UN Decade of Healthy Aging

Prof. Mike Martin

Prof. of Gerontology

Director UZH Healthy Longevity Innovation Cluster

WHO Working Group Metrics and Research Standards for Healthy Aging

Hong Kong, October 18, 2021

Healthy Ageing: The Intersection between Physical Health, Mental Health, and the Environment

1) **From the World Report on Aging and Health 2015 to the «UN Decade of Healthy Aging 2021-2030»**

2) **Healthy Aging as the basis of Public Health: What's new?**

3) **Where do we stand 2021?**

4) **Innovation challenges for «The Decade»**

Life expectancy in Hong Kong

Estimated life expectancy at birth (2021; Worldometer)

1980   *2020*

Men / Women   **Men / Women**

72.6 / 78.6 years   **82.4 / 88.2 years**   **= +89 / +88 days/year**

Aging in historic perspective

«Golden Bolt» Hidekichi Miyazaki
23.9.2015

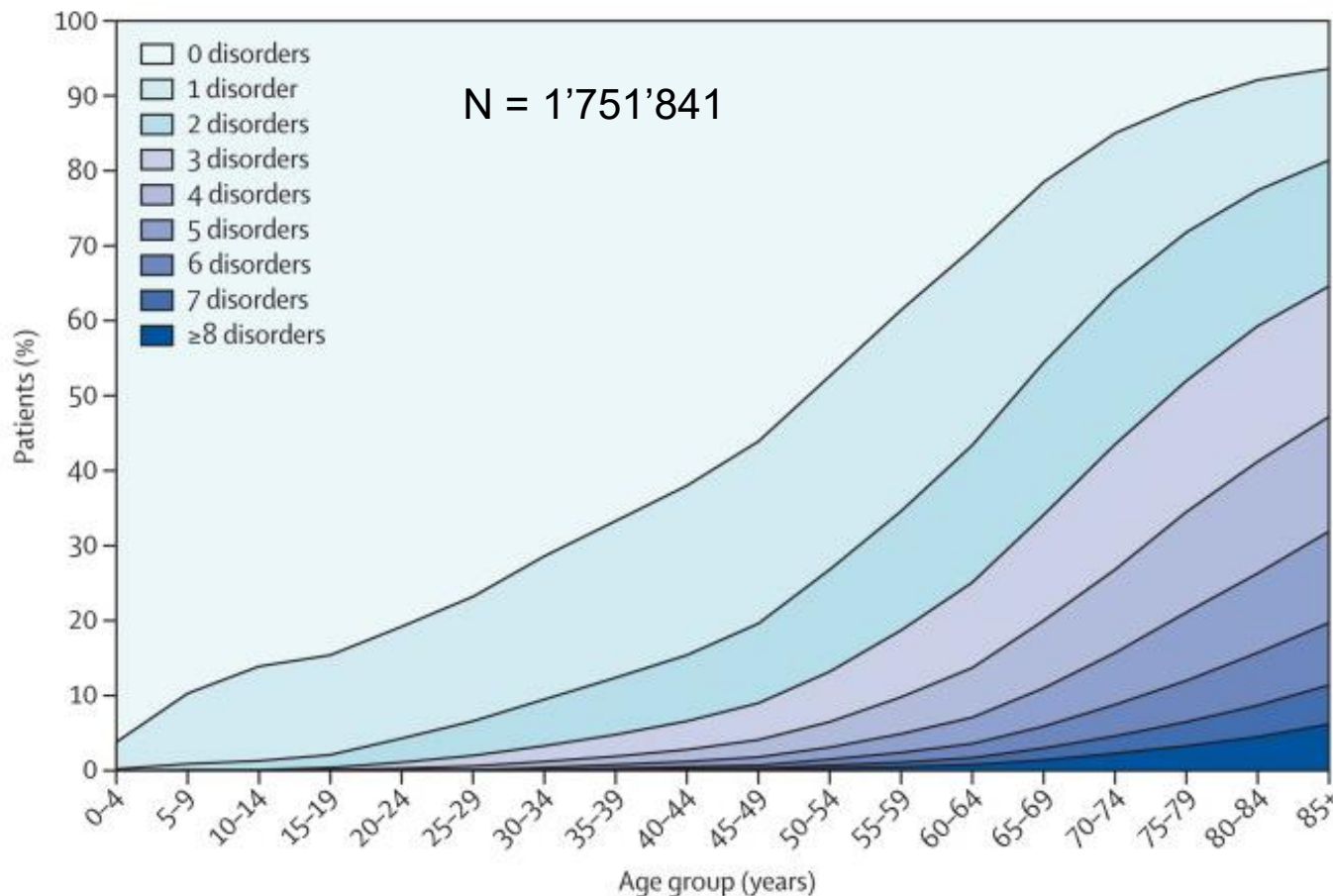**100-Meter-Records**(31.12.2020)

