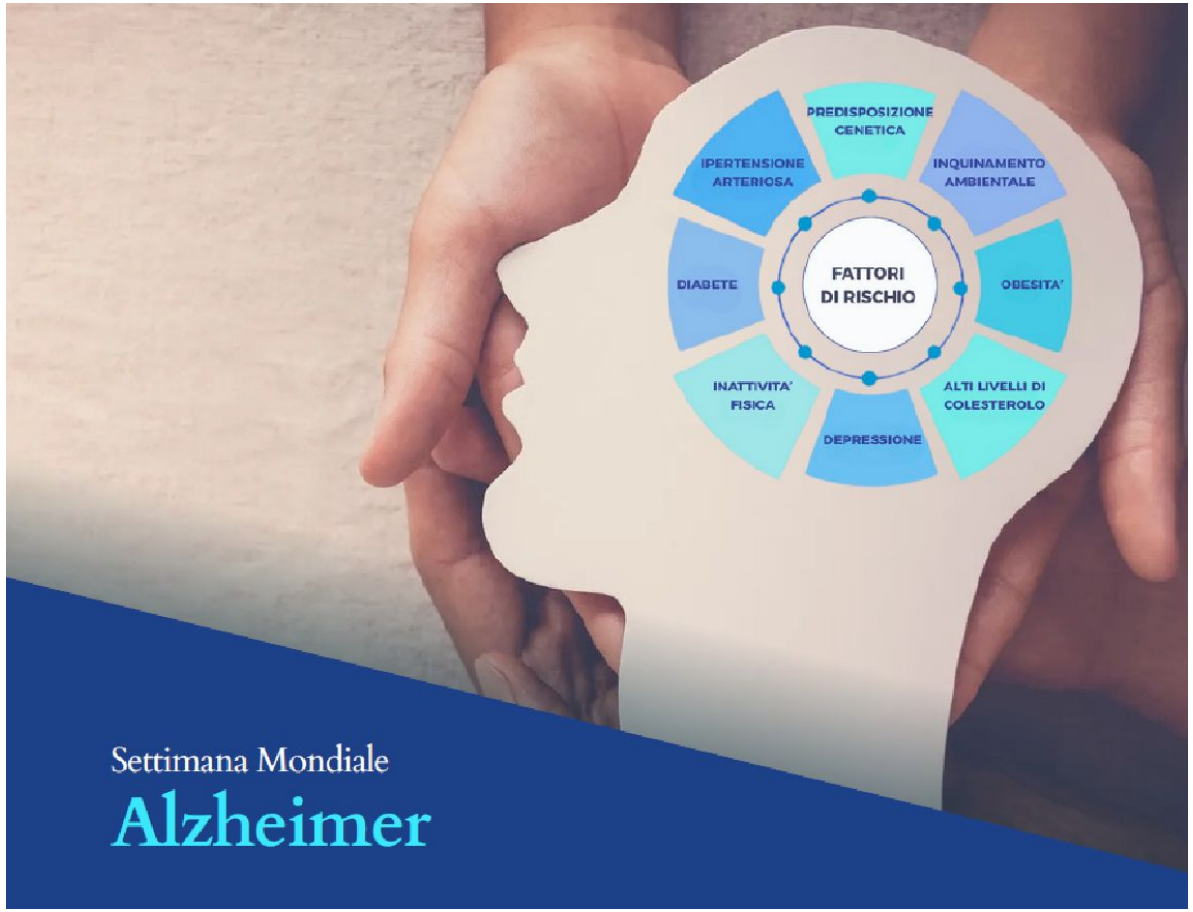
L’importanza degli stili di vita: cognitività e invecchiamento

Alessandra Marengoni



AGING VIEWS

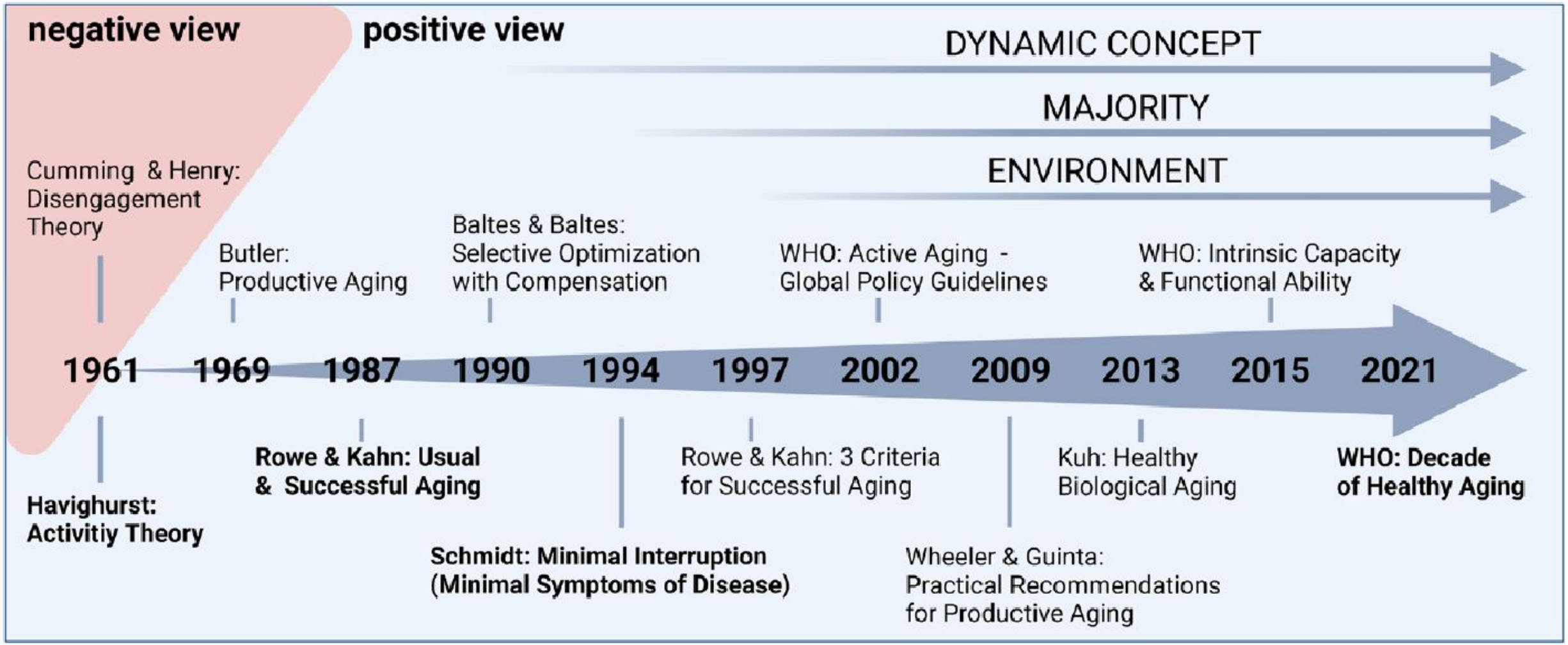
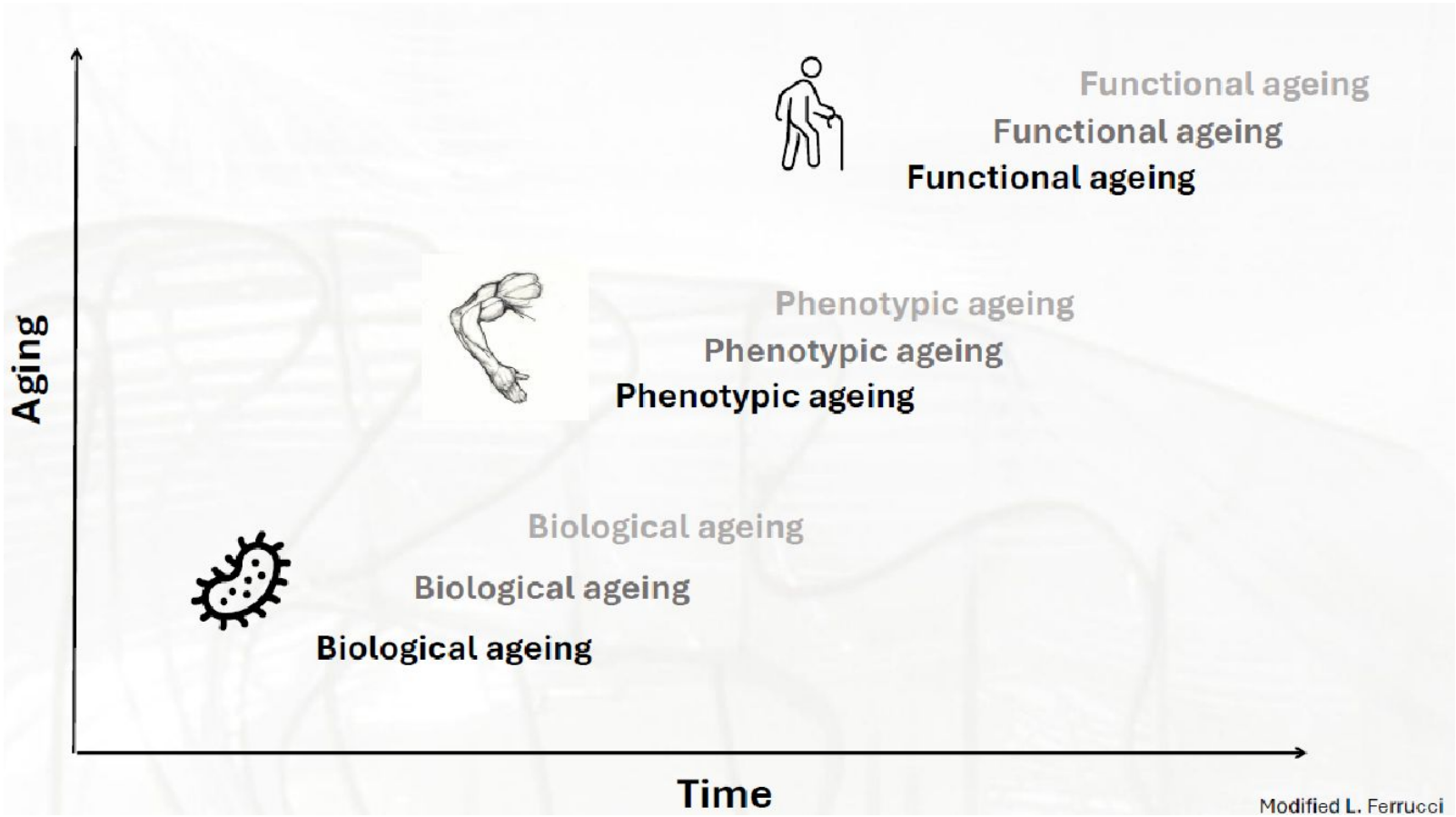


Fig. 1. : Overview of the historical development of the definition of healthy aging. WHO: World Health Organization.

Behr et al. 2023

Invecchiamento: progressivo deterioramento delle funzioni corporee nel tempo, perdita di complessità in una ampia gamma di funzioni e processi fisiologici e strutture anatomiche, come il controllo della pressione arteriosa, il ciclo respiratorio, la dinamica posturale, la visione, e molti altri che infine porta ad un aumentato rischio di eventi avversi e morte.

