



UNIVERSITÀ  
DEGLI STUDI  
DI MILANO



FONDAZIONE IRCCS CA' GRANDA  
OSPEDALE MAGGIORE POLICLINICO

Sistema Sanitario  Regione  
Lombardia

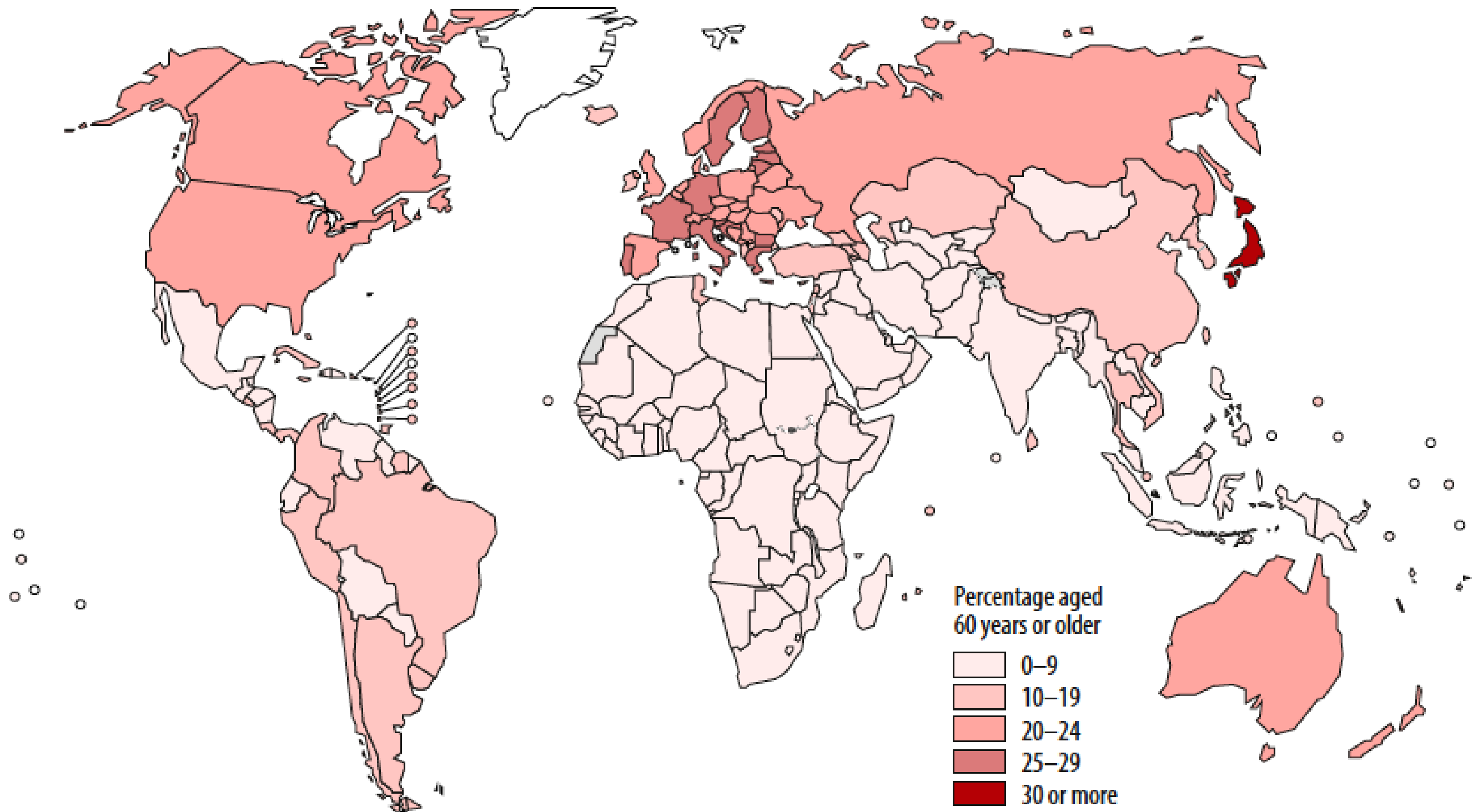
# Il costrutto della capacità intrinseca

Matteo Cesari, MD, PhD

15 Novembre 2018

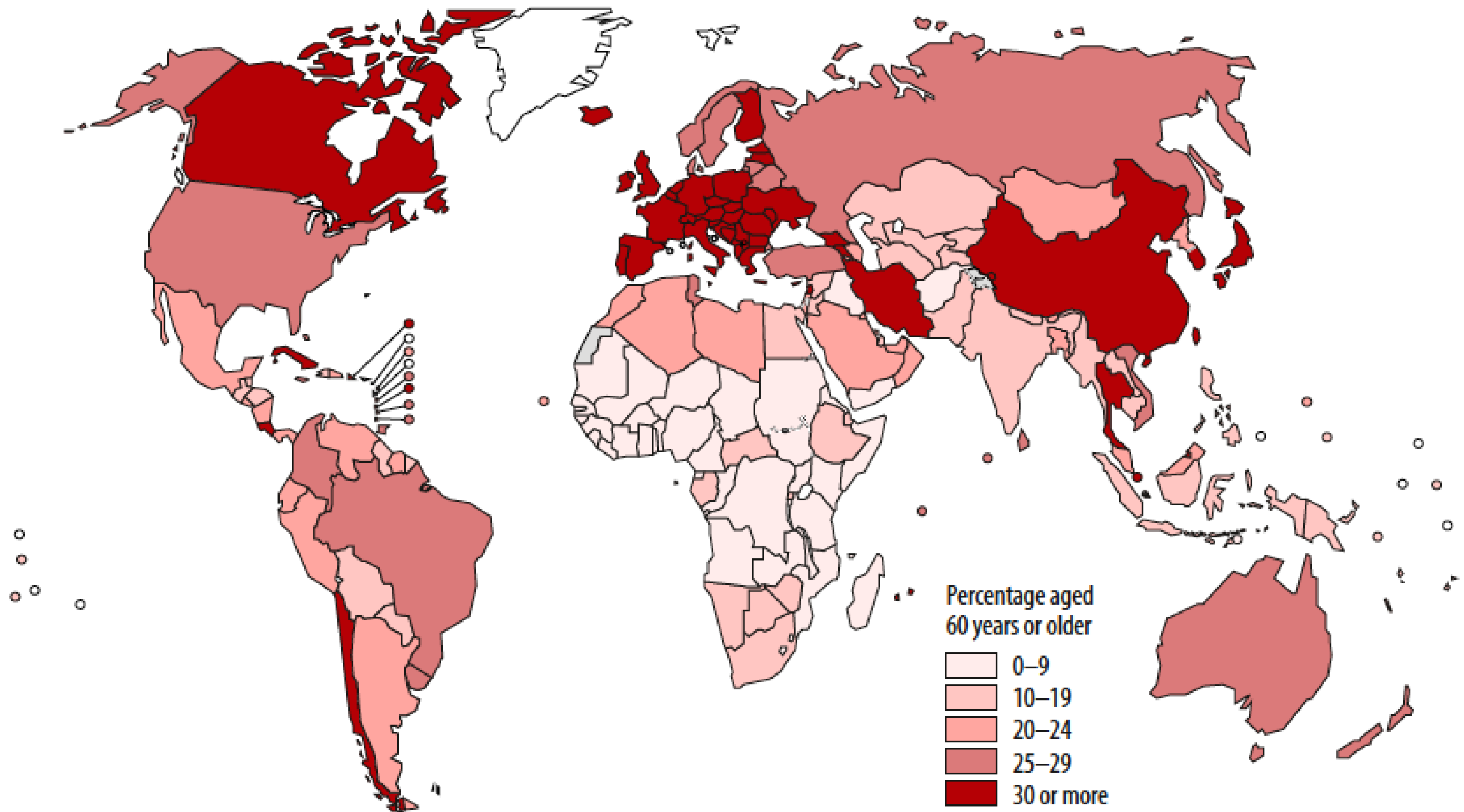
# Population aging

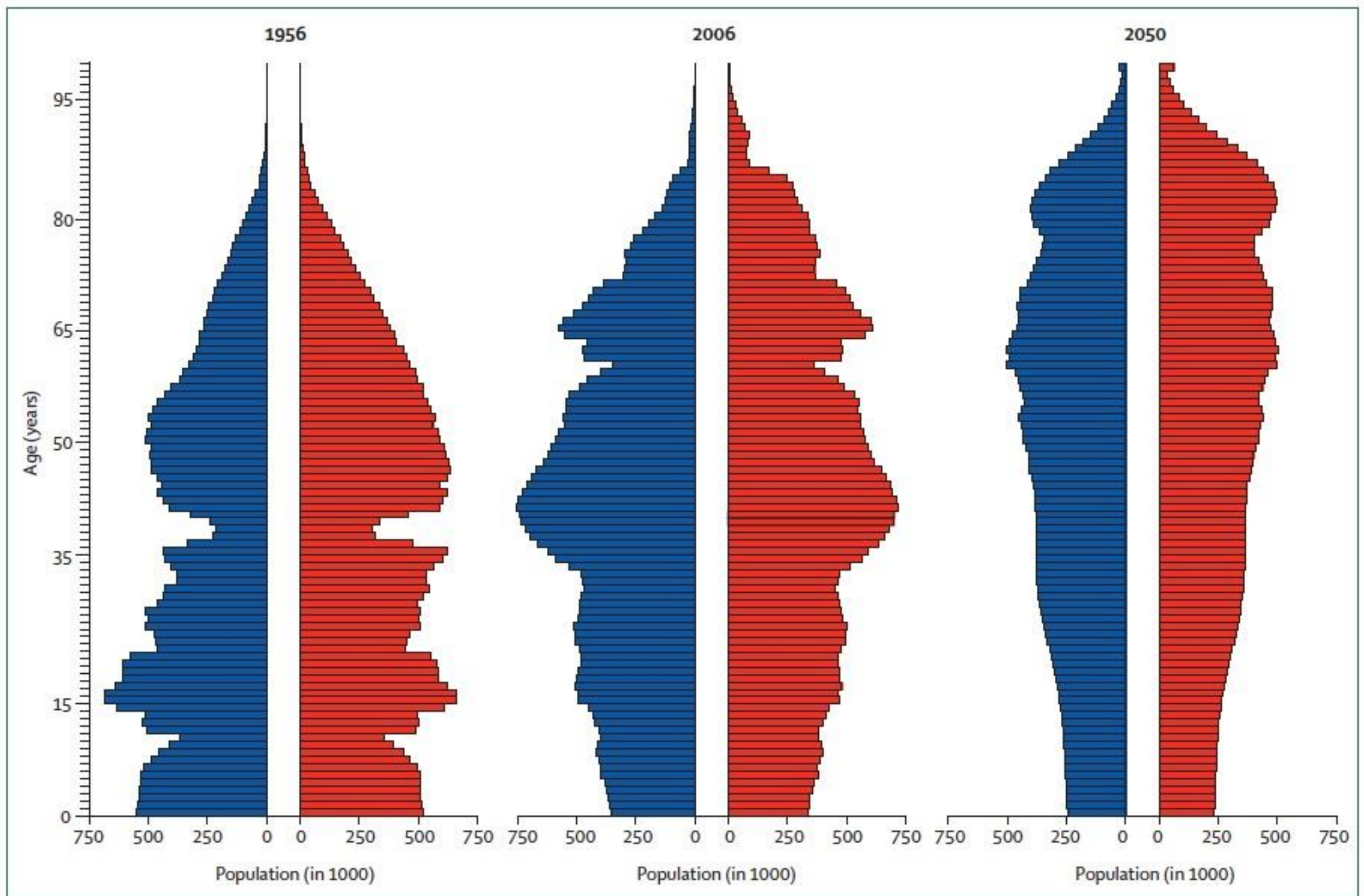
Proportion of population aged 60 years or older, 2015



# Population aging

Proportion of population aged 60 years or older, 2050 projections





**Figure 3: Population pyramids for Germany in 1956, 2006, and 2050**

Horizontal bars are proportional to number of men (blue) and women (red). Data for 2050 are based on the German Federal Statistical Office's 1-W1 scenario, which assumes a roughly constant total fertility rate of 1.4, yearly net migration of 100 000 and life expectancy in 2050 reaching 83.5 years for men and 88.0 years for women. Data from reference 33 and the Human Mortality Database.