30+: 9.58s / 10.49s
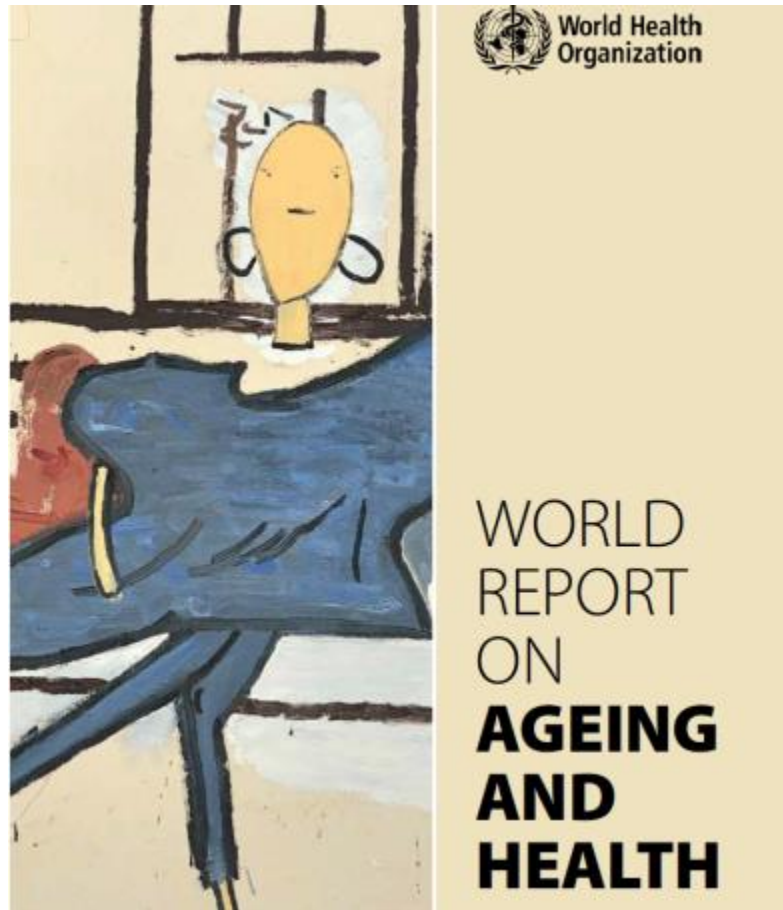
60+: 11.70s / 13.63s

85+: 15.08s / 19.83s

100+: 26.99 / 39.62

(2015 Don Pellman, before 29.83 by Miyazaki / 2017 Julia Hawkins)

Multimorbidity the most frequent disease in old age

Barnett et al, *Lancet.* 2012;380:37–43

2015: 1. World Report on Aging and Health

Healthy Aging Research 2015:

- **Excluding 70+**

- **Excluding multimorbid**

- **Excluding communities**

- **Excluding real life contexts**

- **Excluding what matters to older persons and communities**

Universität Zürich^{UZH}

UFSP Dynamik gesunden Alterns

DRAFT GLOBAL STRATEGY AND PLAN OF ACTION ON AGEING AND HEALTH

VISION

A world in which everyone can live a long and healthy life

STRATEGIC OBJECTIVES

1. Commitment to action on Healthy Ageing in every country
2. Developing age-friendly environments
3. Aligning health systems to the needs of older populations
4. Developing sustainable and equitable systems for providing long-term care (home, communities and institutions)
5. Improving measurement, monitoring and research on Healthy Ageing