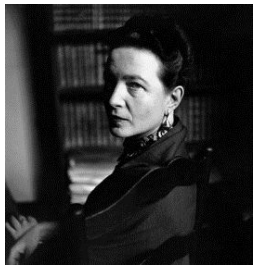
- Il fallimento dell'organizzazione autonoma di sistemi ed apparati e la ridotta capacità di adattarsi all'ambiente
- In its broadest sense, aging merely refers to the changes that occur during an organisms' lifespan, though **the rate at which these take place varies widely** (Kirkwood, 2005)



METRICS OF AGING


JANUARY 18, 2010
Joe Klein: The CIA's Afghan Disaster
Yemen: The New Center Of Terror
Why the Recession Hasn't Been Cool To Teens
TIME
WHY YOUR DNA ISN'T YOUR DESTINY
The new science of epigenetics reveals how the choices you make can change your genes —and those of your kids
BY JOHN CLOUD
www.time.com

STILI DI VITA, CARATTERISTICHE
ESPOSIZIONE: timing



Early life

Transient/Persistent

Mid life

Transient/Persistent

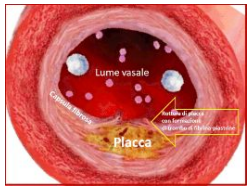
Late life

Transient/Persistent

WHOLE LIFE of an individual or a population

MECCANISMO/EFFETTO

Agisce sulla via patogenetica



Aumenta o diminuisce la probabilità di sviluppare una malattia

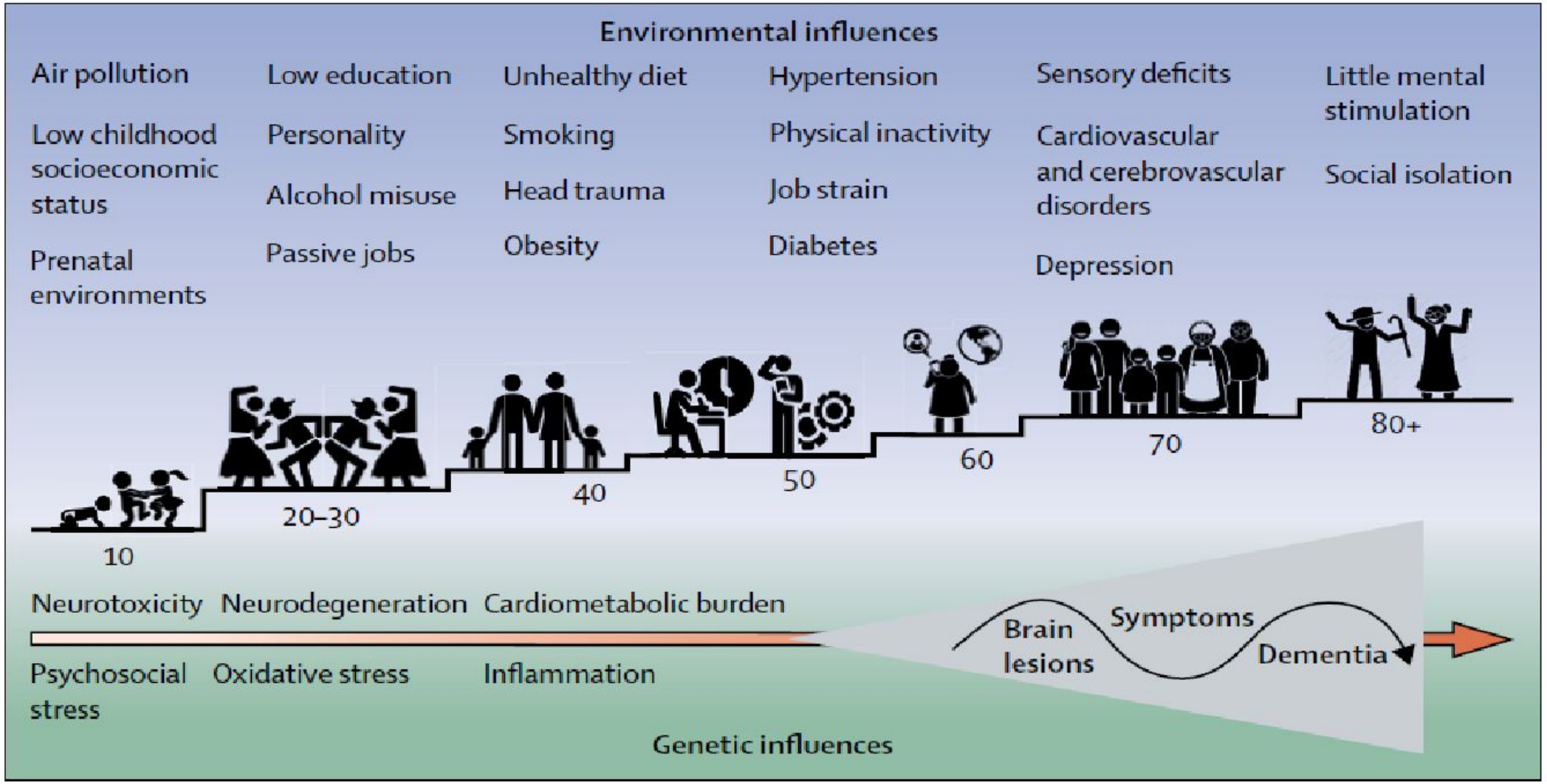
Ridotta attività fisica
Aumento insulino-resistenza
Rischio di diabete

Agisce sulla riserva funzionale

Anticipa o ritarda i sintomi di una malattia

Reti e attività sociali
Ritardo esordio sintomi cognitivi

COMPLEXITY



Lancet Neurol 2020; 19: 533–43

FATTORI CHE INFLUENZANO GLI STILI DI VITA

- **AMBIENTALI: programmazione urbanistica e infrastrutturale**
- **SOCIO-ECONOMICI: livello di istruzione e attività lavorativa, possibilità di accedere a servizi**
- **INDIVIDUALI: motivazioni personali…**

LA MOTIVAZIONE: rewarding

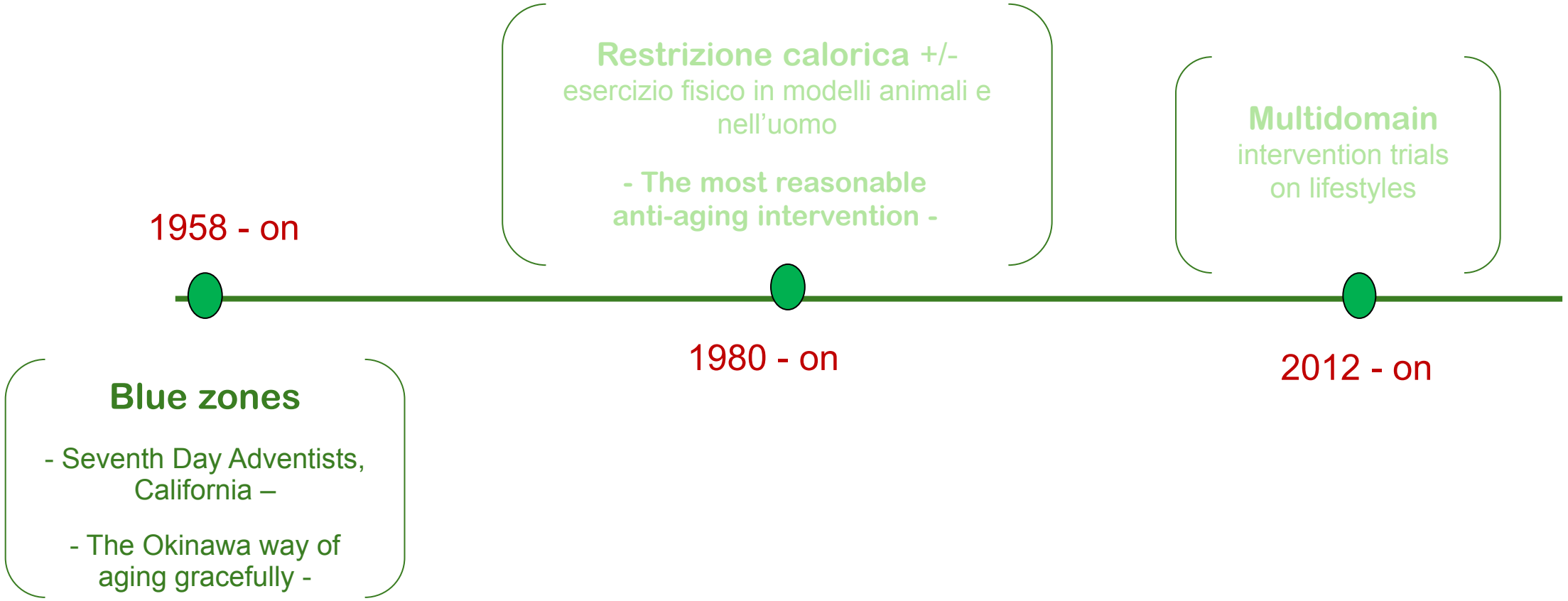
- **Droga**
- **Sesso**
- **Cibo**

- **……**

Lyfestyle defined as «Person's basic character as established early in childhood»

A. Adler - 1929

LA STORIA DEGLI STILI DI VITA



Lessons From the Blue Zones: There is No Silver Bullet (or Magic Pill) for a Long, Healthy Life