## Japanese demography

## Desperately seeking young people

There aren't many, and cities are growing desperate

Jan 7th 2017 | TAMA



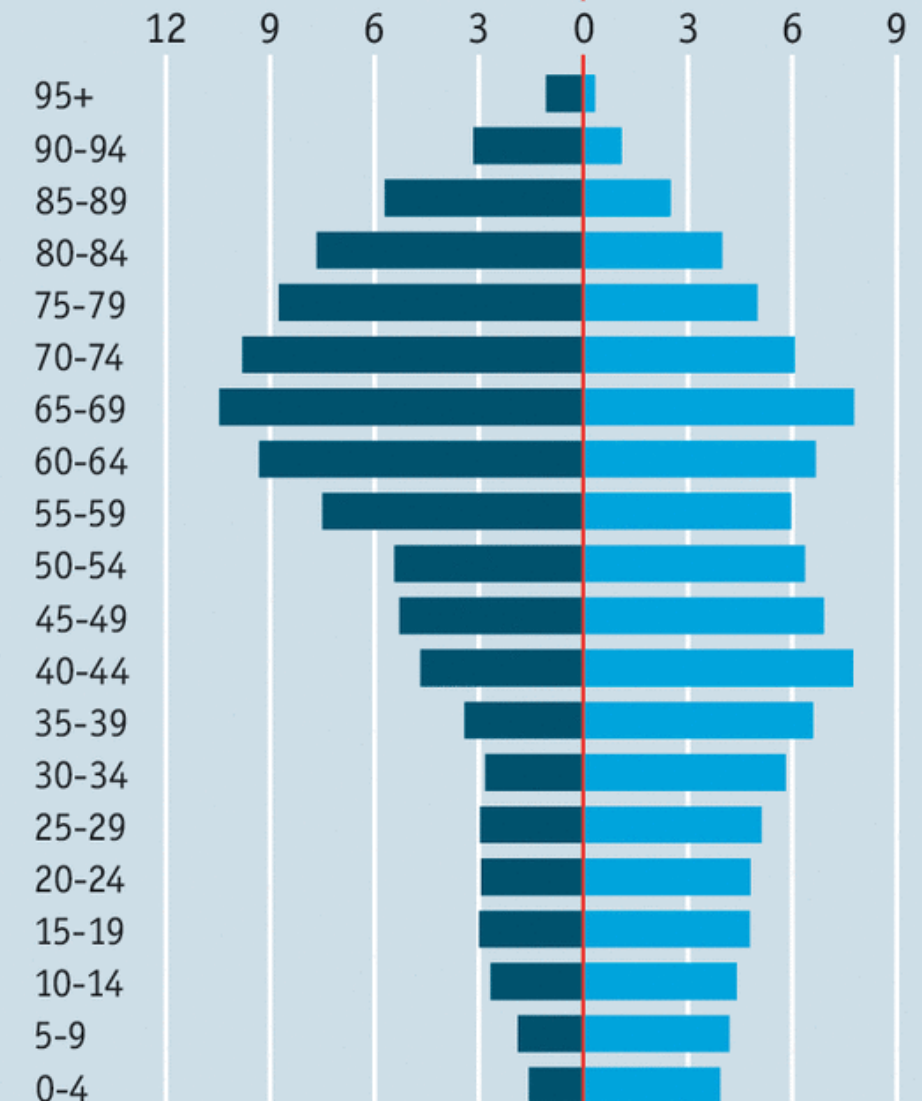
7.7K



## Where are the kids?

Population of Okutama and Japan  
Five-year age groups, 2015, % of total

OKUTAMA, TOKYO PREFECTURE ◀ ▶ JAPAN



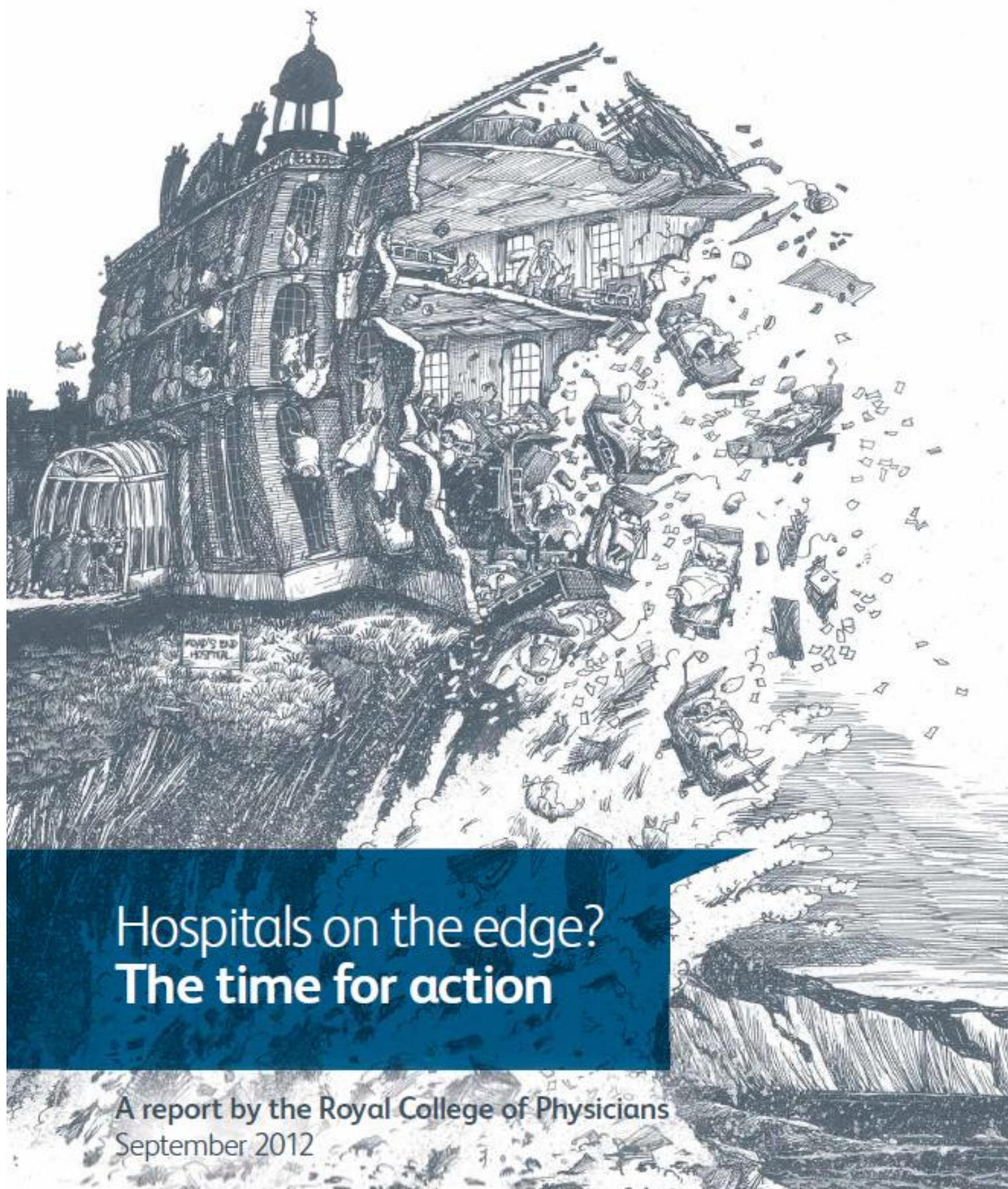
Sources: Okutama town records; Statistics Japan





Royal College  
of Physicians

Setting higher standards



## Hospitals on the edge? **The time for action**

A report by the Royal College of Physicians  
September 2012



# 105-Year-Old Cyclist Rides 14 Miles In An Hour En Route To A World Record

January 4, 2017 · 2:44 PM ET



**Robert Marchand (age 105 yo)**

26.925 kilometers in an hour  
*-50.6% compared to respective world record*

Age and Ageing 2016; **45**: 729–733  
 doi: 10.1093/ageing/afw111  
 Published electronically 4 July 2016

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## Centenarian athletes: Examples of ultimate human performance?

ROMUALD LEPERS<sup>1</sup>, PAUL J. STAPLEY<sup>2</sup>, THOMAS CATTAGNI<sup>3</sup>

REVIEW

*Photos courtesy of Giovanni Guaraldi*

## Geriatric syndromes: How to treat

Matteo Cesari<sup>a,b</sup>, Emanuele Marzetti<sup>c</sup>, Marco Canevelli<sup>d</sup>, and Giovanni Guaraldi<sup>e</sup>

2002 (39 yrs)  
CD4=477 cells/ $\mu$ L  
HIV1-RNA<40 copies/mL  
TDF+FTC+NEV



2011 (47 yrs)  
CD4=715 cells/ $\mu$ L  
HIV1-RNA<40 copies/mL  
TDF+FTC+NEV



2015 (51 yrs)  
CD4=357 cells/ $\mu$ L  
HIV1-RNA non detectable  
RAL+NEV





## SPECIAL ARTICLES

# The End of the Disease Era

Mary E. Tinetti, MD, Terri Fried, MD

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The time has come to abandon disease as the focus of medical care. The changed spectrum of health, the complex interplay of biological and nonbiological factors, the aging population, and the interindividual variability in health priorities render medical care that is centered on the diagnosis and treatment of individual diseases at best out of date and at worst harmful. A primary focus on disease may inadvertently lead to undertreatment, overtreatment, or mistreatment. The numerous strategies that have evolved to address the limitations of the disease model, although laudable, are offered only to a select subset of persons and often further fragment care. Clinical decision making for all patients should be predicated on the attainment of

individual goals and the identification and treatment of all modifiable biological and nonbiological factors, rather than solely on the diagnosis, treatment, or prevention of individual diseases. Anticipated arguments against a more integrated and individualized approach range from concerns about medicalization of life problems to “this is nothing new” and “resources would be better spent determining the underlying biological mechanisms.” The perception that the disease model is “truth” rather than a previously useful model will be a barrier as well. Notwithstanding these barriers, medical care must evolve to meet the health care needs of patients in the 21st century. *Am J Med.* 2004;116:179–185. ©2004 by Excerpta Medica Inc.

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"...The time has come to abandon disease as the primary focus of medical care. When disease became the focus of Western medicine in the 19th and early 20th century, the average life expectancy was 47 years and most clinical encounters were for acute illness. Today, the average life expectancy in developed countries is 74 years and increasing, and most clinical encounters are for chronic illnesses or non-disease-specific complaints..."

# Weaknesses in the definition of a disease and multimorbidity

The definition is closely related to:

- Current knowledge of the condition
  - *Modification of the defining thresholds according to evolving evidence (e.g., changes of guidelines over the years for defining hypertension)*
- Characteristics of the diagnostic instrument
  - *Improvements of diagnostic instruments increase detection of abnormalities (e.g., exponential increase of thyroid cancer diagnosis = overdiagnosis, overtreatment)*
- Priorities in the formulation of the diagnosis
  - *Facilitation of the clinical implementation versus diagnostic accuracy (e.g., BMI to define obesity = clinical friendly but highly inaccurate)*
- Different clinical relevance of diseases
  - *Need of more comprehensive evaluations than simple counting nosological entities*
- Access to health services
  - *High income countries may present higher comorbidity of low income countries*



- 1 Horton R. Offline: Breaking the silence in nephrology. *Lancet* 2015; **385**: 1058.
- 2 Davids MR, Marais N, Jacobs JC. South African Renal Registry annual report 2012. Durban; South African Renal Society, 2014.

## Frailty in sub-Saharan Africa

Most high-income countries are called to urgently adapt their health-care systems to meet the new challenges arising from their ageing populations. Models of health-care services aimed at preventing age-related disabling disorders (including the design of screening and assessment instruments)

low literacy levels.<sup>3-5</sup> All these factors represent different (and probably more immediate) priorities in public health agendas. However, the targeting of these disorders does not preclude a careful assessment of age-related disorders, especially because taking action at a young age might improve the health status of the future generations of elderly people.

