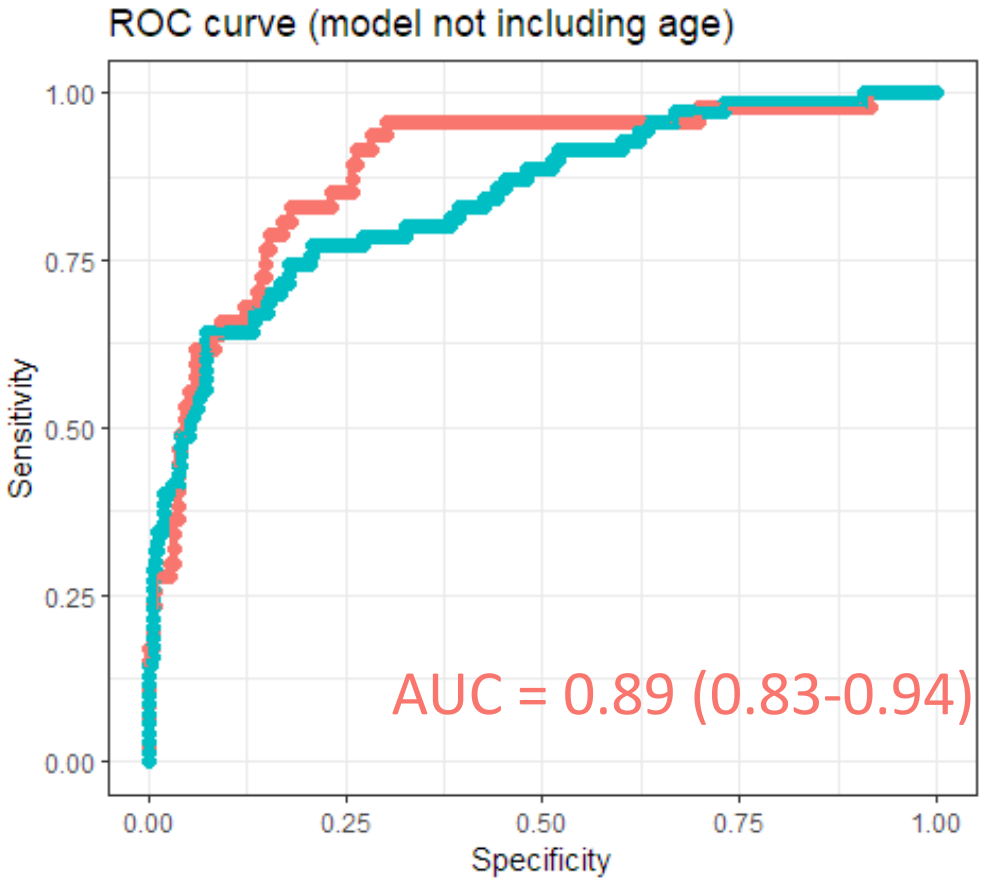


SNAC-K

- 656 persons 60+ wearing an accelerometer 4+ days
- AIM: identification of frail individuals (vs robust)

TEST ; TRAIN





- N. active bouts 30+ min/day
- Ratio walk to stand/active bout
- Maximum cadence reached considering all bouts 60+ seconds

Vavasour et al. J NeuroEngineering Rehabil (2021) 18:112
https://doi.org/10.1186/s12984-021-00909-0

Journal of NeuroEngineering and Rehabilitation

REVIEW Open Access

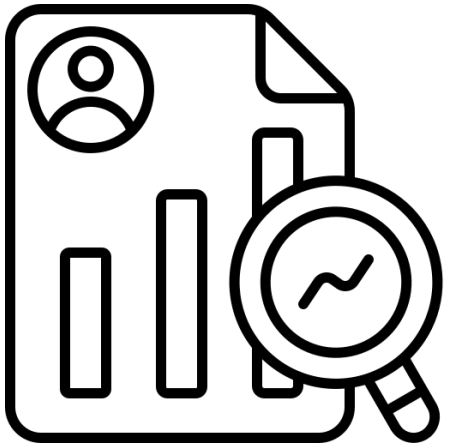
How wearable sensors have been utilised to evaluate frailty in older adults: a systematic review

Grainne Vavasour[1*], Oonagh M. Giggins[1], Julie Doyle[1] and Daniel Kelly[2]