PLAN OF ACTION 2016–2020
GOALS

1. Five years of evidence-based action to maximize functional ability that reaches every person.
2. By 2020, establish evidence and partnerships necessary to support a Decade of Healthy Ageing from 2020 to 2030

1) **From the World Report on Aging and Health 2015 to the «UN Decade of Healthy Aging 2021-2030»**

2) **Healthy Aging as the basis of Public Health: What's new?**

3) **Where do we stand 2021?**

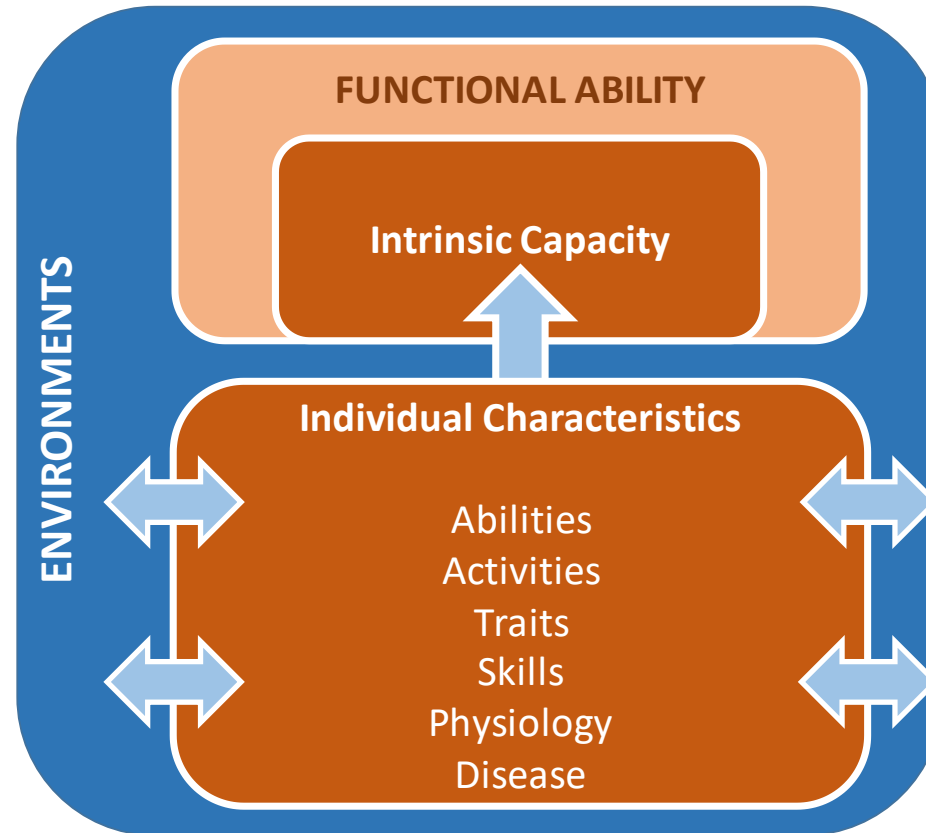4) **Innovation challenges for «The Decade»**

"We must listen to the voices of older people on what matters most to them in their daily lives."

– Olive Bryanton

Olive Bryanton, Activist and Leader in the Older Adult and Caregiver Advisory Committee, AGE-WELL, and many other organizations, recent PhD Graduate, with the dissertation, *Pioneers in Aging: Voices of Women Age 85 and Older Aging in Place in Rural Communities*, Canada

= Functional Ability

Universität Zürich[UZH]

UFSP Dynamik gesunden Alterns

FA = «being and doing what a person has reason to value»

WHO (2015; 2016); Martin et al. (2012; 2016a; 2016b; 2017); Freund, Nikitin & Riediger (2012); Scholz et al. (2015); Wood et al., (2017); Boker & Martin (2017)

«You can only change what you can measure»

To improve FA in the population, FA must be measurable in every person in the population