The ageing of the world's population suggests that changes to existing models of health care are needed to counteract the destabilising effects of age-related disorders on health-care systems.<sup>6</sup> At the same time, interventions should be developed against frailty and the resulting

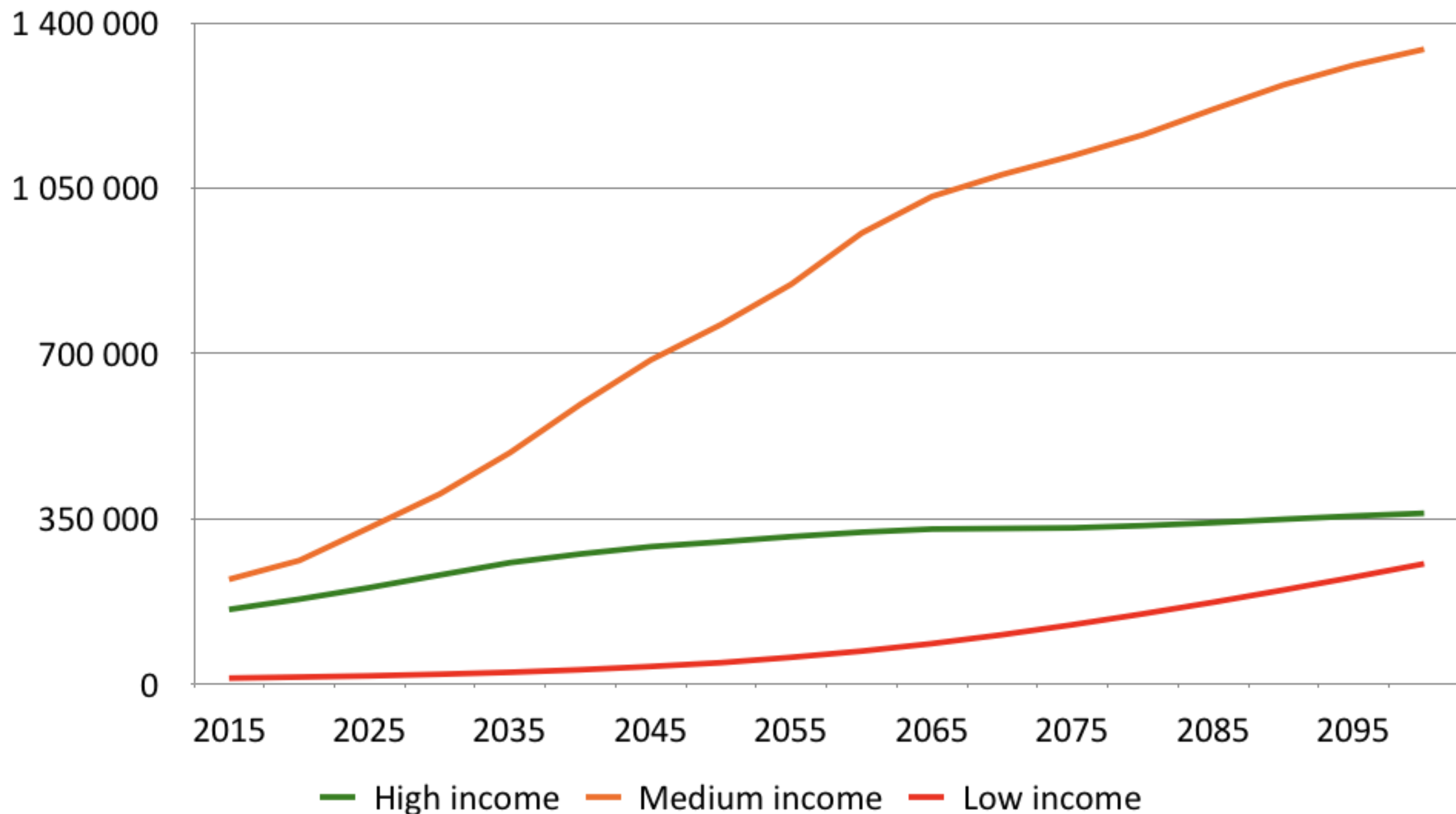
- 2 WHO. Good health adds life to years: global brief for World Health Day 2012. Geneva; World Health Organization, 2012.
- 3 Institute for Health Metrics and Evaluation. Global health data exchange: global burden of disease 2010 study data. <http://ghdx.healthdata.org/> (accessed April 10, 2015).
- 4 Lowsky DJ, Olshansky SJ, Bhattacharya J, Goldman DP. Heterogeneity in healthy aging. *J Gerontol A Biol Sci Med Sci* 2014; **69**: 640-49.
- 5 Gureje O, Oladeji BD, Abiona T, Chatterjee S. Profile and determinants of successful aging in the Ibadan Study of Ageing. *J Am Geriatr Soc* 2014; **62**: 836-42.
- 6 British Geriatrics Society. Fit for frailty: consensus best practice guidance for the care of older people living with frailty in community and outpatient settings. London; British Geriatrics Society, 2014.



Chris Sattler/Science Photo Library

# World population: Age 70 and above

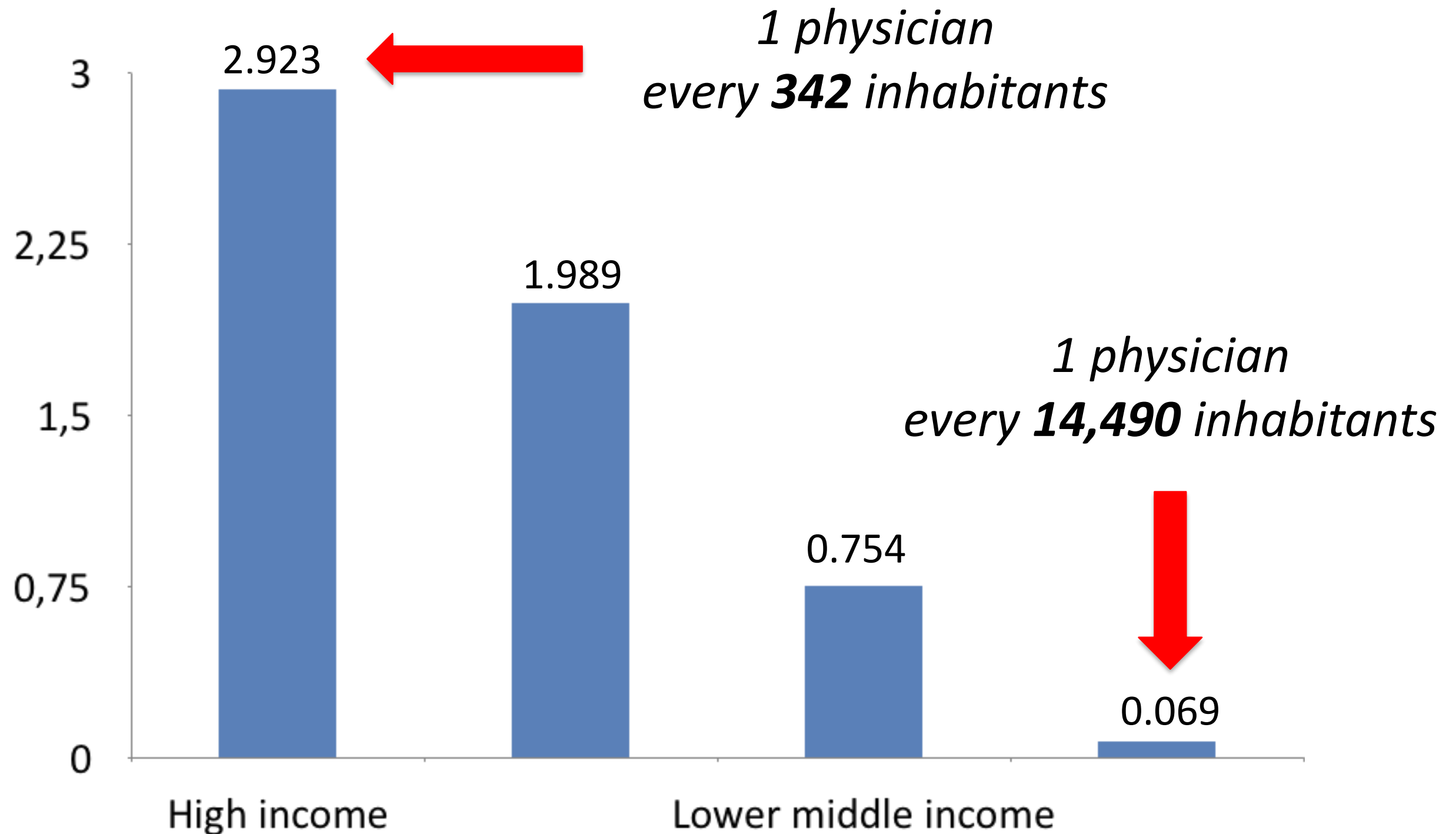
(median, thousands)





# Physicians by income group

*(Physicians per 1,000 inhabitants)*





**World Health  
Organization**



**World Health  
Organization**

WORLD  
REPORT  
ON  
**AGEING  
AND  
HEALTH**

[www.who.int/ageing/events/world-report-2015-launch/en/](http://www.who.int/ageing/events/world-report-2015-launch/en/)



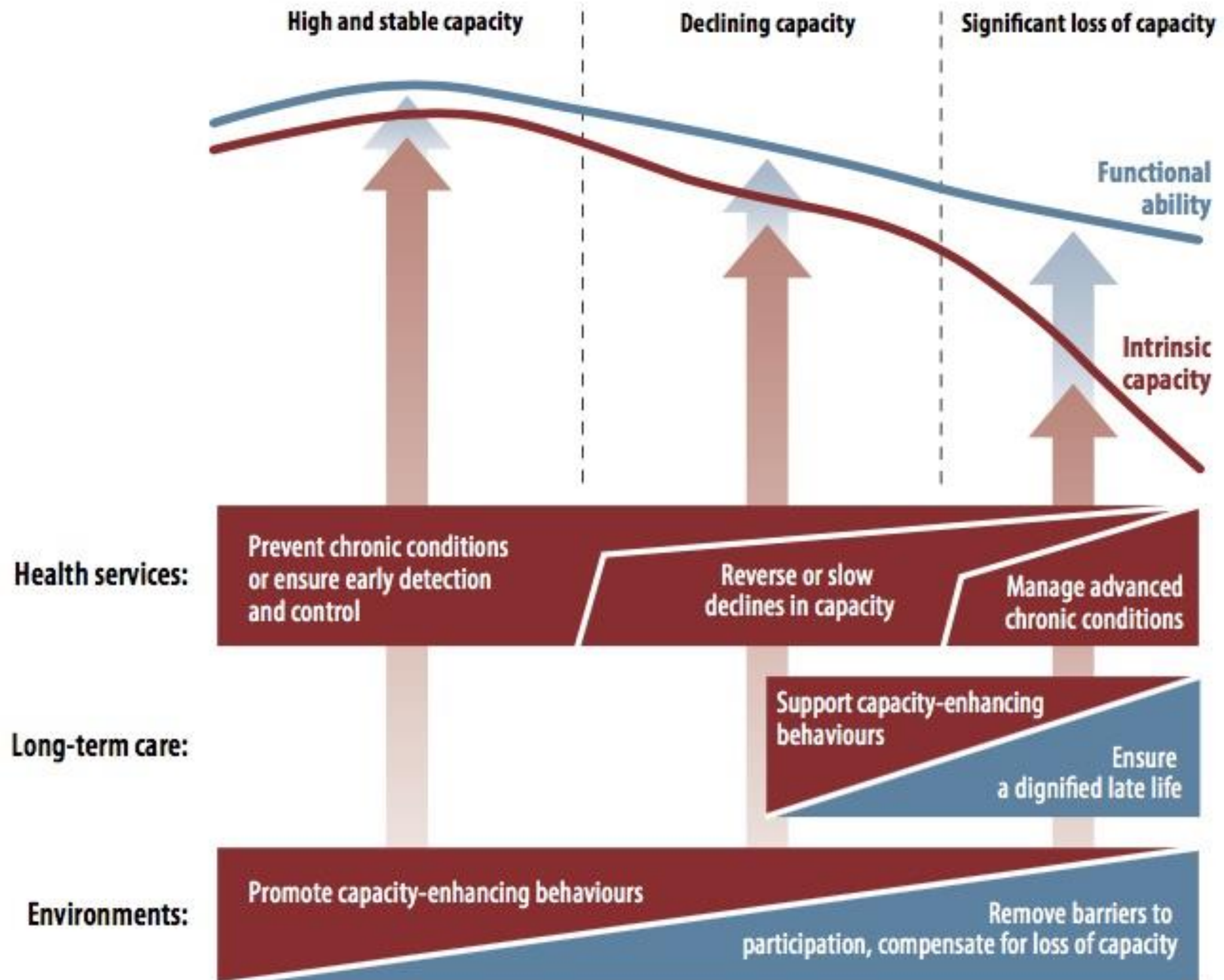
**Healthy Ageing:** the process of developing and maintaining the functional ability that enables well-being in older age.