Dan Buettner, BA

Moderate exercise

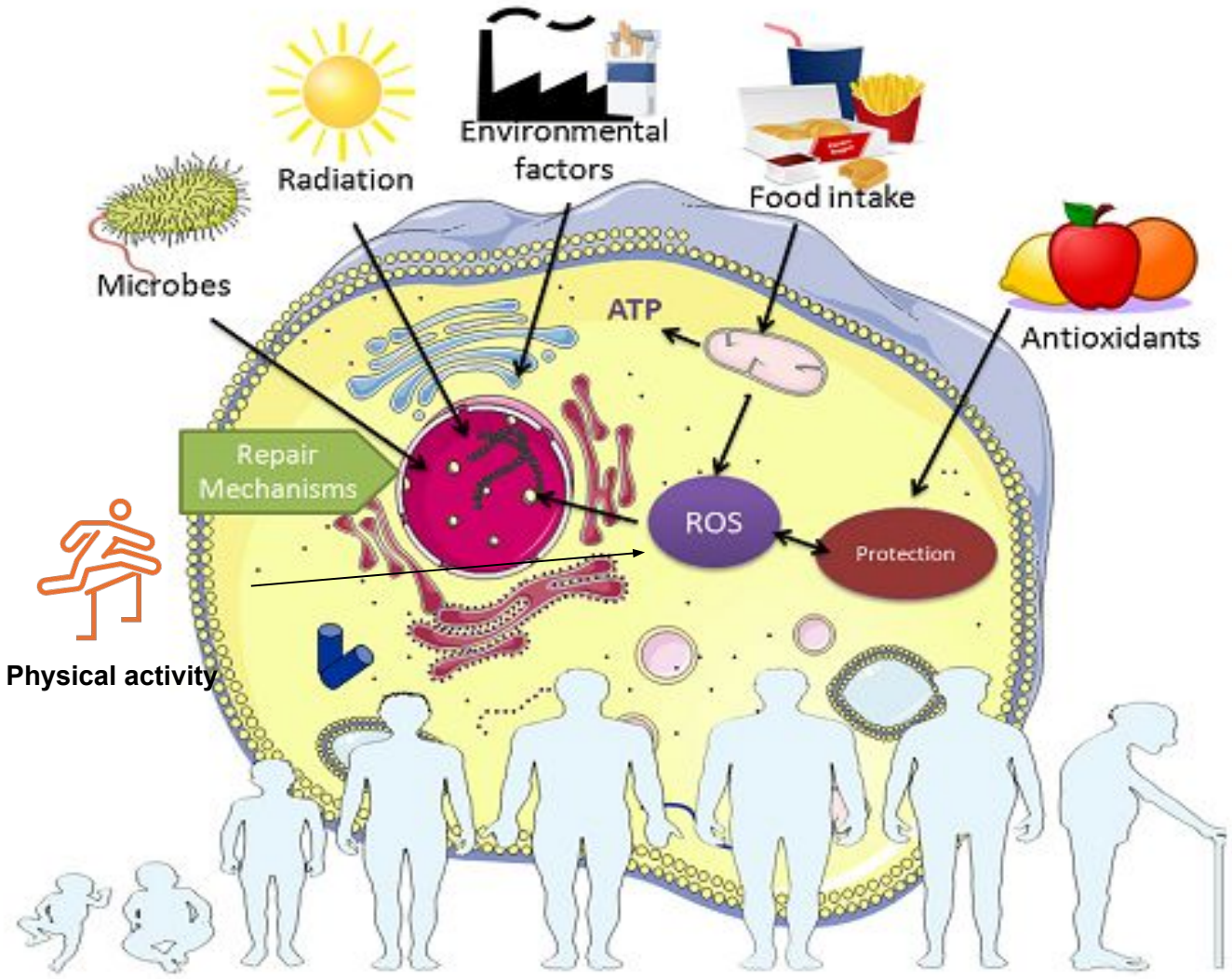
Low alcohol

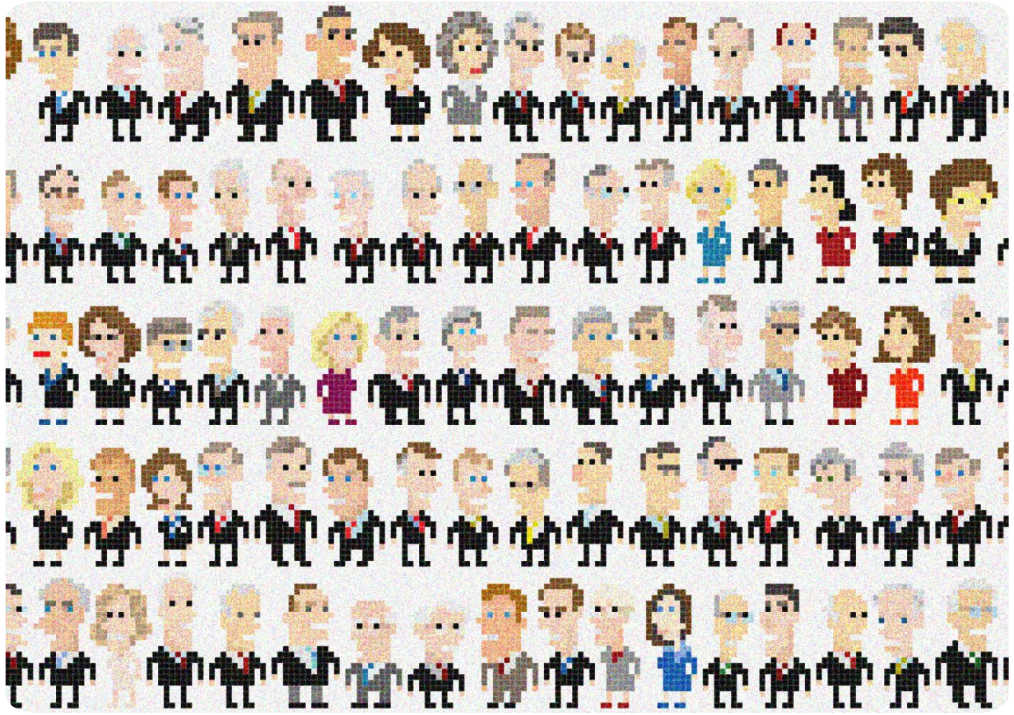
Early, light dinner

Diet

No smoking

Social life

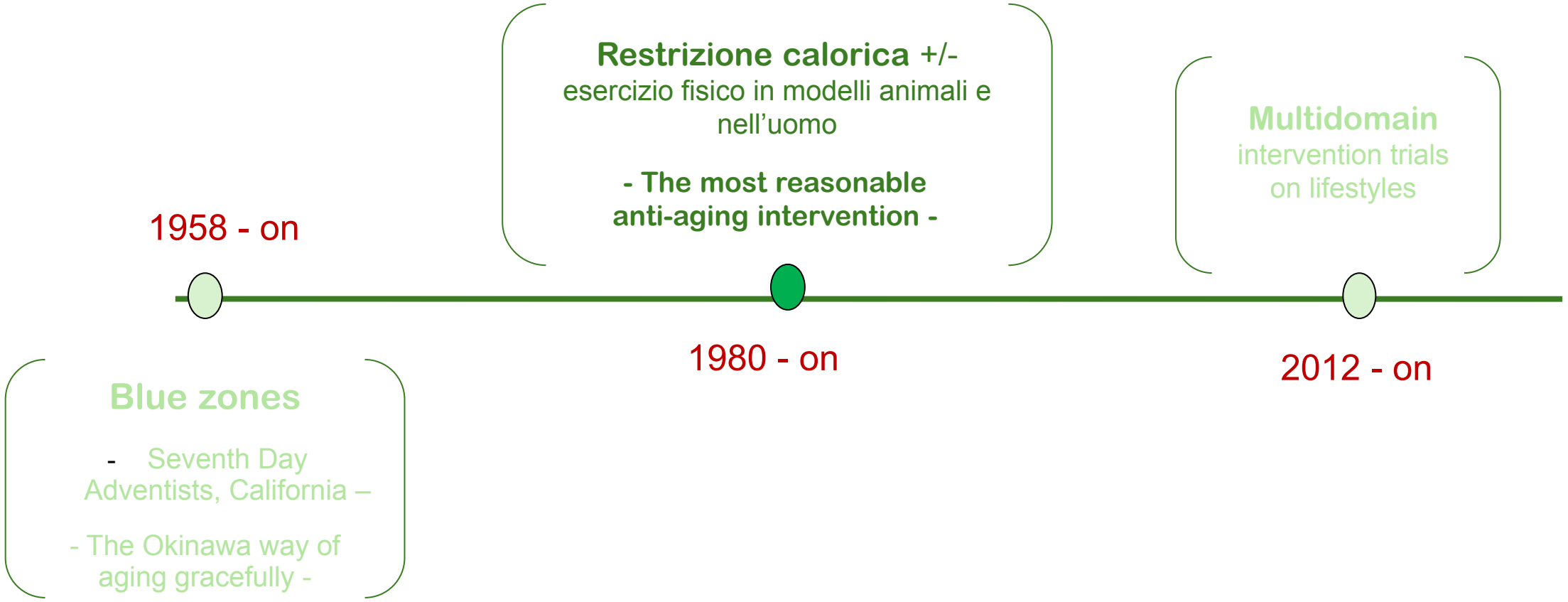

Radiation
Environmental factors
Food intake
Microbes
Antioxidants
ATP
Repair Mechanisms
ROS
Protection
Physical activity



Rete sociale:

- Influenza su stili di vita salutari (attività fisica)
- Migliori meccanismi di adattamento e risposte neuroendocrine allo stress
- Reciproca assistenza in caso di bisogno, accesso a risorse cognitive, affettive e informazioni rilevanti per la prevenzione

LA STORIA DEGLI STILI DI VITA



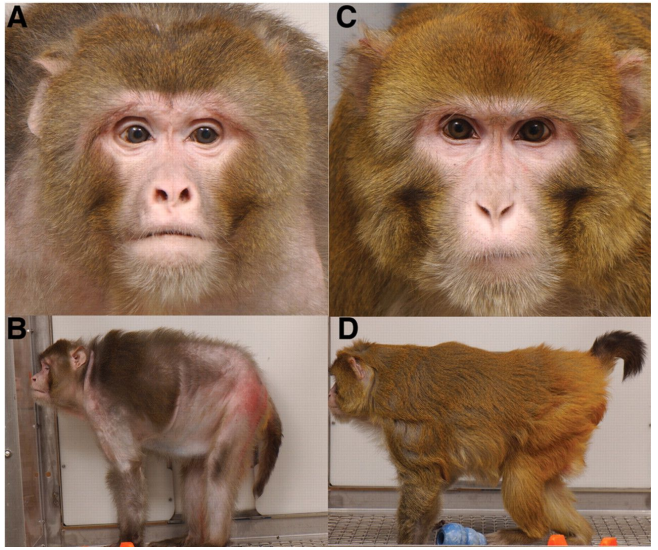
Wisconsin National Primate Research Center /1989

Restrizione Calorica

Science / dicembre 2009

Rhesus Monkeys

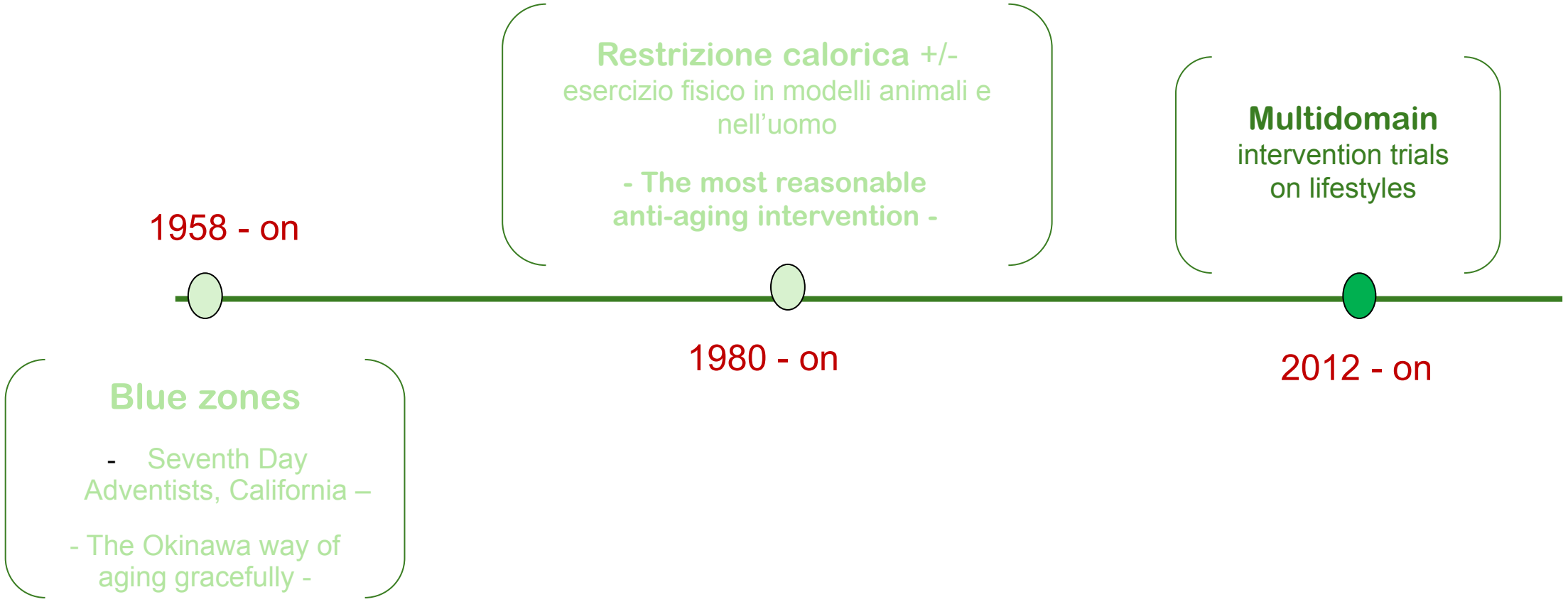
	RC (38) *(calorie: -30%)*	Controlli (38)
• *Mortalità*	13%	37%
• Peso corporeo	Ridotto	(rispetto ai controlli)
• Sarcopenia	Ritardata	(rispetto ai controlli)
• *Diabete*	Prevenzione completa	5 casi
• *Malattie cardio-vascolari*	Riduzione del 50%	
• *Neoplasie*	Riduzione del 50%	
• *Atrofia cerebrale*	Significativa riduzione	