Meeting everyday basic needs for food, shelter and clothing ...
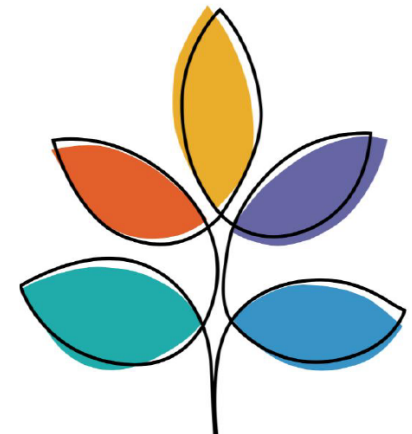
... **staying mobile,** and getting where you want, or need to go
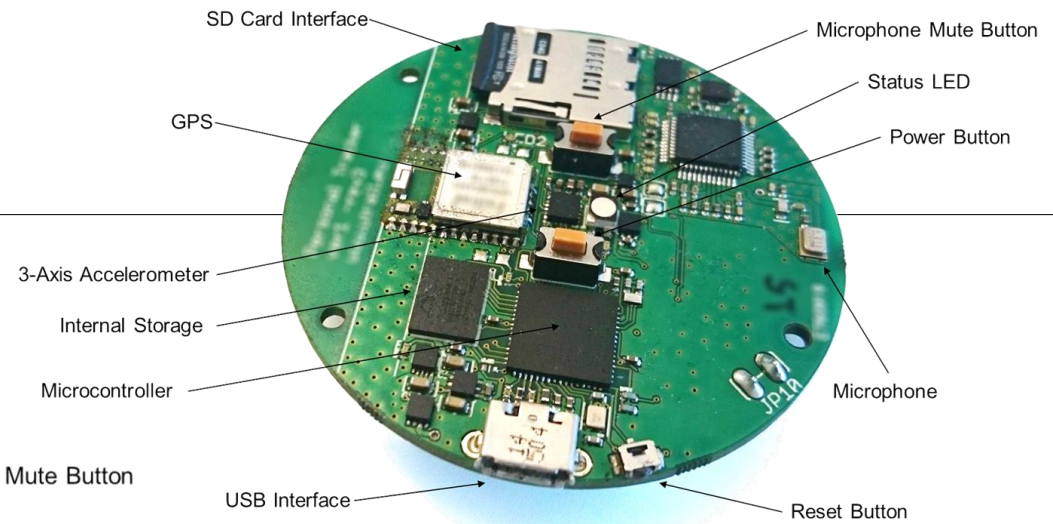
... **building and maintaining** relationships