**Functional ability:** the health-related attributes that enable people to be and to do what they have reason to value. It is made up of the ***intrinsic capacity*** of the individual, relevant ***environmental characteristics*** and the interactions between the individual and these characteristics.

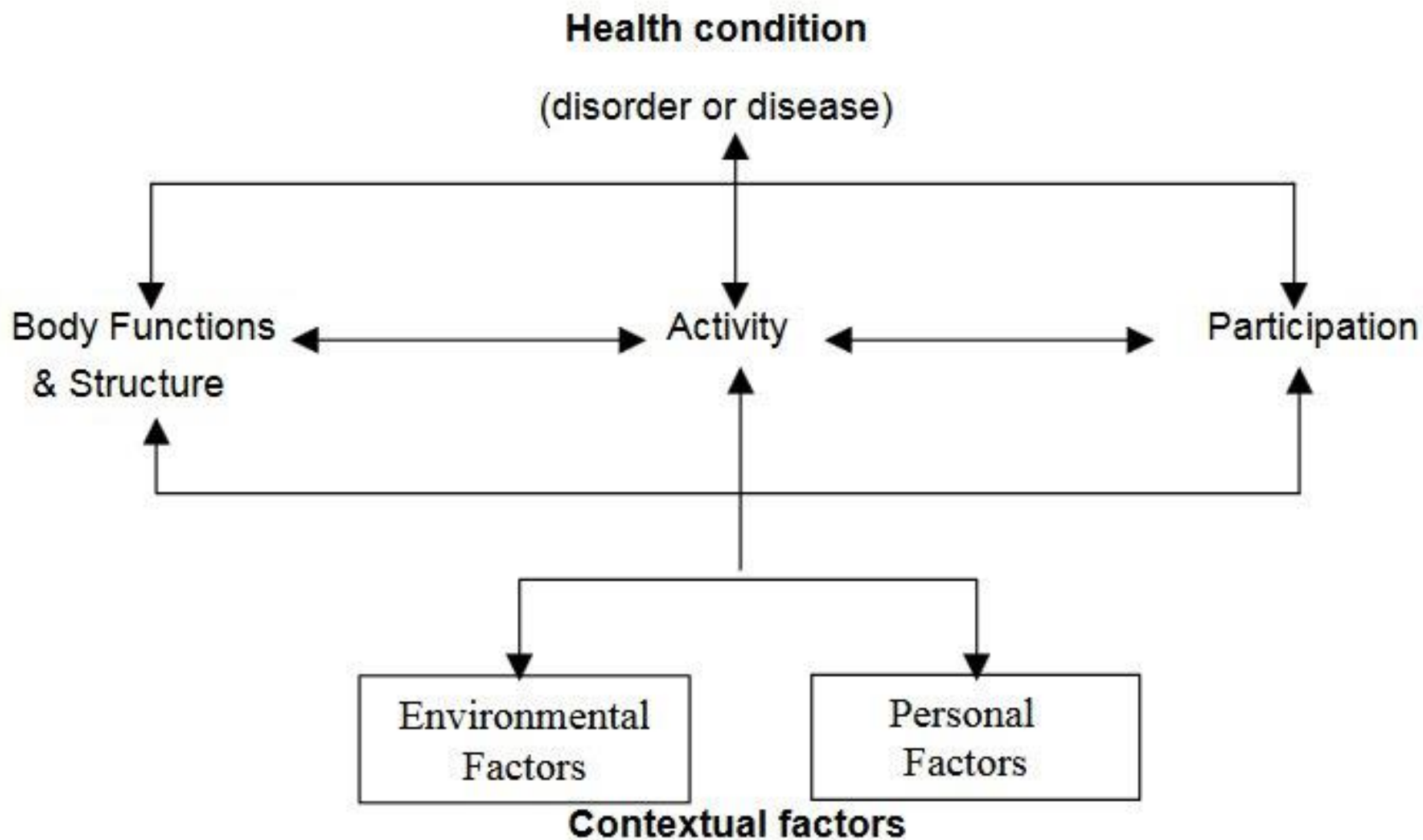
**Intrinsic capacity:** the composite of all the physical and mental capacities of an individual.

**Environments:** all the factors in the extrinsic world that form the context of an individual's life.

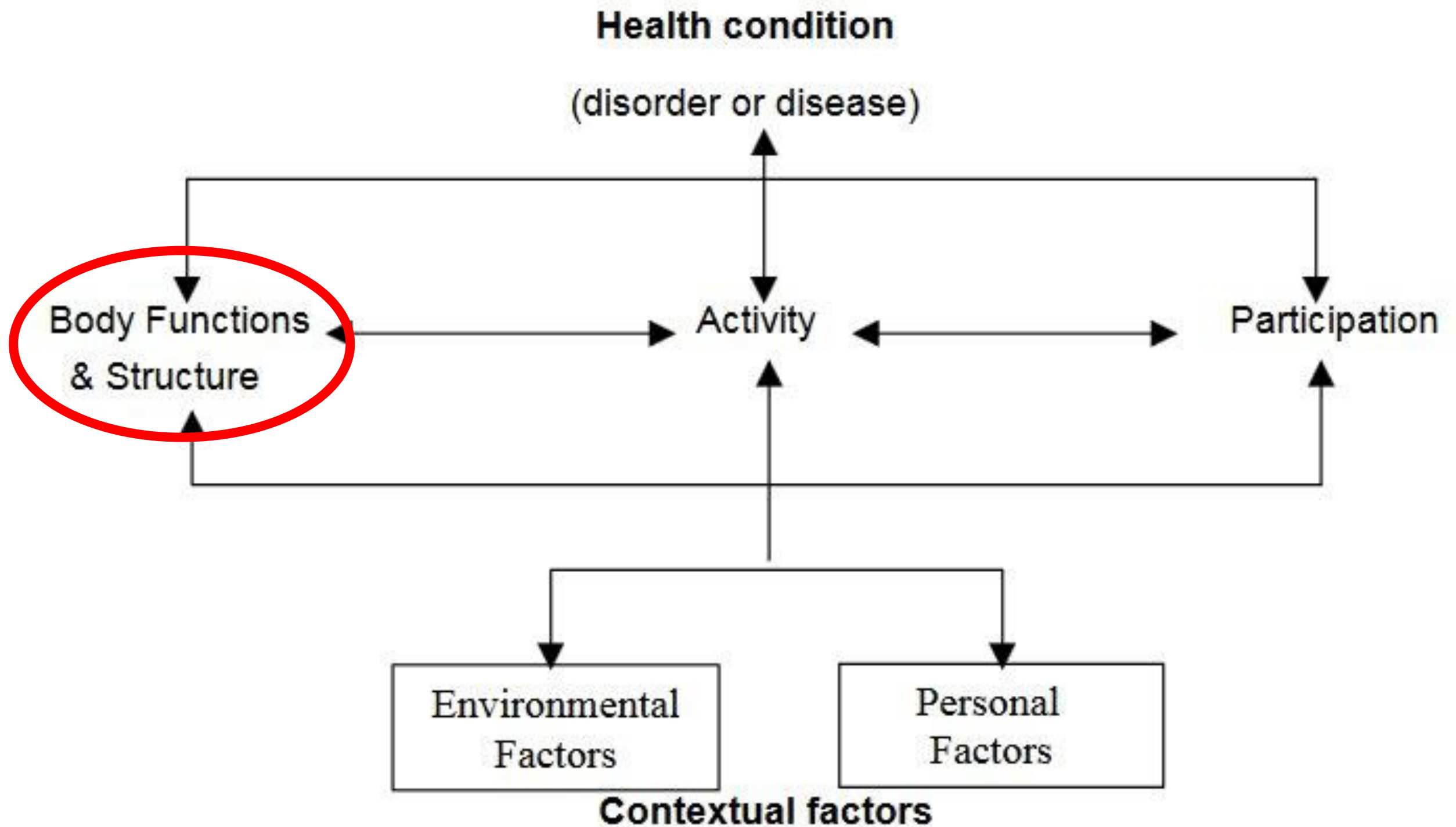
**Fig. 2.4.** A public-health framework for *Healthy Ageing*: opportunities for public-health action across the life course







World Health Organization. *The International Classification of Functioning, Disability and Health*. Geneva, Switzerland: World Health Organization; 2001



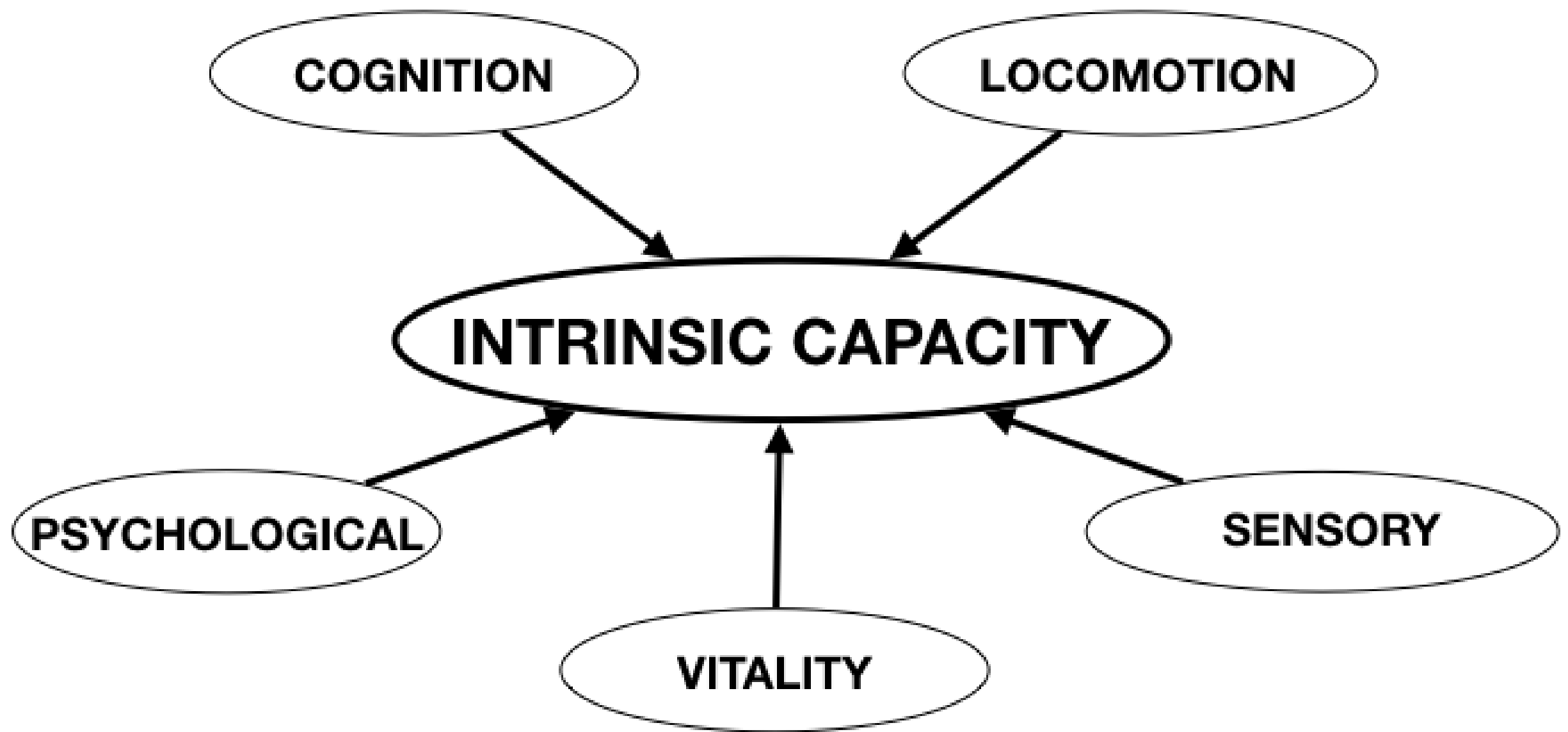
World Health Organization. *The International Classification of Functioning, Disability and Health*. Geneva, Switzerland: World Health Organization; 2001