Conclusioni: RC <

- Promuove la SOPRAVVIVENZA
- Ritarda l'inizio delle PATOLOGIE ETA'-ASSOCIATE

LA STORIA DEGLI STILI DI VITA

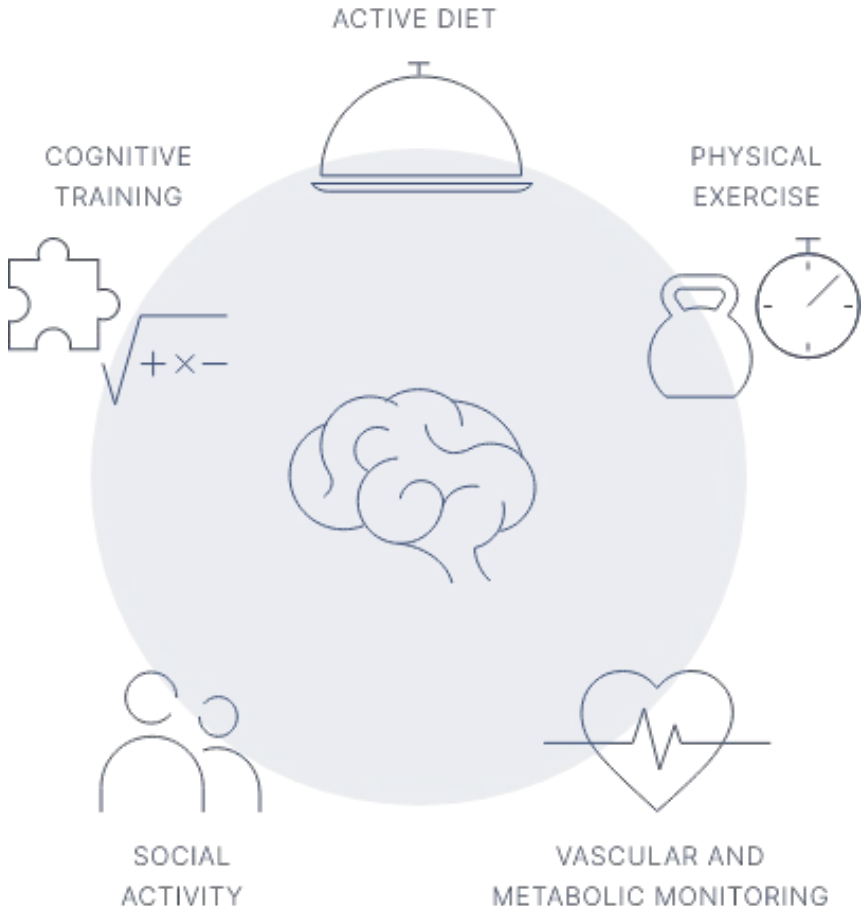


Multidomain intervention trials

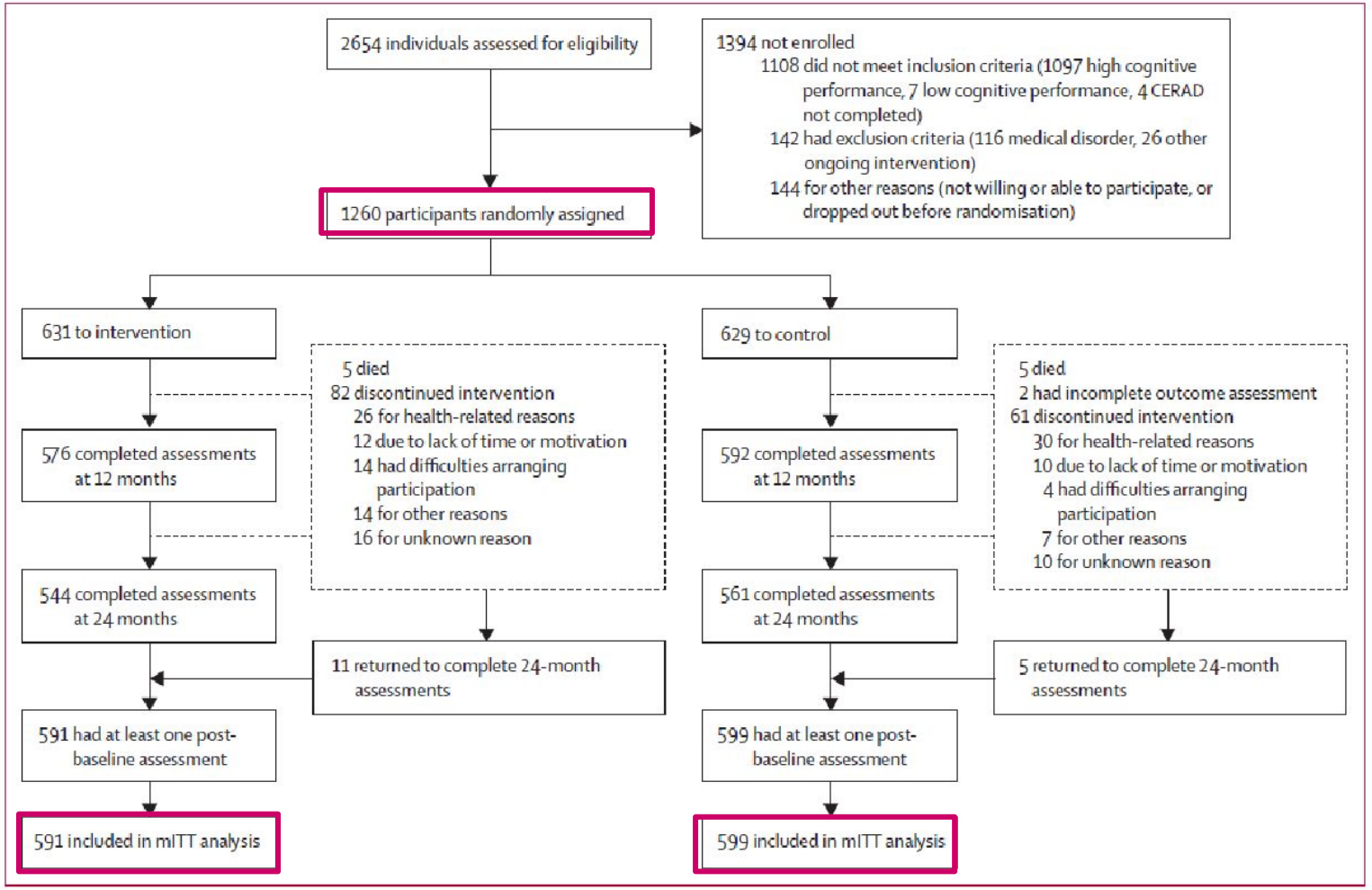
Pre-DIVA Prevention of dementia by intensive vascular care

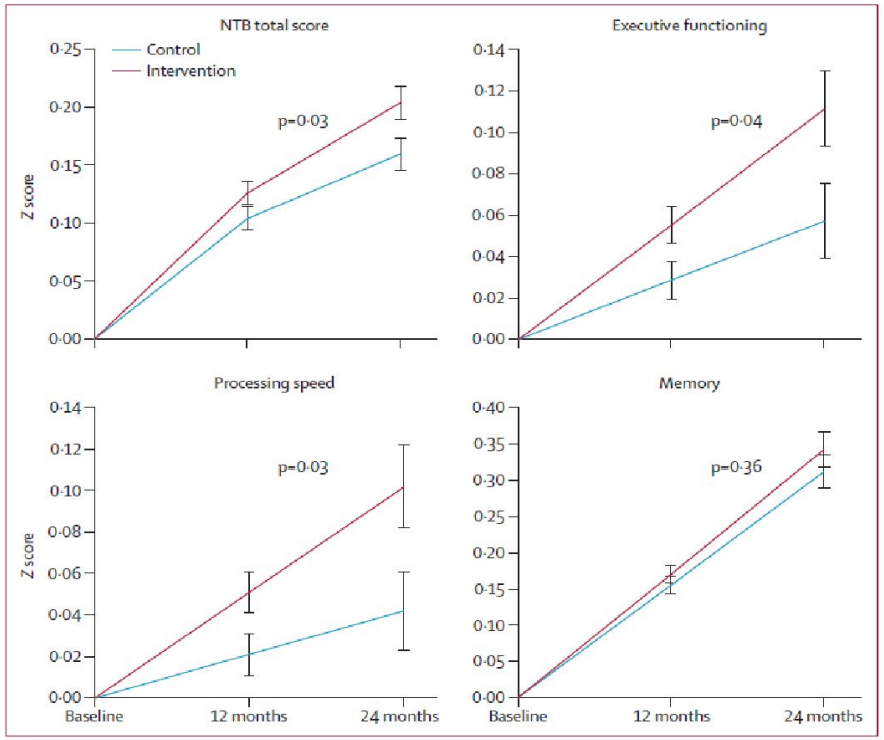
MAPT A MULTIDOMAIN APPROACH FOR PREVENTING ALZHEIMER'S DISEASE

FINGER Finnish Geriatric Intervention Study to Prevent Cognitive Impairment and Disability

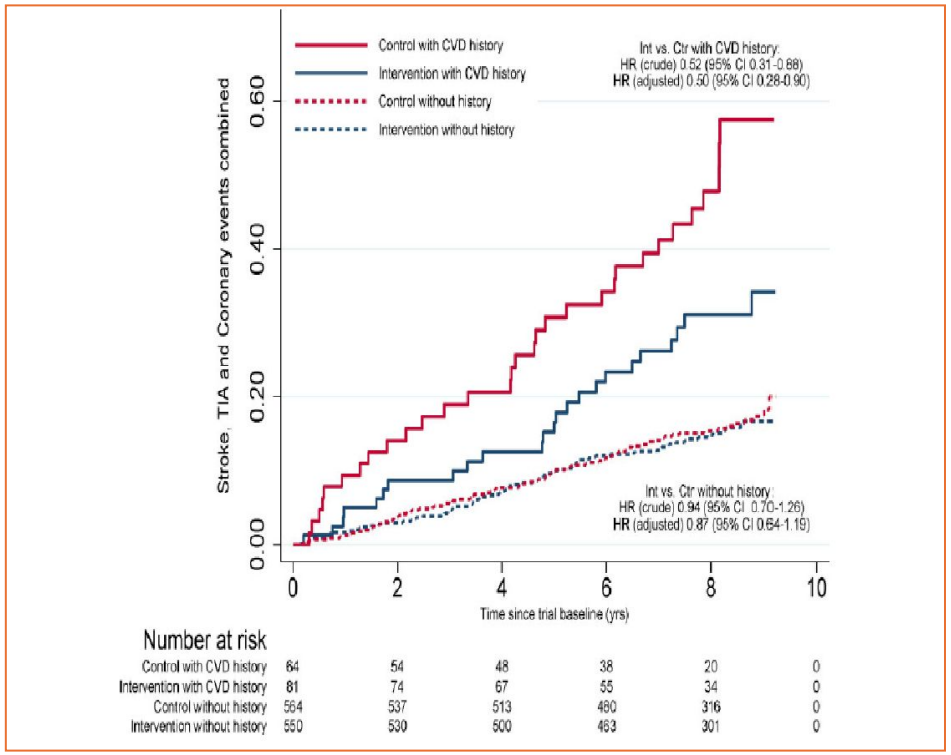


Finnish Geriatric Intervention Study to Prevent Cognitive Impairment and Disability – FINGER -