...continuing to learn and make decisions

...contributing to family and communities

Our goals

uTrail
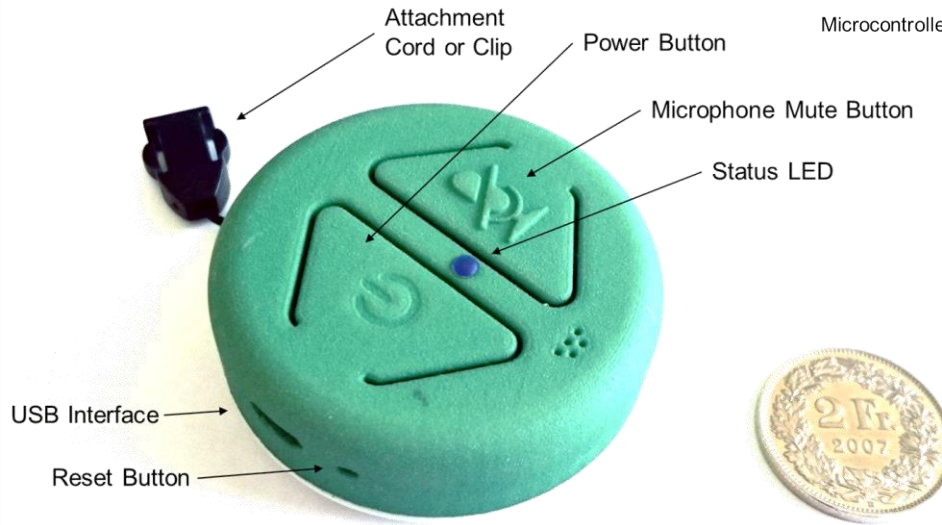
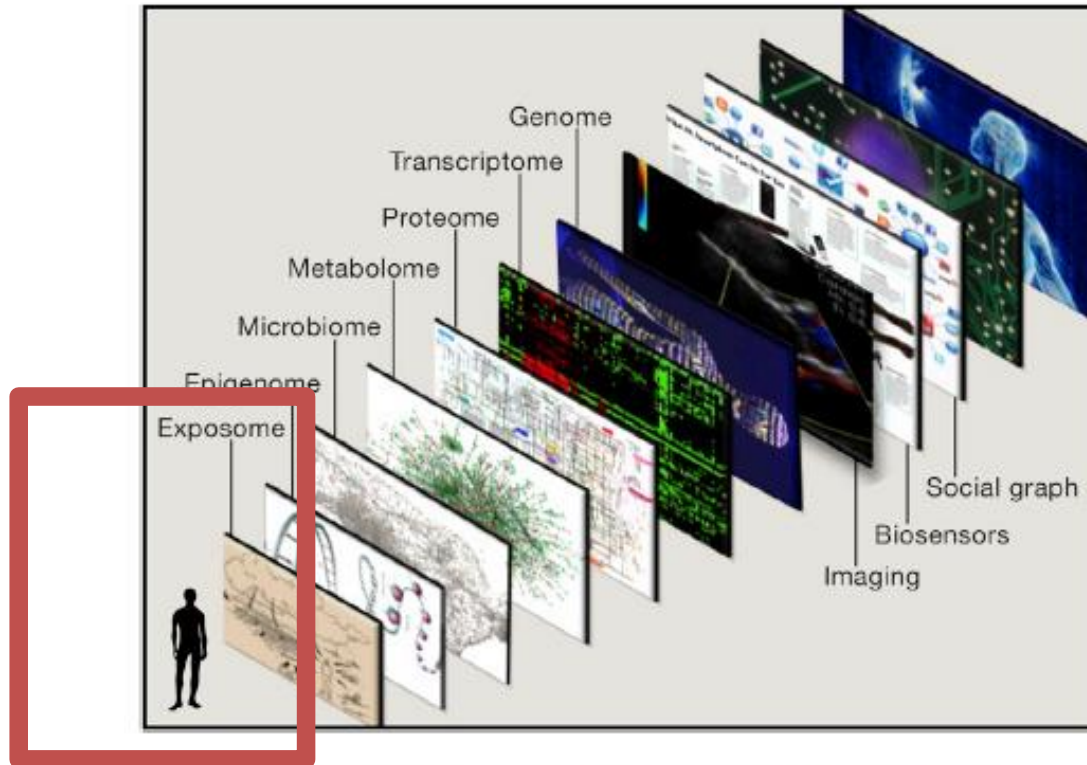| Aktivitätsbereich	Sensor	Variable	Samplingrate
Mobilität/Räumliche Aktivität	GPS	Zeit, Breite, Länge	1 Hz
Körperliche Aktivität	IMU	Zeit, Beschleunigung (x,y,z)	50 Hz
Soziale Aktivität	EAR	Zeit, Audioaufnahme (50 Sek)	1 pro 18 Min

Figure 1. Geographic Information System of a Human Being
The ability to digitize the medical essence of a human being is predicated on the integration of multiscale data, akin to a Google map, which consists of superimposed layers of data such as street, traffic, and satellite views. For a human being, these layers include demographics and the social graph, biosensors to capture the individual's physiome, imaging to depict the anatomy (often along with physiologic data), and the biology from the various omics (genome-DNA sequence, transcriptome, proteome, metabolome, microbiome, and epigenome). In addition to all of these layers, there is one's important environmental exposure data, known as the "exposome."