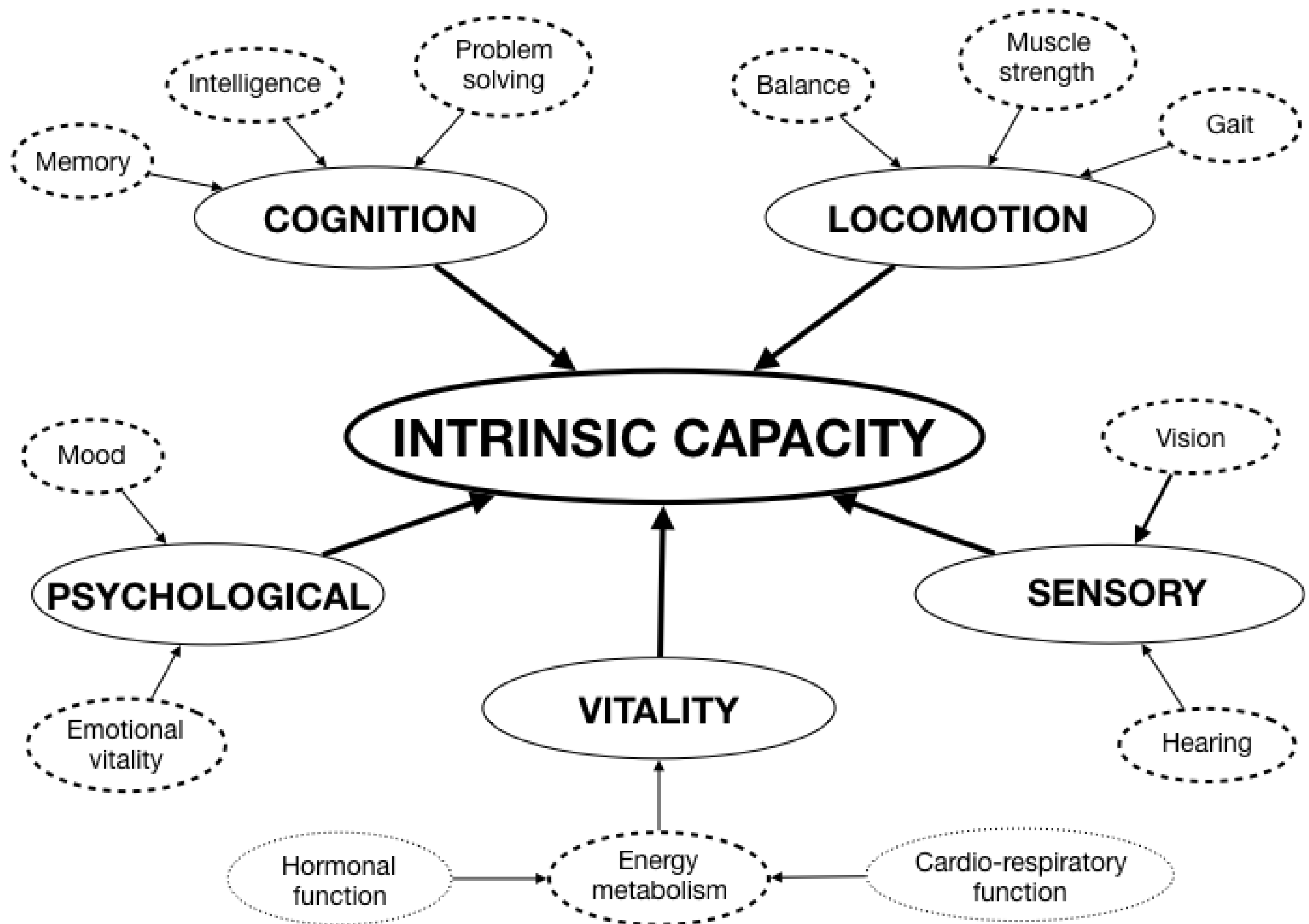
# Body functions and structures

FUNCTIONS	STRUCTURES
<b>Mental function</b>	Structure of the nervous system
<b>Sensory functions and pain</b>	The eye, ear and related structures
<b>Voice and speech functions</b>	Structures involved in voice and speech
<b>Functions of the cardiovascular, hematological, immunological and respiratory systems</b>	Structure of the cardiovascular, immunological and respiratory systems
<b>Functions of the Digestive, Metabolic, Endocrine Systems</b>	Structures Related to the Digestive, Metabolic and Endocrine Systems
<b>Genitourinary and Reproductive Functions</b>	Structure Related to Genitourinary and Reproductive Systems
<b>Neuro-musculoskeletal and Movement-Related Functions</b>	Structure Related to Movement
<b>Functions of the Skin and Related Structures</b>	Skin and Related Structures

World Health Organization. *The International Classification of Functioning, Disability and Health*. Geneva, Switzerland: World Health Organization; 2001





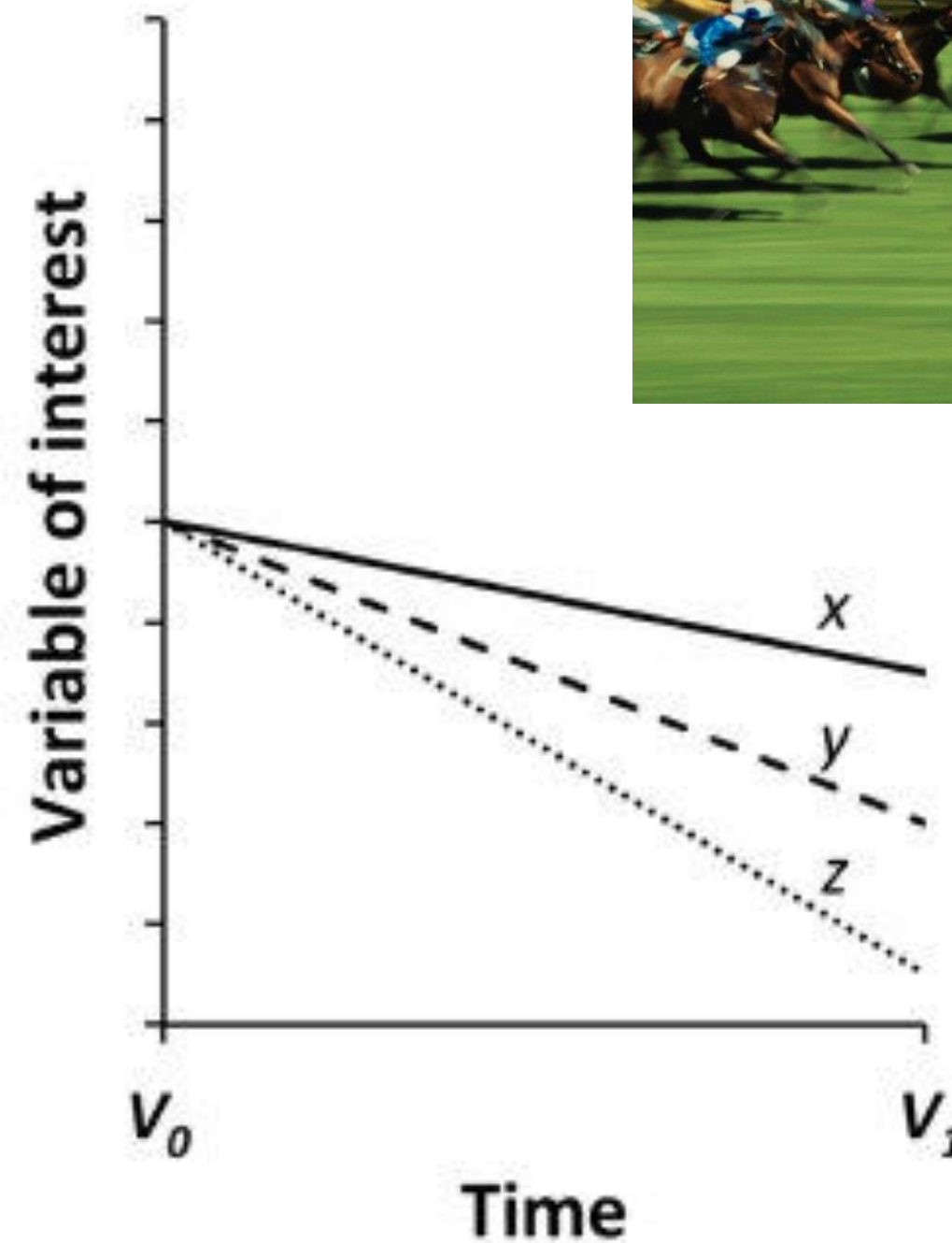






# Horse-racing effect and clinical trials in older persons

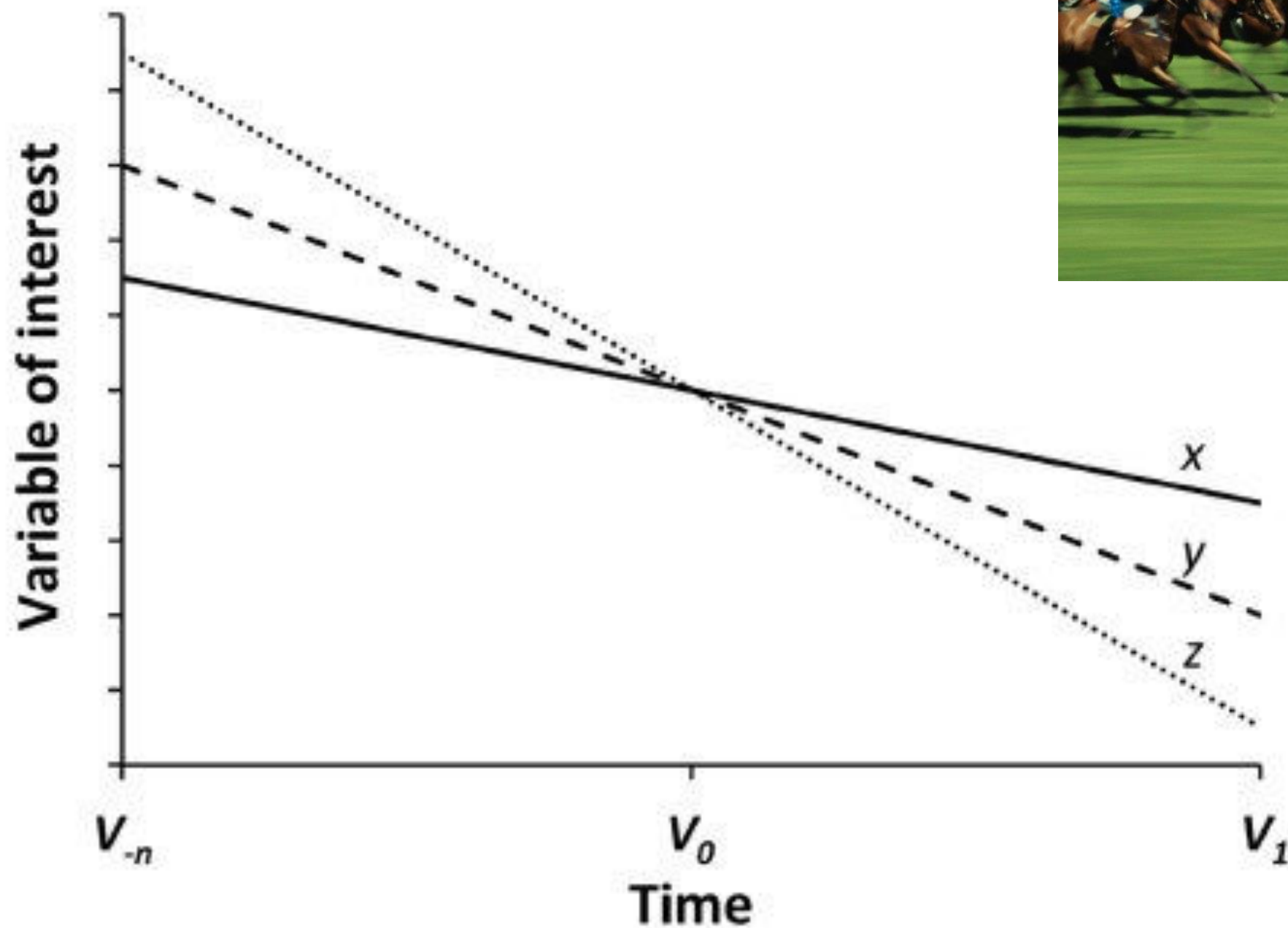
*Matteo Cesari<sup>1,2\*</sup> and Marco Canevelli<sup>3</sup>*