Ngandu et al. Lancet 2015



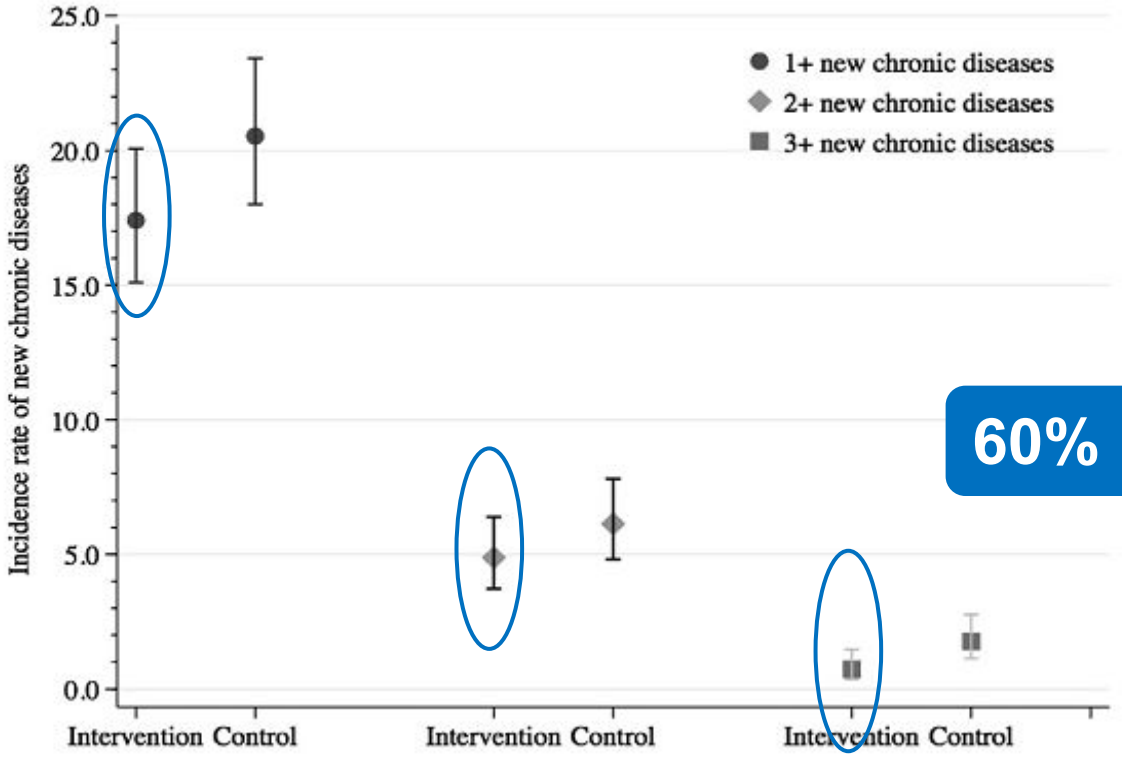
Lehtisalo et al. EHJ 2022

JAMDA

journal homepage: www.jamda.com

Original Study

The Effect of a 2-Year Intervention Consisting of Diet, Physical Exercise, Cognitive Training, and Monitoring of Vascular Risk on Chronic Morbidity—the FINGER Randomized Controlled Trial



60% lower risk

WORLD WIDE FINGERS
ALZHEIMER'S ASSOCIATION

Marengoni A, Rizzuto D et al. 2017

LETHE Project

As the world's population increases in age, the number of people living with **dementia** grows. Dementia has long been considered to be neither preventable nor treatable, but while the underlying illnesses are not curable, today we know that the disease course might be modifiable with good preventive interventions at an early time point.

LETHE will establish **novel digital biomarkers**, for early detection of risk factors, based on **unobtrusive ICT-based passive** and **active** monitoring. The aim is to establish a digital-enabled intervention for cognitive decline prevention based on the evolution of a successful protocol (**FINGER** study) evolving into an ICT based **preventive lifestyle intervention** through individualized **profiling, personalized recommendations, feedback** and **support** –**FINGER** 2.0-, well targeted on a population stratified by cost-effective biological biomarkers.

LETHE is leading to a more personalized risk factor prevention for persons in the initial stages of cognitive decline, thereby empowering people to an active and healthy lifestyle. Expansion of digital-enabled health preventive approaches, by reaching out to large populations, can save healthcare systems costs on expensive traditional interventions and confer benefits for the wider society.

https://www.lethe-project.eu/

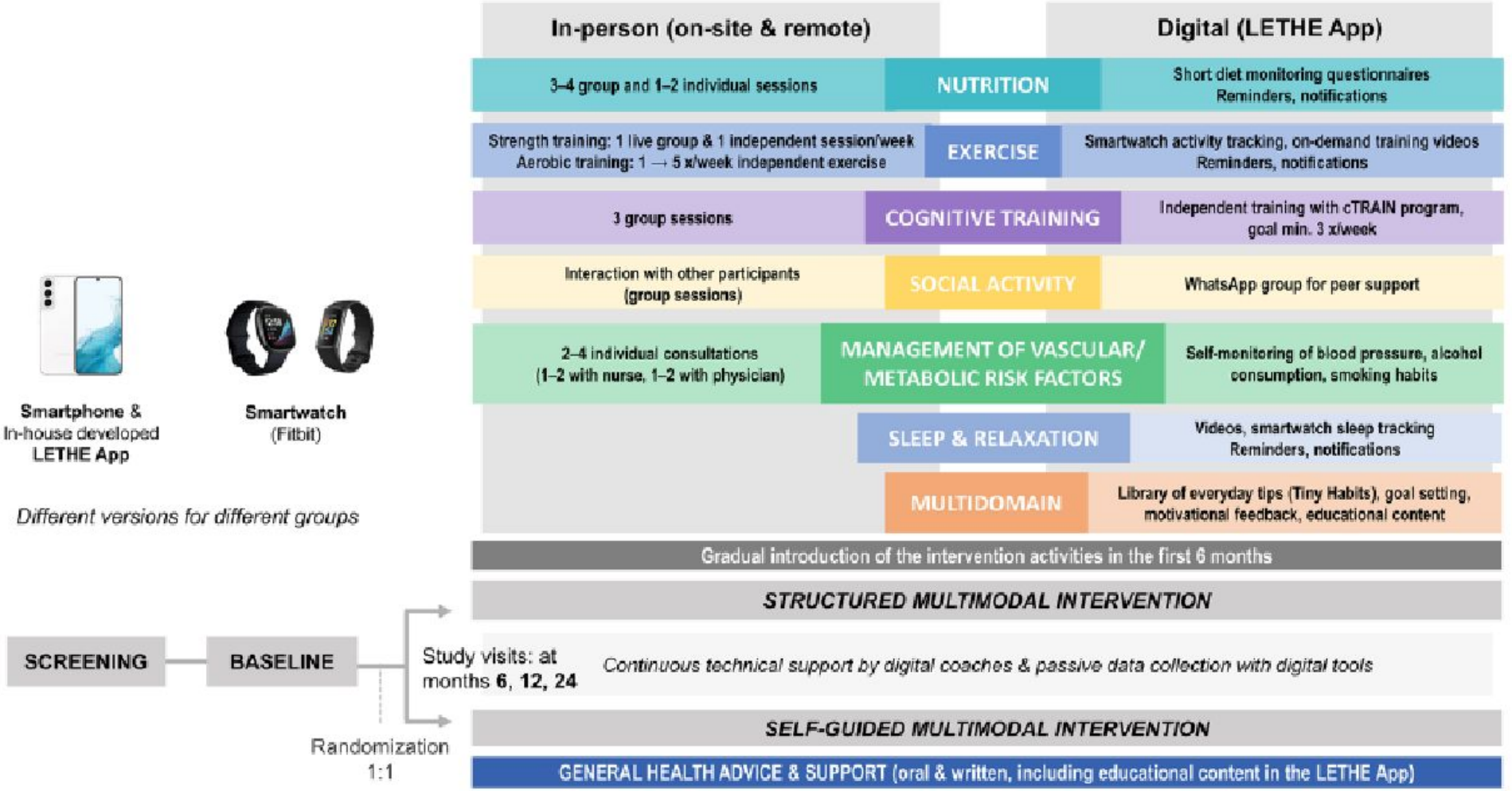


Fig. 1 Overview of the LETHE trial design

https://www.lethe-project.eu/

Article

A natural experiment on the effect of herpes zoster vaccination on dementia

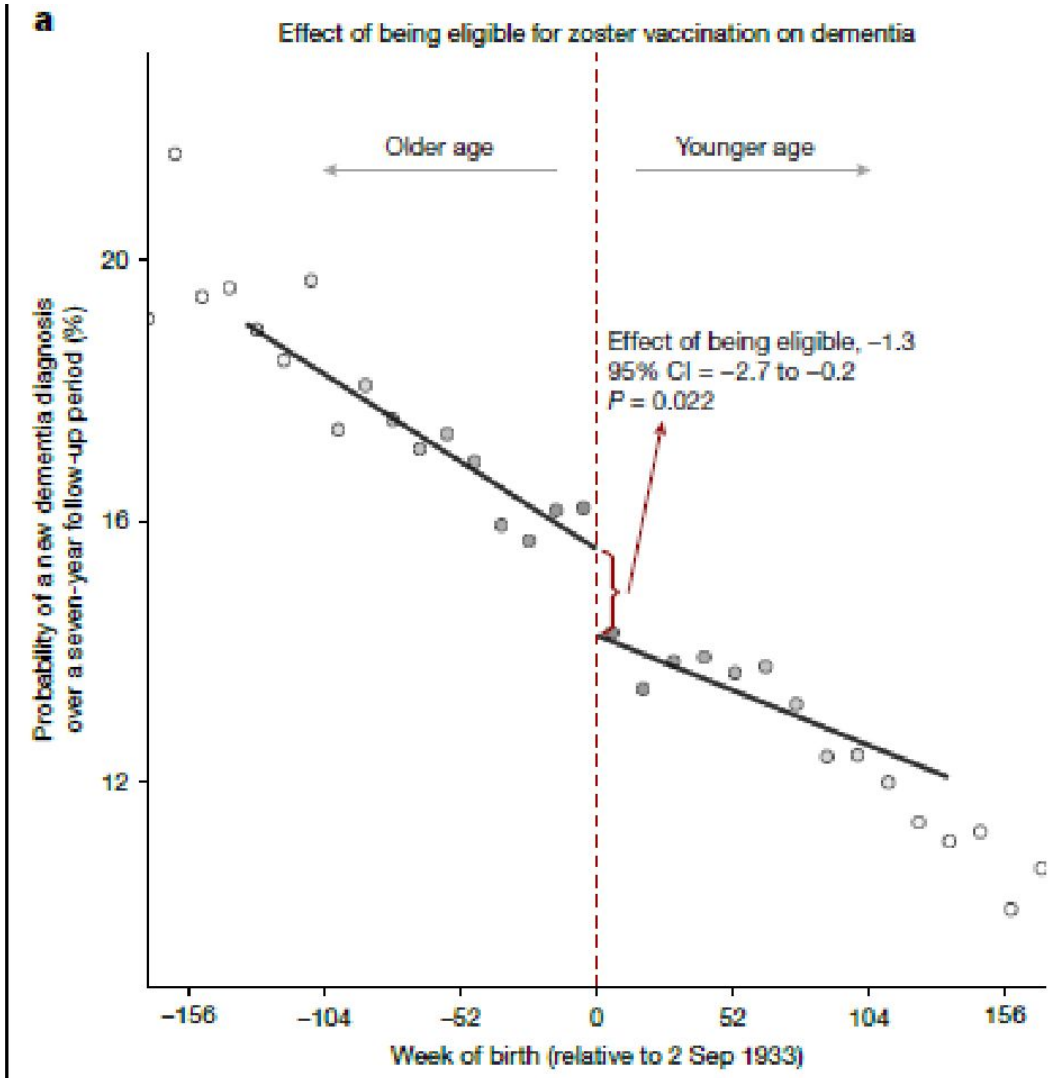


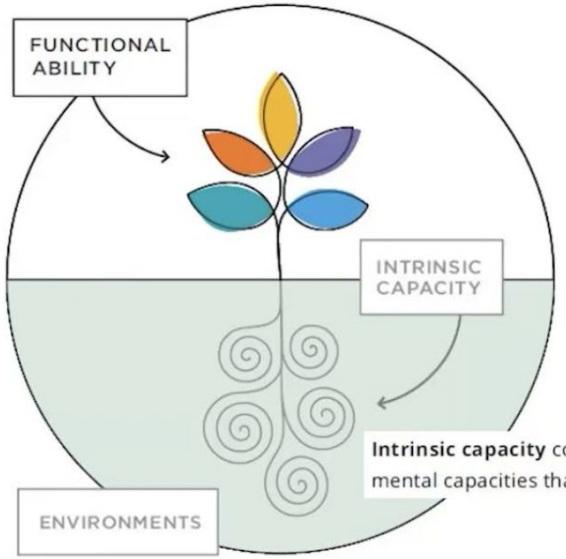
Fig. 3 | The effect of the zoster vaccine on new diagnoses of dementia.