29 studies

Most commonly assessed

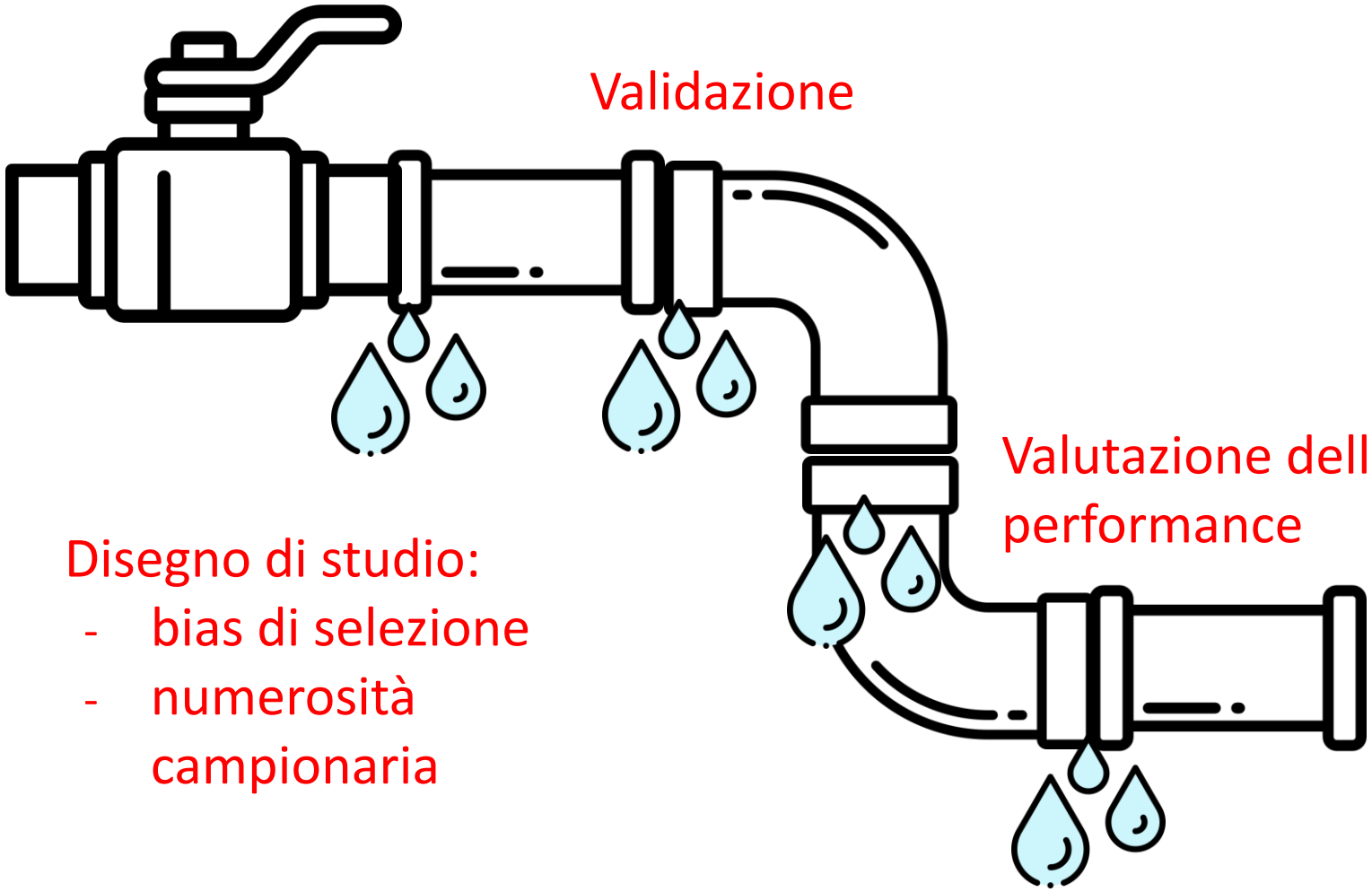
- Time spent in non-sedentary activity
- Time spent in various intensities of activity
- N postural transitions



Most commonly assessed

- Gait speed
- Stride regularity
- % time in double support
- Angular velocity of trunk

I limiti attuali



Validazione

Valutazione della performance

Disegno di studio:

- bias di selezione
- numerosità campionaria

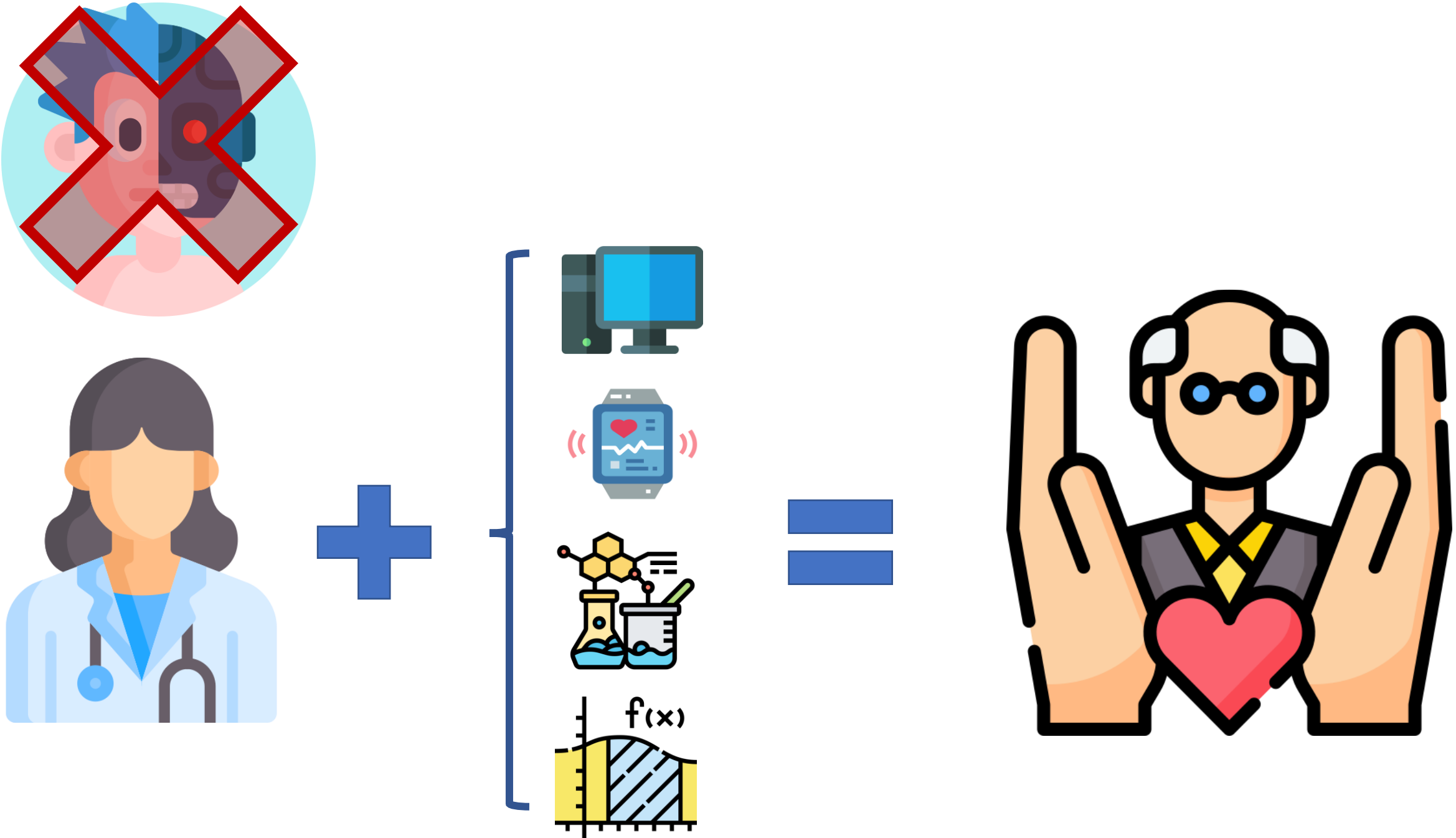
Analisi costo-beneficio

FALSO POSITIVO

FALSO NEGATIVO

Prospettive future

- Dati
- Interdisciplinarietà
- Tecnologia come supporto


f(x)

Grazie!!!

UNIVERSITÀ DEGLI STUDI DI BRESCIA

I miei co-autori:

- Alessandra Marengoni
- Davide Vetrano
- Nicola Lopomo
- Simone Pancera
- Laura Fratiglioni
- Debora Rizzuto
- Amaia Calderón-Larrañaga

YOUNG EPIDEMIOLOGISTS SIGG

Karolinska Institutet

Alberto Zucchelli | MD, PhD
RTDB
Dip. Scienze Cliniche e Sperimentali
Università degli Studi di Brescia

a.zucchelli001@unibs.it

@Albe_Zucc