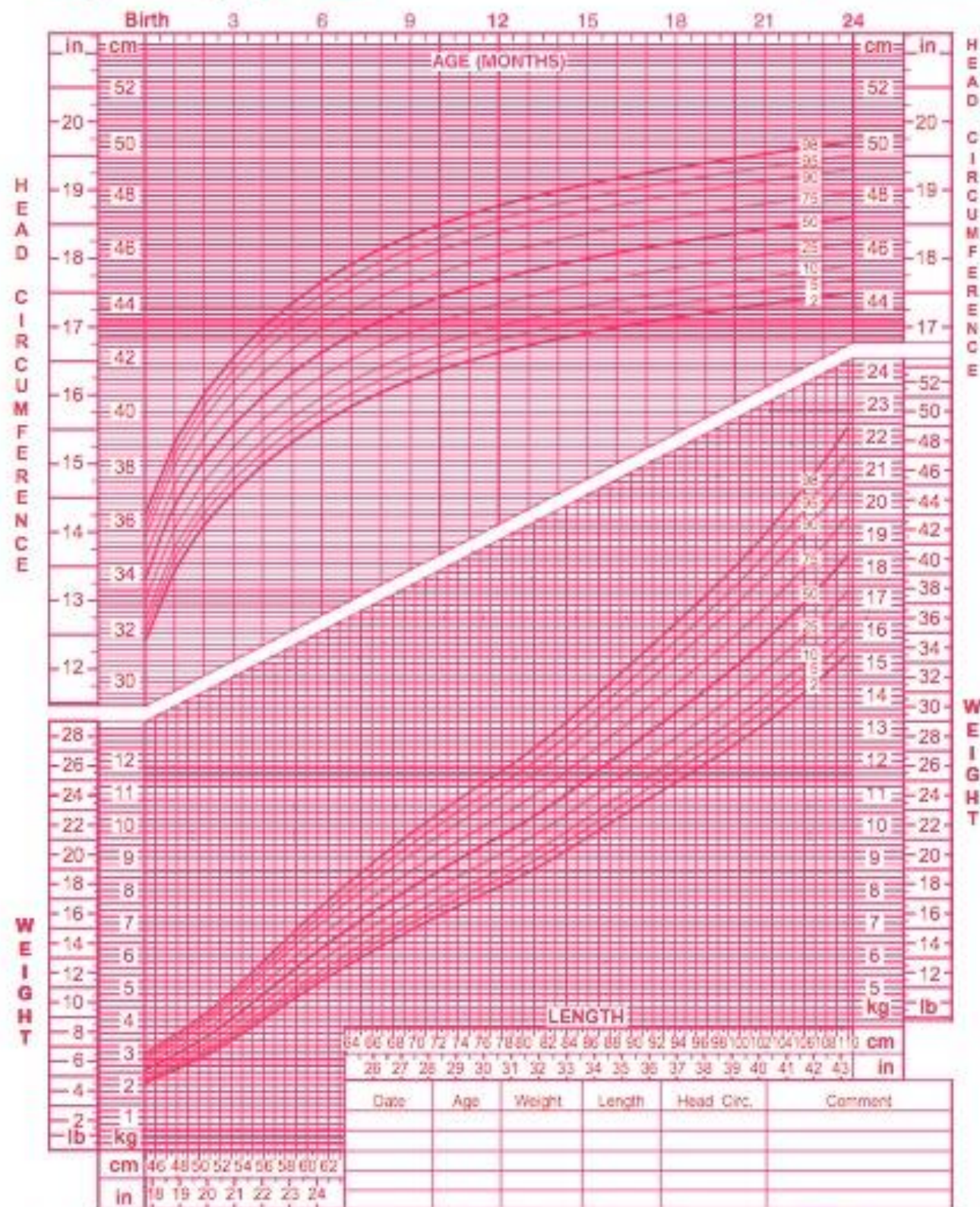
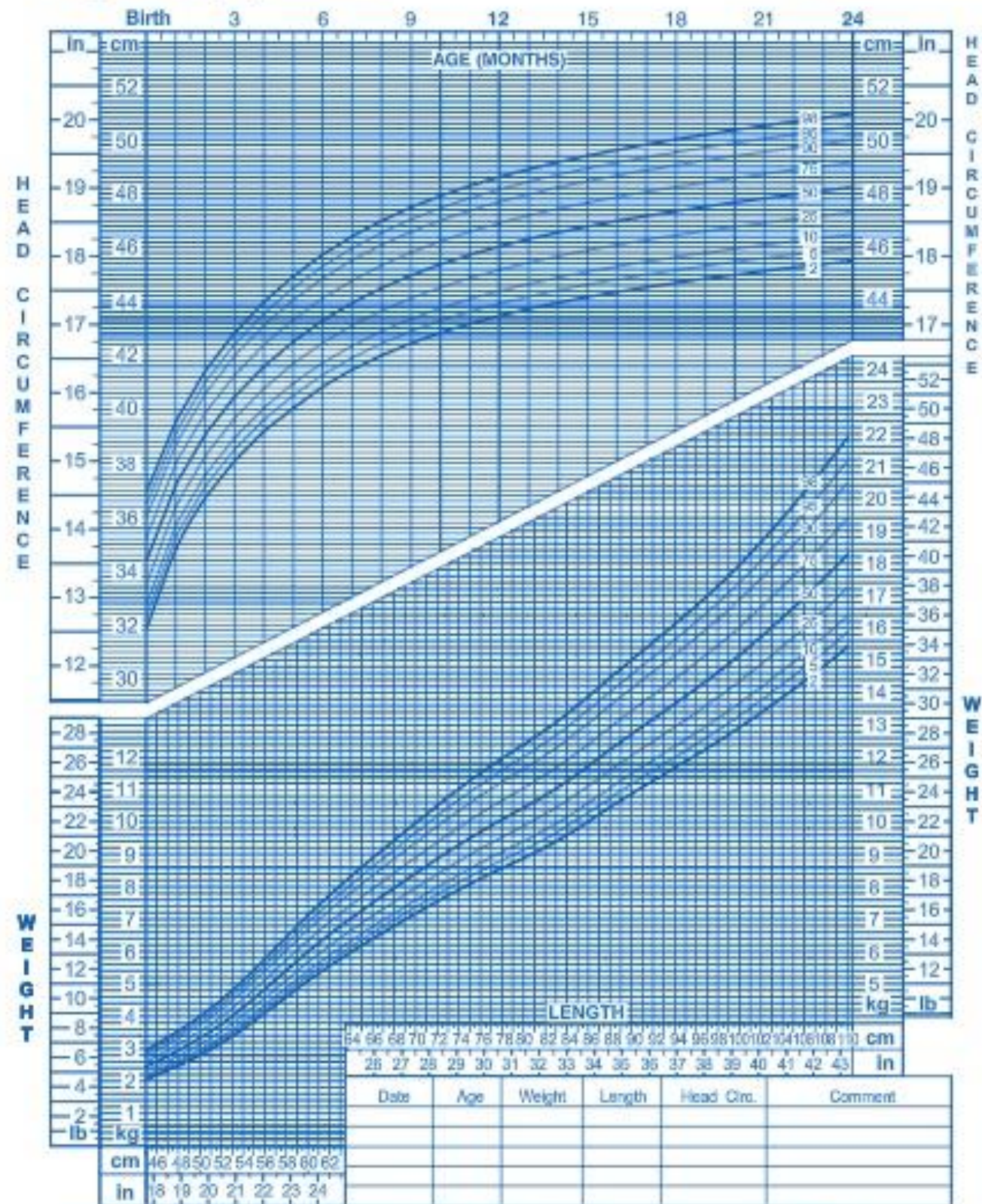