Nature 2025

2015 WHO World report on Aging and Health

The three components of healthy ageing

Functional ability combines the intrinsic capacity of the individual, the environment a person lives in and how people interact with their environment.



Healthy ageing is "the process of developing and maintaining the functional ability that enables well-being in older age".

Intrinsic capacity comprises all the physical and mental capacities that a person can draw on.

Environments are where people live and conduct their lives. Environments shape what older people with a given level of intrinsic capacity can be and do.

WHO Decade of Healthy Ageing: Baseline report
https://apps.who.int/iris/handle/10665/338677

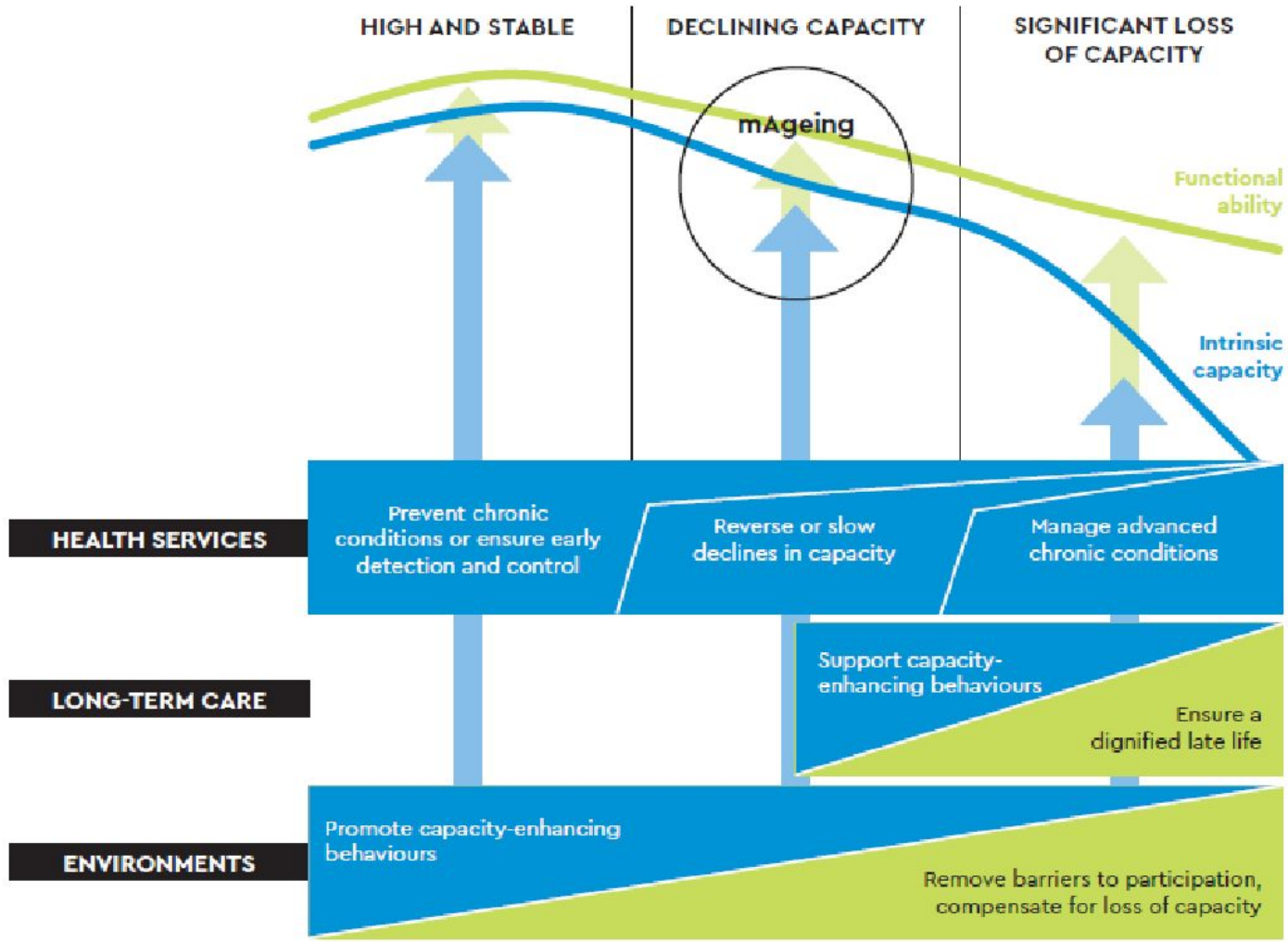
6 ACTIONS | to manage declines in the instrinsic capacity of older people

1. Improve musculoskeletal function, mobility and vitality
2. Maintain older adults' capacity to see and hear
3. Prevent severe cognitive impairment & promote psychological well-being
4. Manage age-related conditions such as urinary incontinence
5. Prevent falls
6. support caregivers*

mHealth, is defined as "medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants, and other wireless devices"

VACCINAZIONI		
>60 anni	Antiinfluenzale	Annuale
>65 anni	Antipneumococco coniugato + polisaccarido	Una volta (anche in concomitanza con il vaccino antiinfluenzale)
	Anti herpes zoster (2 dosi)	Una volta, a distanza di almeno 6 mesi dall'ultima infezione
	Difterite, tetano, pertosse	richiamo ogni 10 anni

FIGURE 1. A PUBLIC HEALTH FRAMEWORK FOR *HEALTHY AGEING*



Annals of Epidemiology 100 (2024) 1–9

Contents lists available at ScienceDirect

Annals of Epidemiology

journal homepage: www.sciencedirect.com/journal/annals-of-epidemiology

The influence of frailty: How the associations between modifiable risk factors and dementia vary

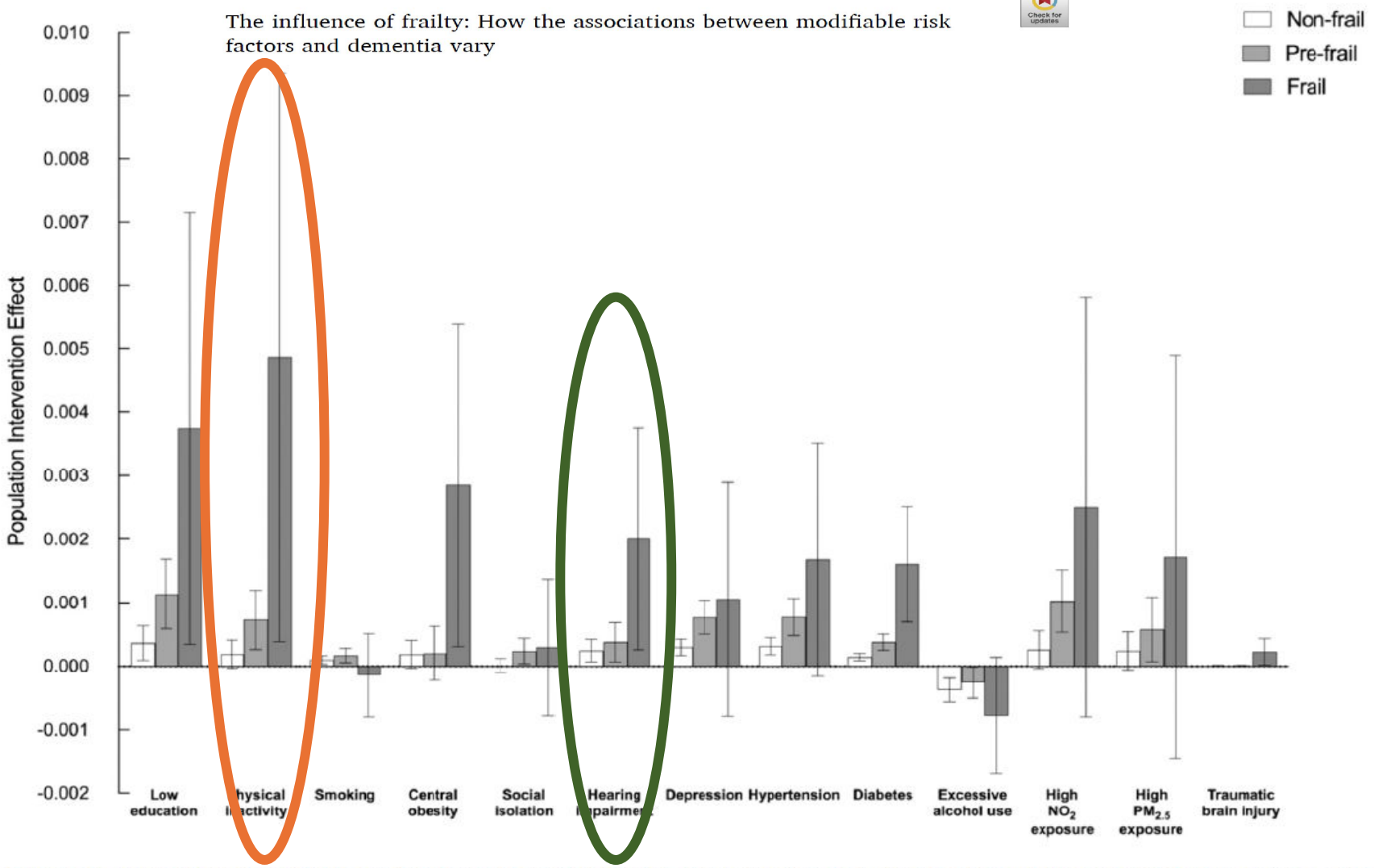


Fig. 2b. Population intervention effect (PIE) of each exposure for a hypothetical intervention of the randomly 50 % coverage among the non-frail (n = 222 740), prefrail (n = 145 663), and frail (n = 13 016) participants. **Note:** Each Q-model was adjusted for baseline age, sex, ethnicity, Townsend deprivation index, co-morbidity index, cognitive function, and APOE e4 carrier status.

RUOTA DEGLI ESERCIZI

CAMMINO

CAMMINA PER 20 MINUTI. RIPETI L'ESERCIZIO 2 VOLTE.

CAMMINA AD UNA VELOCITÀ CHE TI CONSENTA D'INTRATTENERE UNA CONVERSAZIONE PER TUTTA LA DURATA DELL'ESERCIZIO MA IN MODO TALE CHE LA CAMMINATA RISULTI ESSERE UN PO' FATICOSA.

DALLA SETTIMA SETTIMANA, CAMMINA 30-45 MINUTI SENZA FERMARTI.

RIPOSO

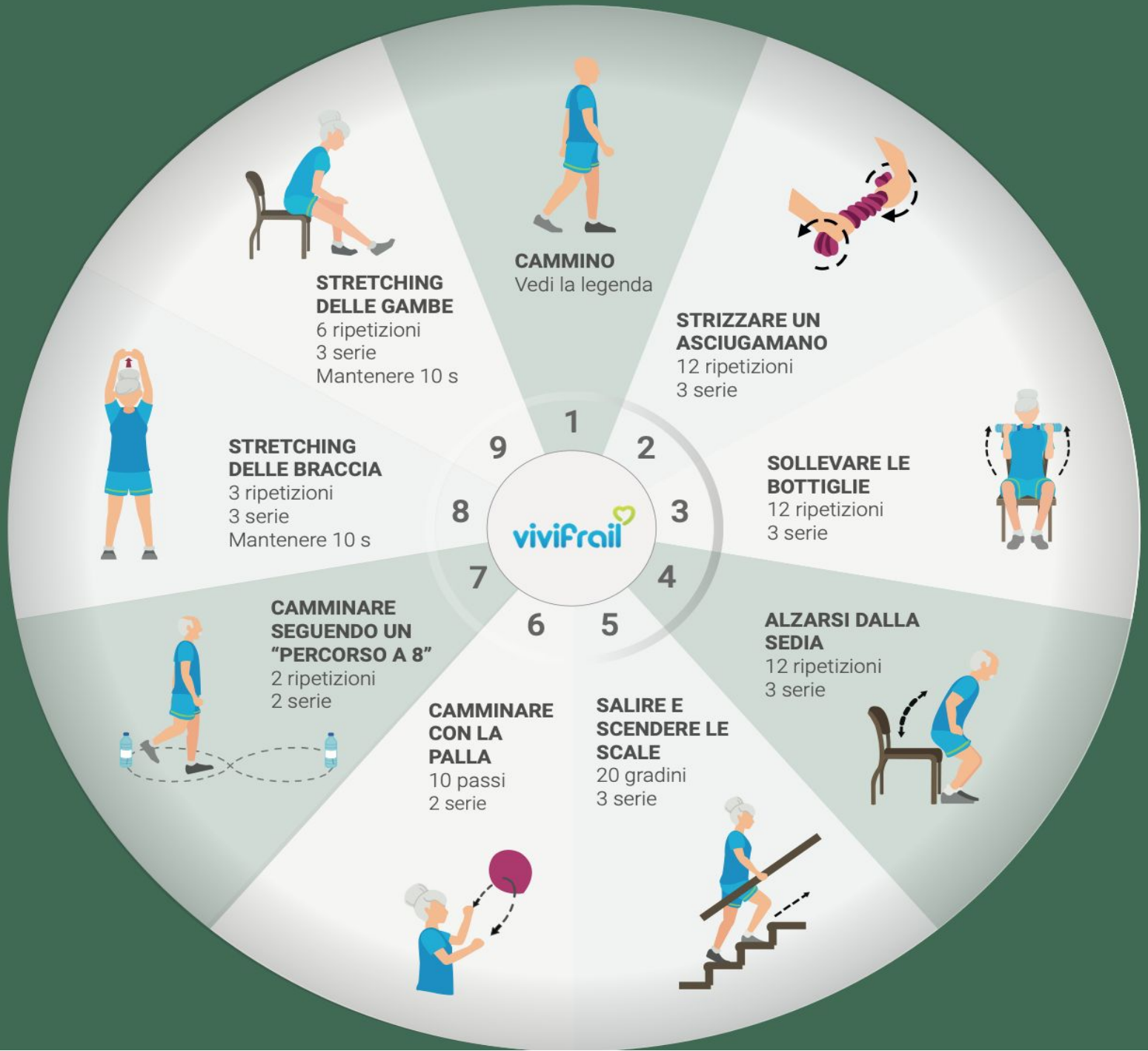
RICORDATI DI RIPOSARTI FRA LE DIFFERENTI SERIE.

RESPIRA CORRETTAMENTE

RESPIRA CORRETTAMENTE. NON TRATTENERE IL RESPIRO DURANTE GLI ESERCIZI.

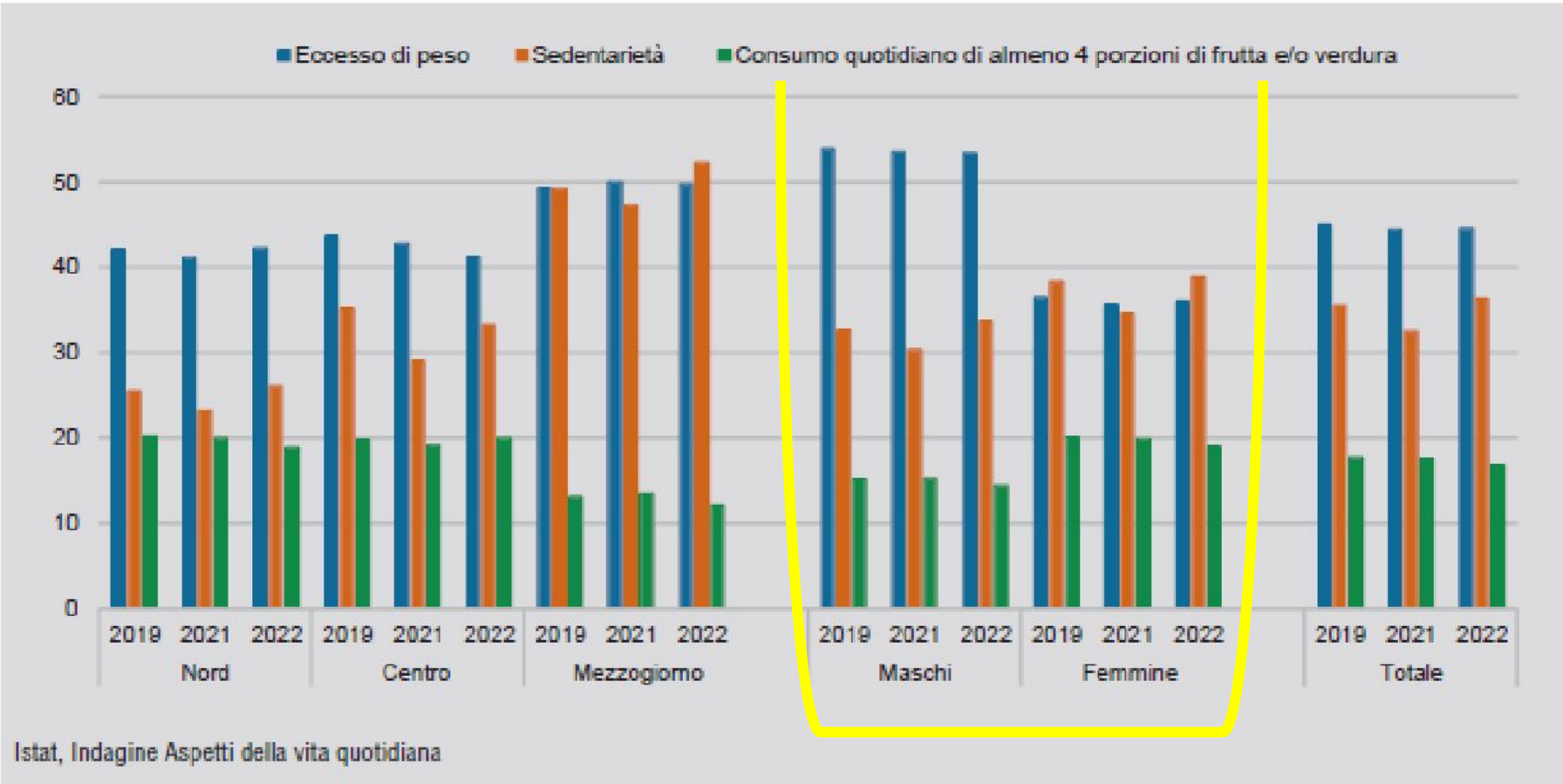
ESERCIZI

SE CI DOVESSERO ESSERE DUBBI SU COME ESEGUIRE GLI ESERCIZI, CONSULTA IL TUO PASSAPORTO.



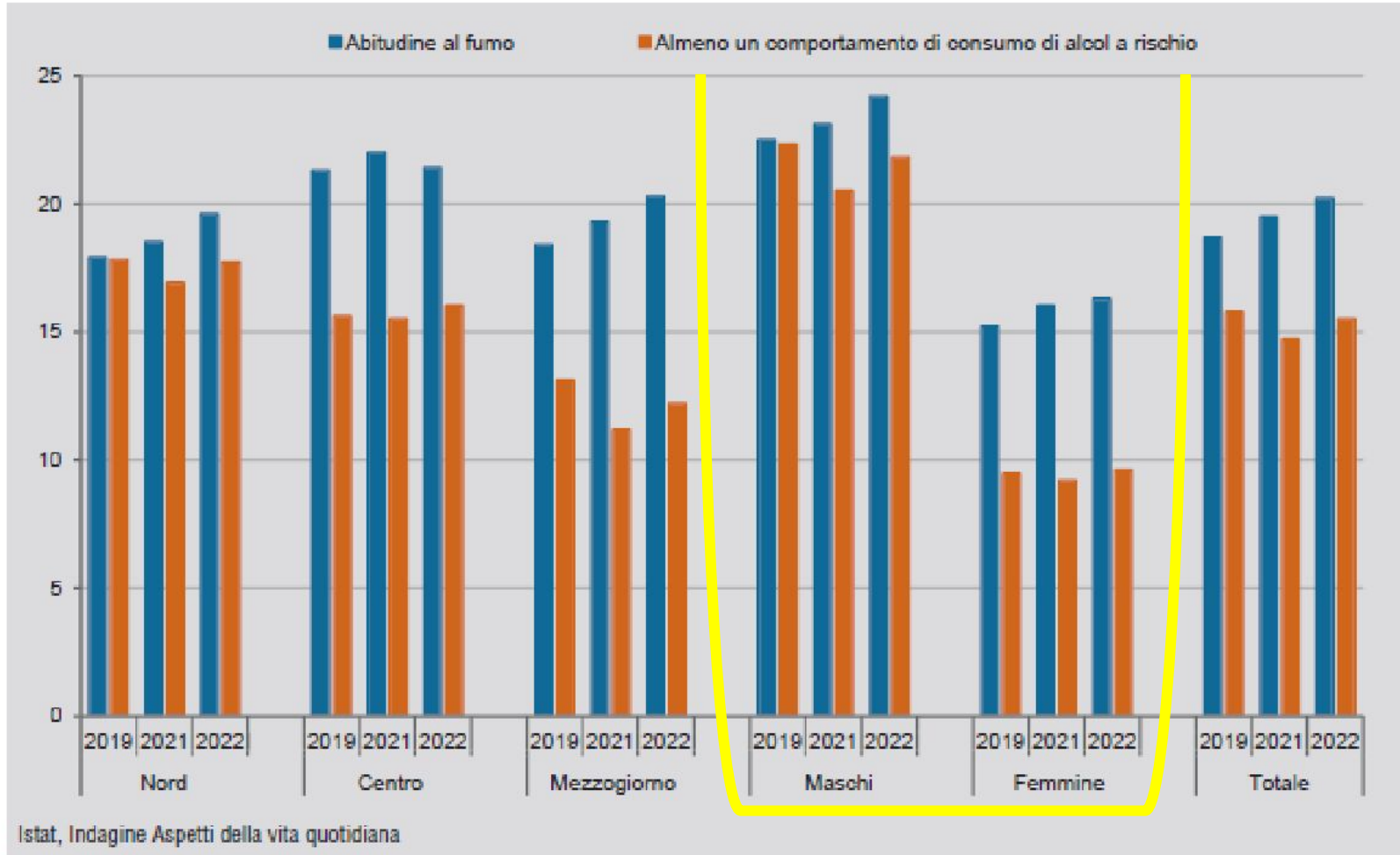
Il progetto è stato cofinanziato al 65% dal Fondo Europeo di Sviluppo Regionale (FESR)

Proporzione standardizzata di persone di 14 anni e più che non praticano alcuna attività fisica, proporzione standardizzata di persone di 18 anni e più in eccesso di peso e proporzione standardizzata di persone di 3 anni e più che consumano quotidianamente almeno 4 porzioni di frutta e/o verdura per sesso e ripartizione geografica. Anni 2019, 2021 e 2022. Valori percentuali



Istat, Indagine Aspetti della vita quotidiana

Proporzione standardizzata di persone di 14 anni e più che dichiarano di fumare attualmente e proporzione standardizzata di persone di 14 anni e più che presentano almeno un comportamento a rischio nel consumo di alcol per sesso e ripartizione geografica. Anni 2019, 2021 e 2022. Valori percentuali