# Horse-racing effect and clinical trials in older persons

*Matteo Cesari<sup>1,2\*</sup> and Marco Canevelli<sup>3</sup>*



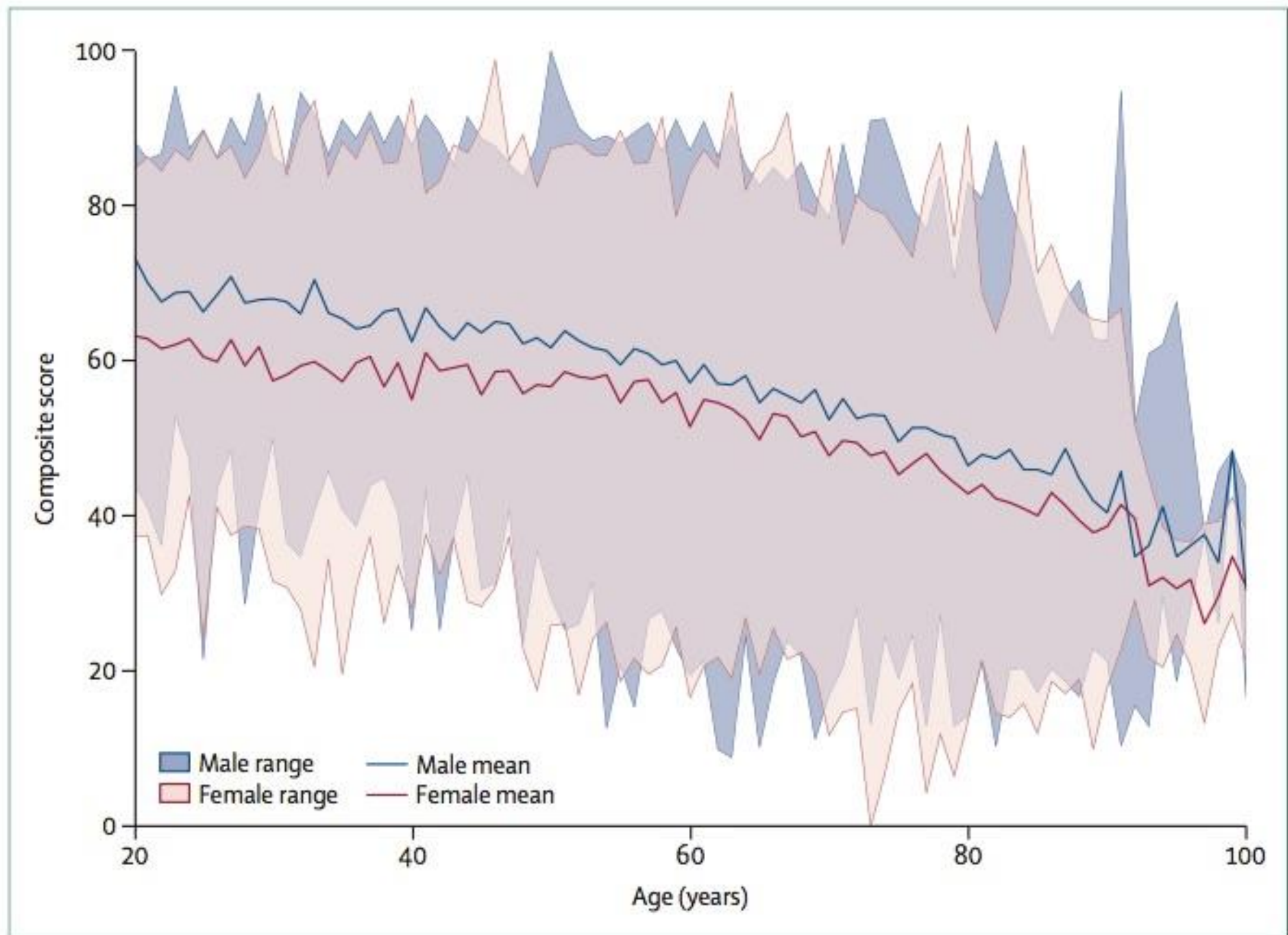


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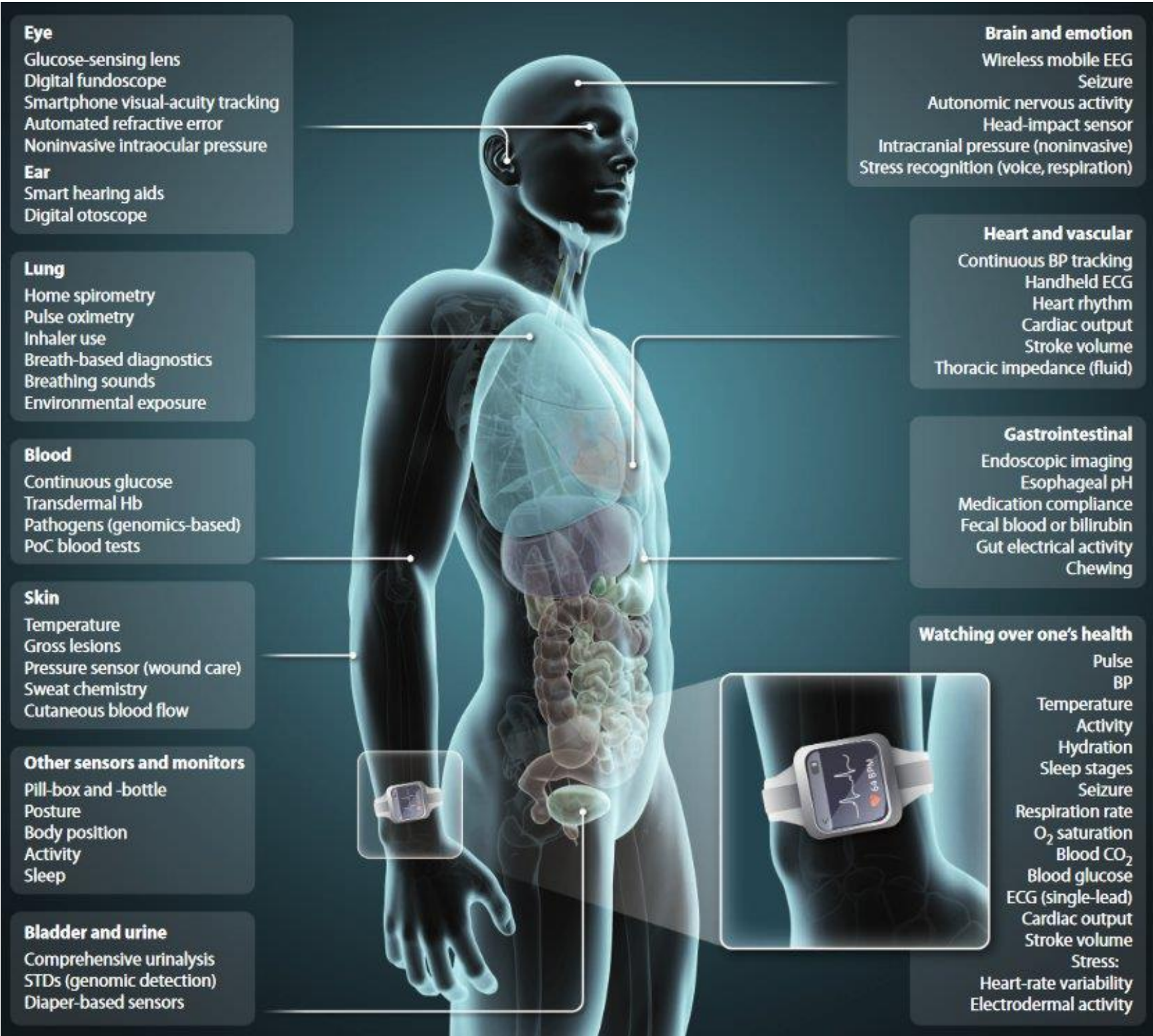


**Figure 3: Range and mean intrinsic capacity of men and women in countries in the Study on global AGEing and adult health 2007–2010 (wave 1)<sup>42</sup>**



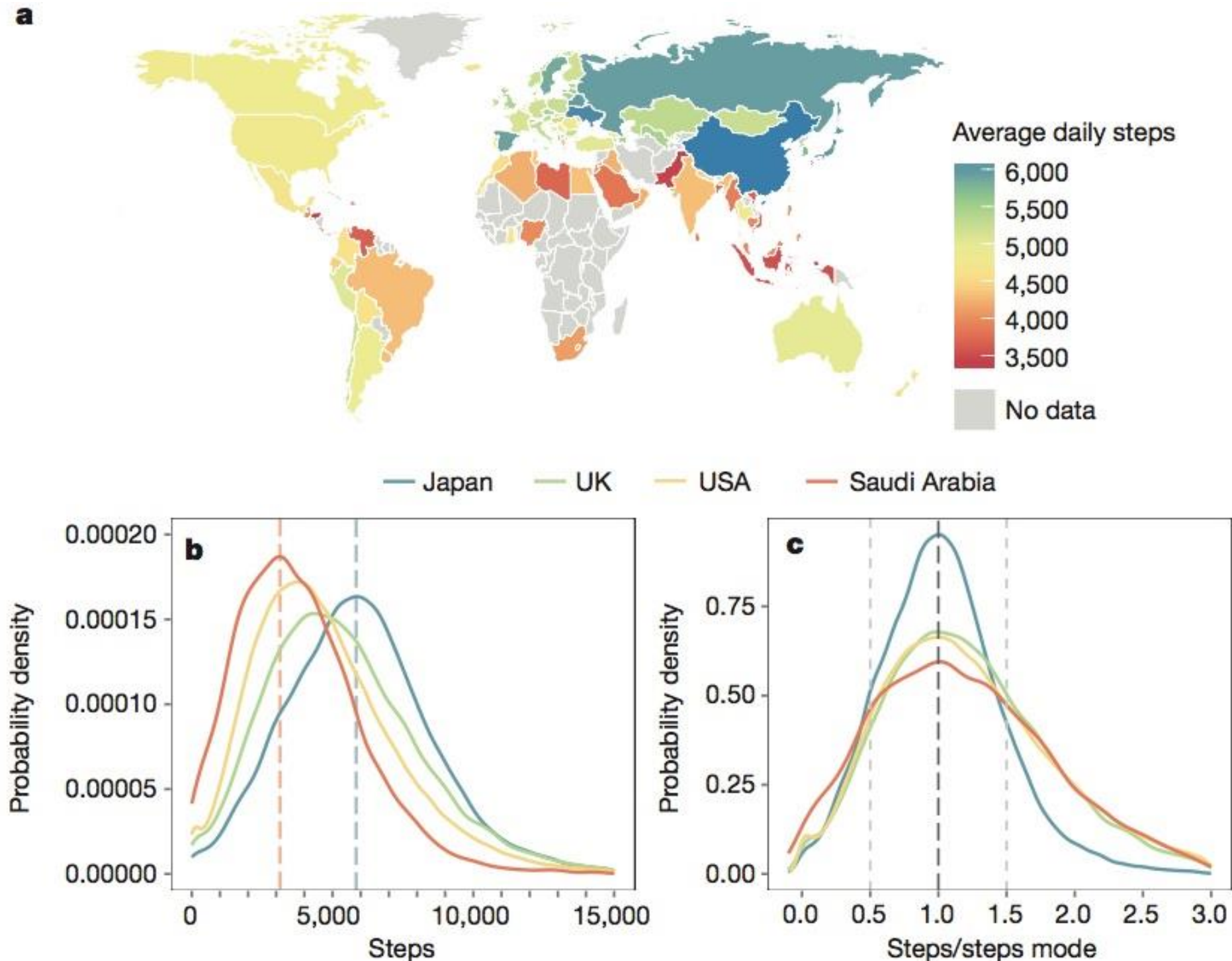
# The emerging field of mobile health

Steven R. Steinhubl,\* Evan D. Muse, Eric J. Topol



# Large-scale physical activity data reveal worldwide activity inequality

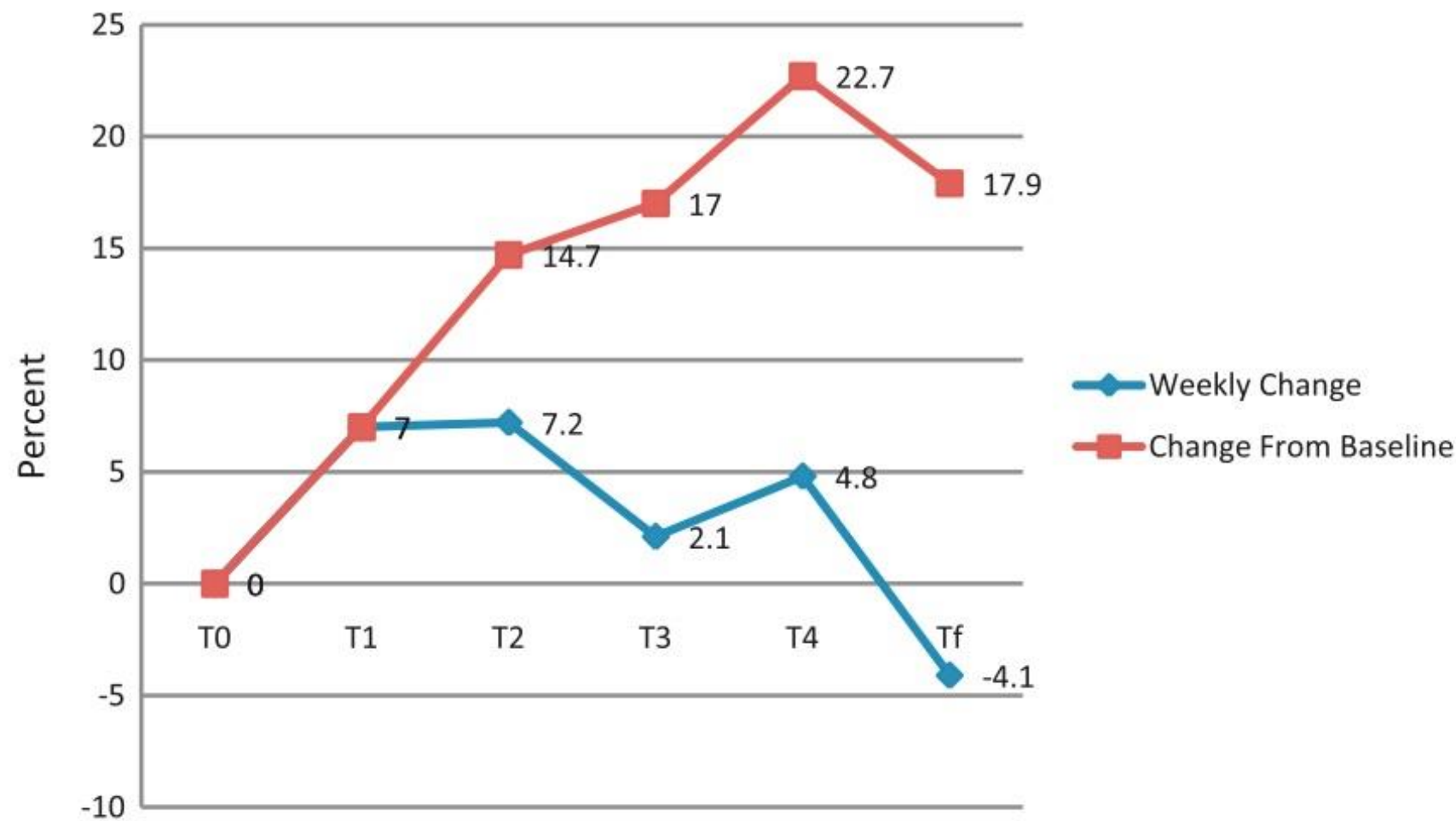
Tim Althoff<sup>1</sup>, Rok Sosič<sup>1</sup>, Jennifer L. Hicks<sup>2</sup>, Abby C. King<sup>3,4</sup>, Scott L. Delp<sup>2,5</sup> & Jure Leskovec<sup>1,6</sup>





# Pedometer Use Increases Daily Steps and Functional Status in Older Adults

Allison Snyder, MD, Bryanne Colvin, MD, and Julie K. Gammack, MD



**Fig. 1.** Percent change in average daily steps at weekly study time points compared to baseline and to previous week.



BUSINESS | MANAGEMENT

## Employees Get Apple Watch for \$25 (But There's a Catch)

Since passage of the Affordable Care Act, employers have dangled ever-larger incentives to motivate workers to stay healthy