Istat, Indagine Aspetti della vita quotidiana

GBD – GLOBAL BURDEN OF DISEASE

MALES

Leading risks 2021	Percent DALYs 2021	Percent change number of DALYs 2000-2021	Percent change age-standardised rate of DALYs 2000-2021
1 Smoking	9.0 (7.6 to 10.6)	12.4 (3.3 to 23.0)	-34.0 (-39.3 to -27.9)
2 Particulate matter pollution	8.5 (7.1 to 9.9)	-14.9 (-23.7 to -4.1)	-40.4 (-46.0 to -33.9)
3 High systolic blood pressure	8.1 (6.7 to 9.4)	39.4 (29.5 to 50.6)	-21.0 (-26.5 to -15.0)
4 Low birth weight and short gestation	5.9 (5.2 to 6.7)	-32.4 (-41.4 to -21.6)	-32.6 (-41.7 to -21.7)
5 High fasting plasma glucose	5.3 (4.7 to 5.9)	89.6 (79.3 to 100.0)	7.6 (2.0 to 13.7)
6 High body-mass index	3.9 (1.8 to 6.0)	100.2 (89.6 to 111.9)	18.8 (12.2 to 25.9)
7 High alcohol use	3.9 (3.2 to 4.8)	13.9 (3.0 to 23.5)	-24.4 (-31.4 to -18.0)
8 High LDL cholesterol	3.4 (2.2 to 4.7)	29.7 (21.7 to 39.2)	-23.5 (-27.9 to -18.4)
9 Kidney dysfunction	3.0 (2.7 to 3.4)	52.8 (44.2 to 62.8)	-10.3 (-15.3 to -4.7)
10 Child growth failure	2.6 (1.4 to 3.5)	-68.6 (-76.8 to -60.4)	-70.3 (-78.0 to -62.5)
11 Occupational injuries	1.8 (1.6 to 1.9)	-24.5 (-30.5 to -18.9)	-43.1 (-47.7 to -38.9)
12 Diet high in sodium	1.7 (0.4 to 3.7)	31.9 (6.1 to 50.3)	-24.3 (-38.4 to -13.5)
13 Diet low in fruits	1.6 (0.6 to 2.5)	22.0 (13.5 to 33.4)	-26.3 (-31.3 to -20.2)
14 Diet low in whole grains	1.6 (0.7 to 2.4)	32.1 (24.1 to 40.7)	-21.4 (-25.7 to -16.2)
15 Unsafe water source	1.4 (0.7 to 2.0)	-60.1 (-68.0 to -51.3)	-66.0 (-72.8 to -58.3)
16 Lead exposure	1.3 (-0.1 to 2.6)	28.5 (7.7 to 45.0)	-23.8 (-29.8 to -16.3)
17 Drug use	1.2 (1.1 to 1.3)	27.5 (20.0 to 35.0)	-7.4 (-12.8 to -2.1)
18 Secondhand smoke	1.1 (0.6 to 1.7)	-12.9 (-20.5 to -1.6)	-41.7 (-46.3 to -35.7)
19 Unsafe sanitation	1.1 (0.8 to 1.5)	-63.6 (-70.5 to -55.5)	-68.9 (-74.8 to -61.7)
20 Unsafe sex	1.0 (0.9 to 1.1)	-38.0 (-47.5 to -22.6)	-54.1 (-60.8 to -43.2)
21 Low temperature	0.9 (0.7 to 1.0)	22.2 (8.4 to 39.7)	-35.3 (-41.4 to -28.3)
22 No access to handwashing facility	0.8 (-0.2 to 1.8)	-59.4 (-69.2 to -50.7)	-64.7 (-73.4 to -56.7)
23 Diet low in vegetables	0.7 (0.4 to 1.0)	18.0 (8.9 to 32.2)	-30.6 (-35.8 to -23.5)
24 Diet low in omega-6 polyunsaturated fatty acids	0.7 (-2.4 to 2.7)	34.8 (22.8 to 43.4)	-19.1 (-24.9 to -13.1)
25 Diet low in nuts and seeds	0.7 (0.2 to 1.1)	12.1 (3.9 to 20.9)	-32.1 (-37.0 to -27.0)

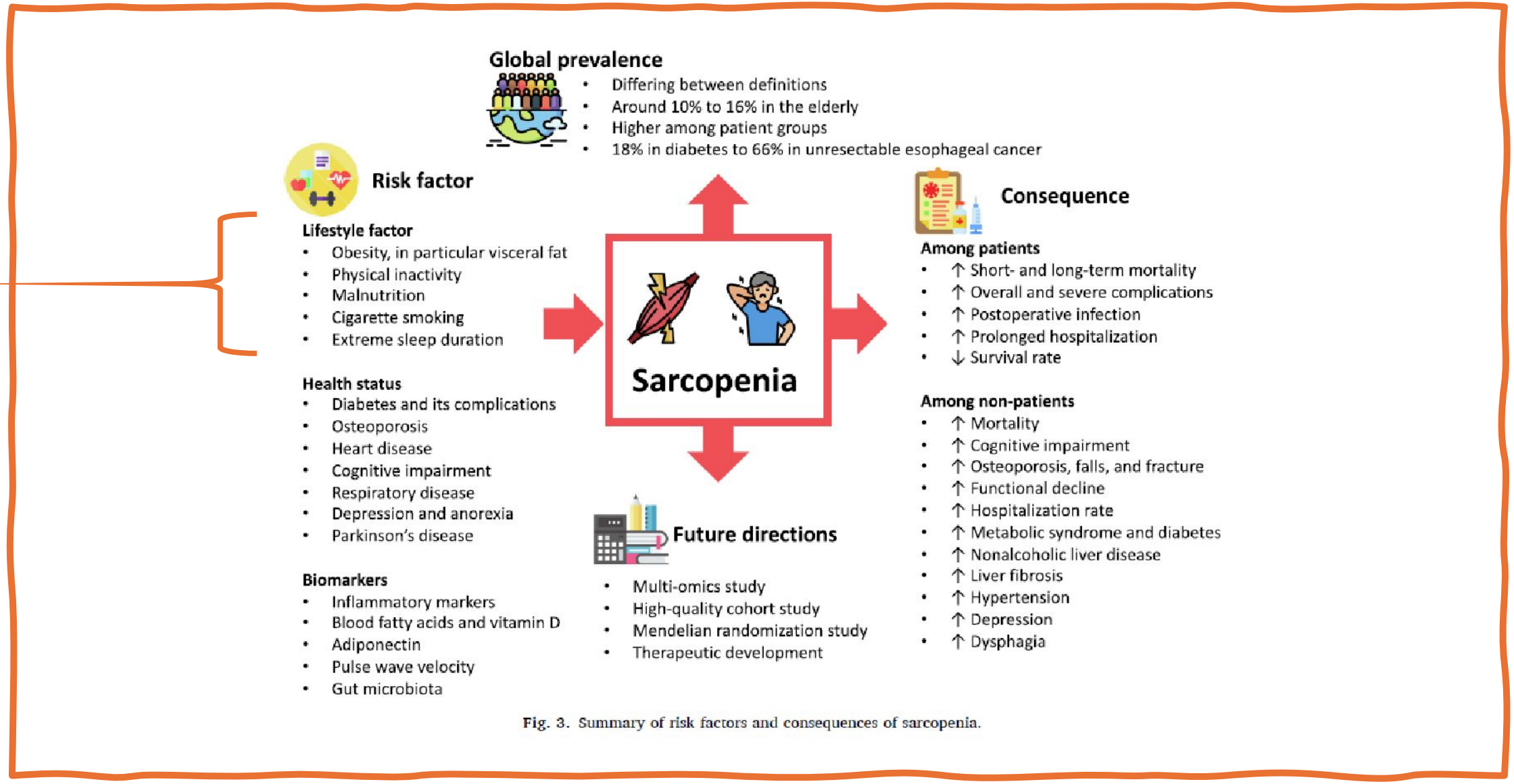


Fig. 3. Summary of risk factors and consequences of sarcopenia.

GBD FEMALES

Early life nutritional deprivation in Africa and Asia where boys receive better nourishment than girls

Leading risks 2021	Percent DALYs 2021	Percent change number of DALYs 2000-2021	Percent change age-standardised rate of DALYs 2000-2021
1 High systolic blood pressure	7.6 (6.1 to 8.9)	28.4 (19.2 to 37.1)	-27.8 (-33.1 to -22.9)
2 Particulate matter pollution	7.5 (6.1 to 8.8)	-20.1 (-29.4 to -7.5)	-44.0 (-49.9 to -36.1)
3 High fasting plasma glucose	5.5 (4.8 to 6.2)	86.5 (77.4 to 96.0)	7.8 (2.5 to 13.6)
4 Low birth weight and short gestation	5.1 (4.4 to 5.8)	-32.5 (-40.8 to -23.1)	-33.5 (-41.6 to -24.1)
5 High body-mass index	5.1 (2.1 to 7.8)	93.2 (82.8 to 103.5)	13.7 (7.4 to 20.2)
6 Kidney dysfunction	2.9 (2.6 to 3.3)	45.7 (37.0 to 54.9)	-14.8 (-19.9 to -9.3)
7 High LDL cholesterol	2.6 (1.5 to 3.7)	23.1 (15.2 to 30.6)	-29.2 (-33.6 to -24.8)
8 Child growth failure	2.6 (1.4 to 3.6)	-71.0 (-78.9 to -64.1)	-72.8 (-80.2 to -66.1)
9 Unsafe sex	2.2 (2.0 to 2.4)	-33.3 (-43.2 to -18.8)	-51.5 (-58.1 to -41.8)
10 Smoking	1.9 (1.5 to 2.4)	2.9 (-4.4 to 10.7)	-40.3 (-44.6 to -35.7)
11 Iron deficiency	1.9 (1.4 to 2.4)	7.5 (2.5 to 12.3)	-14.0 (-17.9 to -10.1)
12 Unsafe water source	1.5 (0.7 to 2.2)	-60.2 (-69.1 to -52.4)	-66.8 (-73.7 to -60.3)
13 Diet low in fruits	1.4 (0.6 to 2.1)	23.3 (13.7 to 39.8)	-27.1 (-32.7 to -18.3)
14 Secondhand smoke	1.3 (0.7 to 2.0)	-18.9 (-26.6 to -8.6)	-48.3 (-52.8 to -42.8)
15 Diet low in whole grains	1.2 (0.5 to 1.8)	26.8 (19.3 to 35.1)	-26.0 (-30.4 to -21.2)
16 Unsafe sanitation	1.1 (0.8 to 1.5)	-64.1 (-71.7 to -56.9)	-69.8 (-75.8 to -63.3)
17 Diet high in sodium	1.1 (0.2 to 2.7)	20.2 (-15.0 to 35.8)	-31.6 (-51.0 to -22.9)
18 Lead exposure	1.0 (-0.0 to 2.1)	29.2 (2.2 to 42.0)	-24.0 (-30.4 to -17.0)
19 Low temperature	0.9 (0.8 to 1.0)	-1.8 (-13.0 to 9.7)	-44.1 (-49.4 to -38.7)
20 High alcohol use	0.8 (0.7 to 1.0)	4.9 (-2.1 to 12.5)	-32.3 (-36.8 to -27.3)
21 No access to handwashing facility	0.8 (-0.2 to 1.8)	-61.6 (-70.4 to -52.5)	-66.9 (-74.4 to -58.7)
22 Low physical activity	0.7 (0.3 to 1.1)	61.3 (47.6 to 77.6)	-9.0 (-17.0 to 1.1)
23 Diet low in vegetables	0.7 (0.4 to 1.0)	26.8 (16.3 to 42.0)	-26.1 (-32.4 to -17.6)
24 Low bone mineral density	0.7 (0.6 to 0.8)	61.5 (55.5 to 68.0)	-9.6 (-12.9 to -6.2)
25 Drug use	0.7 (0.6 to 0.8)	39.5 (29.5 to 49.2)	2.1 (-5.1 to 9.4)

Men and women, with normal BMI, are shaped differently with men showing an upper body distribution of fat (visceral fat), while women mainly a lower body distribution (subcutaneous fat). This difference in fat depot distribution is of particular interest from a clinical point of view since obesity-linked metabolic diseases such as T2D, metabolic syndrome, CVD, and cancer as well, associate mainly with the “android” distribution of fat
over the
last decades, the prevalence of abdominal obesity as well as that of the associated metabolic syndrome have increased more in women than in men