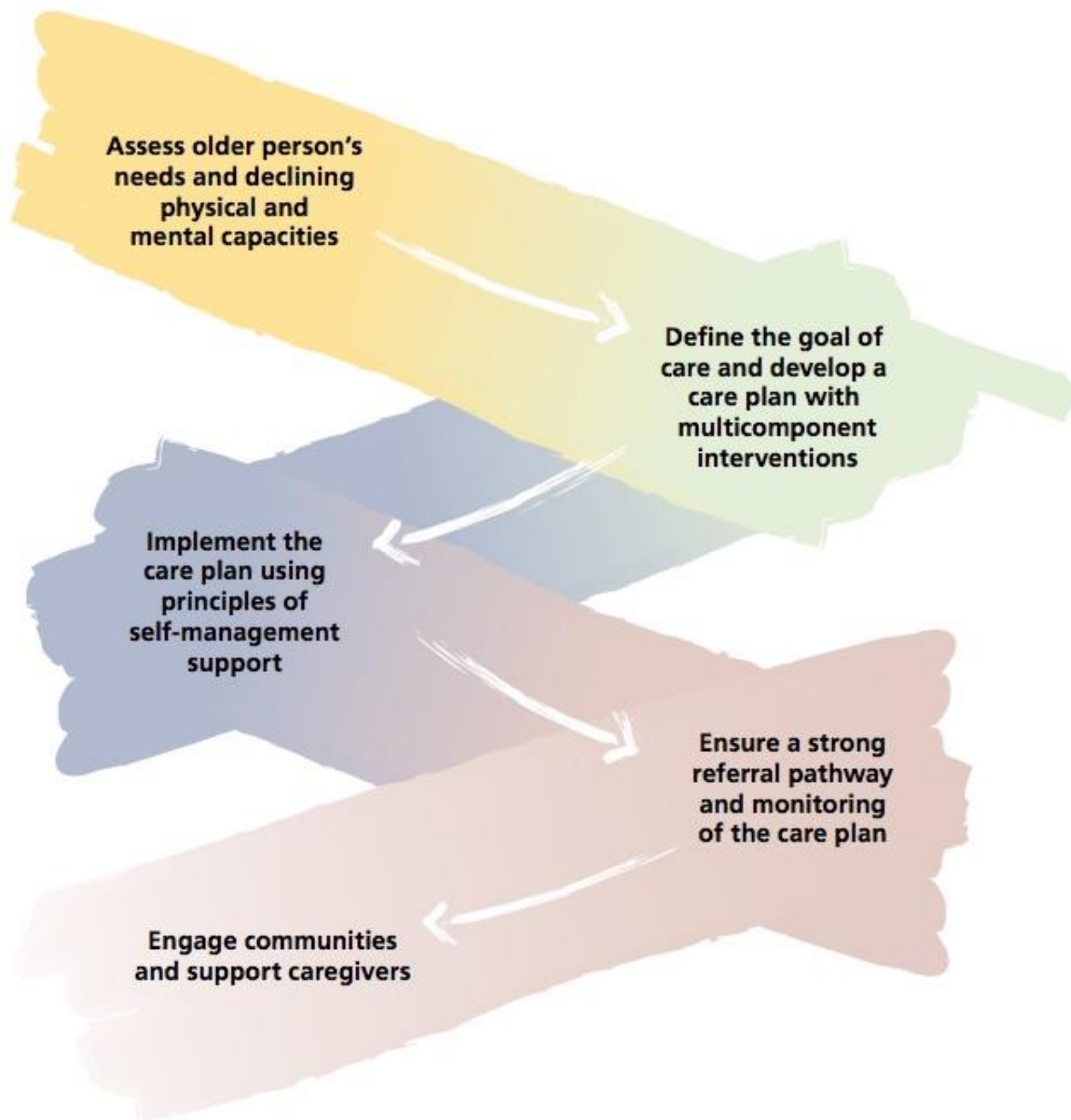


The activity app on an Apple Watch is displayed during a preview event for the smartwatch in 2015. Some employers are offering these watches for \$25 to their staff, if they can stick to fitness goals over a period of two years. PHOTO: CHRIS RATCLIFFE/BLOOMBERG



## Integrated care for older people

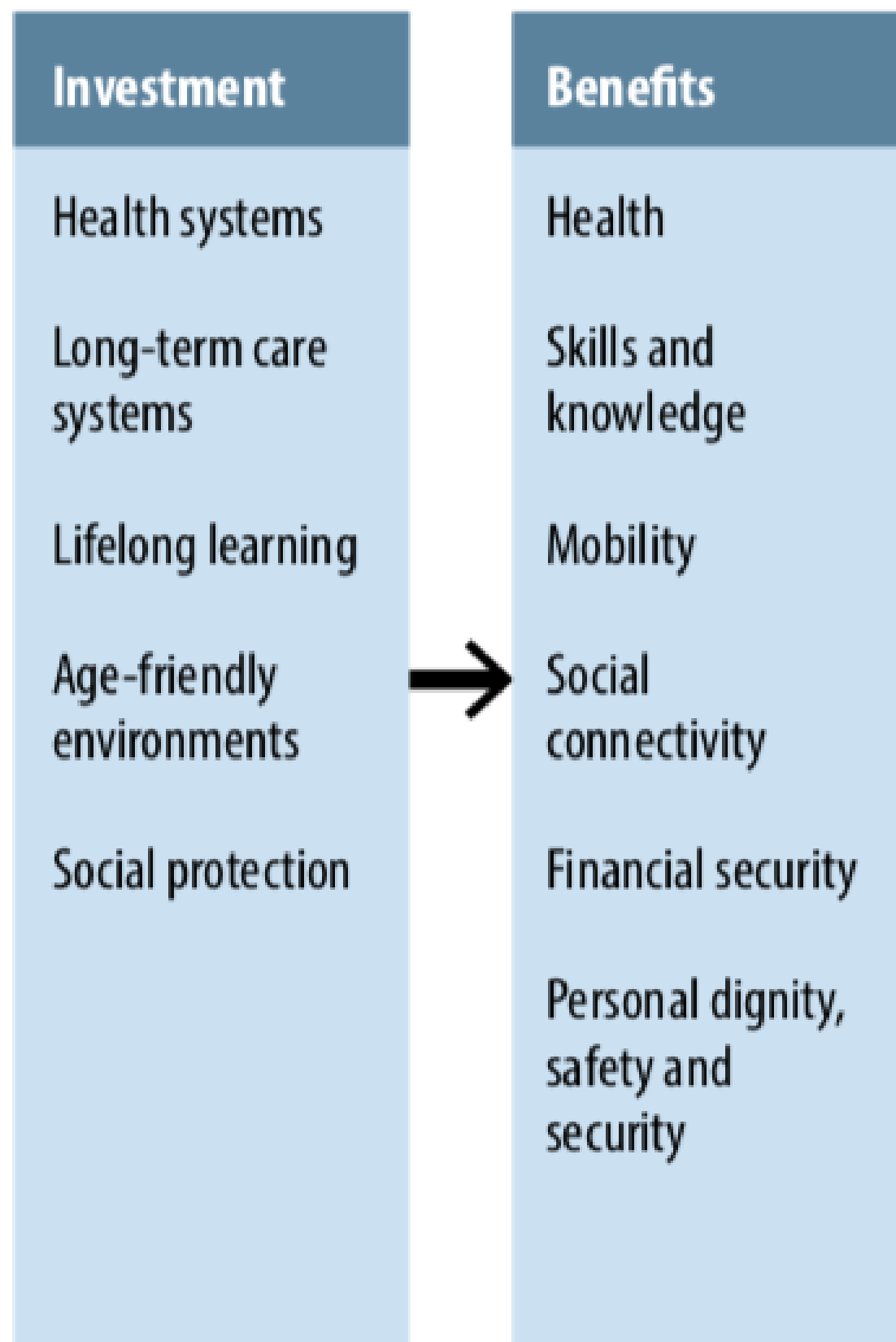
Guidelines on community-level interventions to manage declines in intrinsic capacity



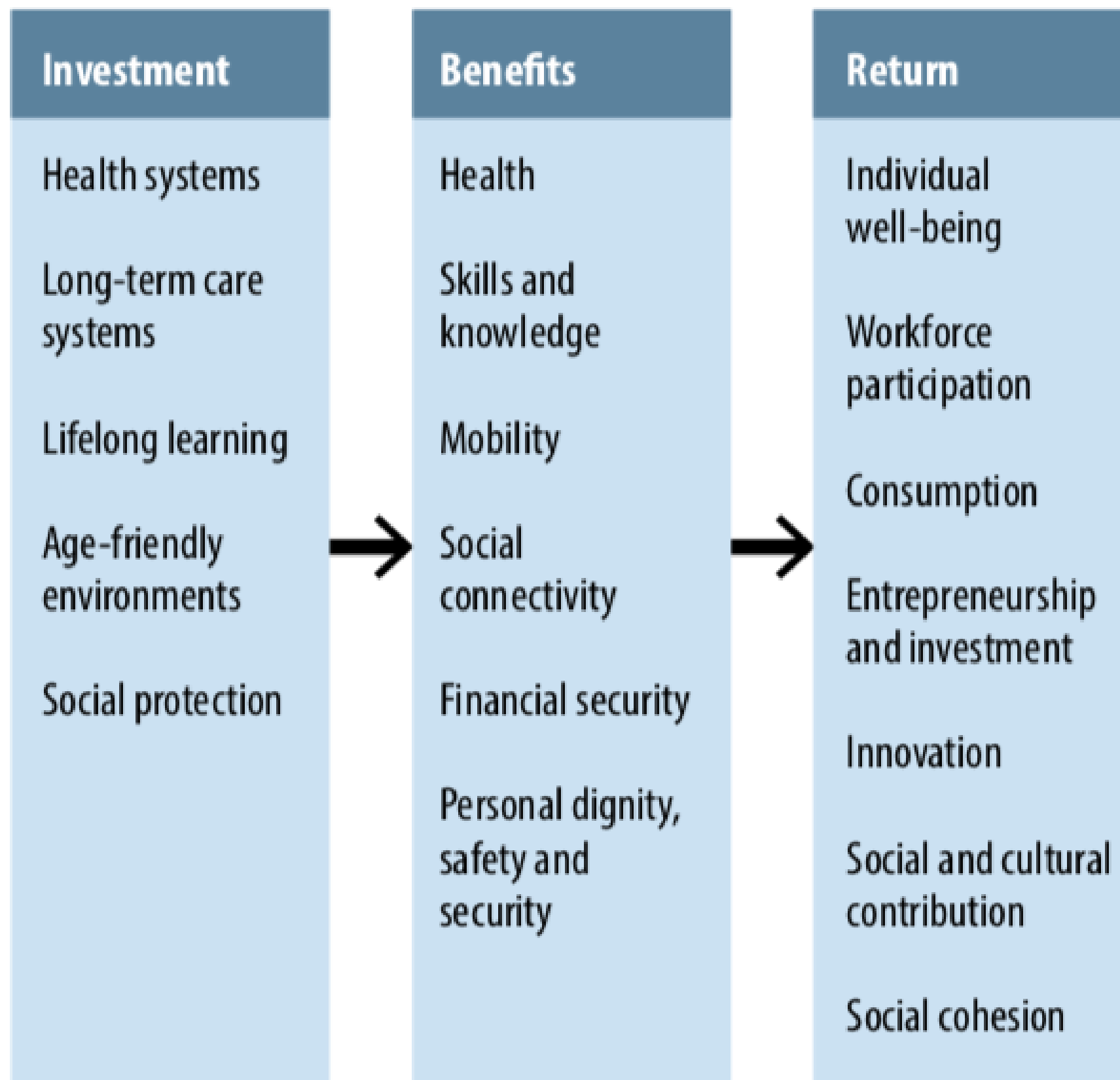
Investment
Health systems
Long-term care systems
Lifelong learning
Age-friendly environments
Social protection

*Source:* adapted from unpublished information from the World Economic Forum's Global Agenda Council on Ageing, 2013.





*Source:* adapted from unpublished information from the World Economic Forum's Global Agenda Council on Ageing, 2013.



*Source:* adapted from unpublished information from the World Economic Forum's Global Agenda Council on Ageing, 2013.

# Conclusions

Intrinsic capacity is a novel concept addressing the inadequacy of current systems, which are traditionally focused on the disease construct

Tracking intrinsic capacity modifications will allow to:

- Implement more comprehensive assessments of the individual's health status
- Introduce a longitudinal (thus more informative) approach in the evaluation of older persons
- Prioritize functions (rather than nosological conditions)
- Better take into account environmental (social, economic) inequalities
- Overcome possible stigma (ageism)
- Benefit from potential novel technologies



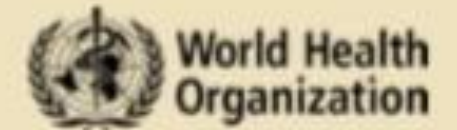


World Health  
Organization

**Grazie!**

Matteo Cesari, MD, PhD  
macesari@gmail.com

 @macesari



WORLD  
REPORT  
ON  
**AGEING  
AND  
HEALTH**

[www.who.int/ageing/events/world-report-2015-launch/en/](http://www.who.int/ageing/events/world-report-2015-launch/en/)