Topol (2014)

Universität Zürich^{UZH}

2.5

REAL-TIME COLLECTION OF
DATA ON FUNCTIONAL ABILITY

SWITZERLAND
University of Zurich

Clock time: 12:00 - 12:00
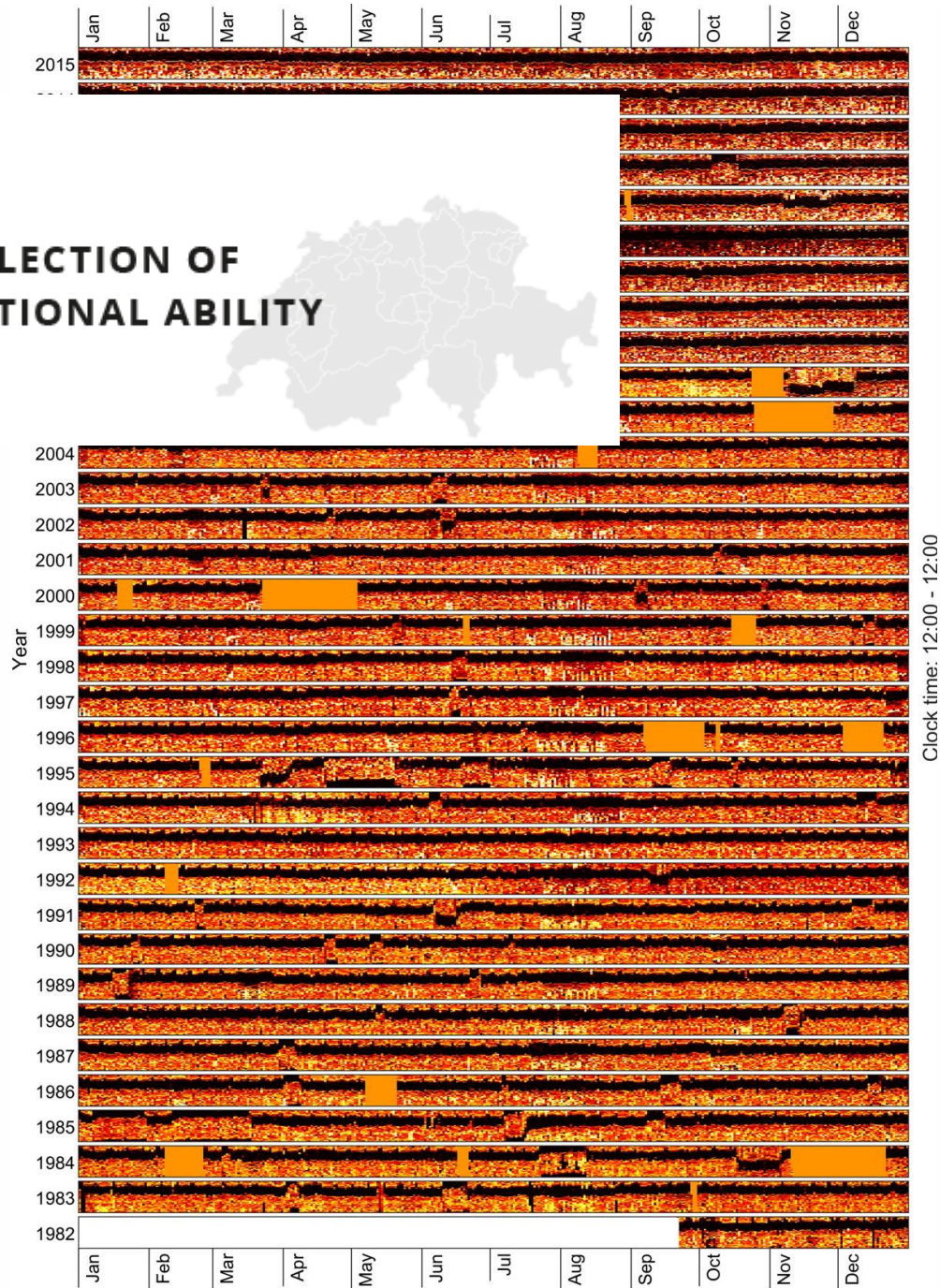
Retro-harvested data
from Borbély, Rusterholz
& Achermann, 2017

REAL-TIME COLLECTION OF DATA ON FUNCTIONAL ABILITY

SWITZERLAND
University of Zurich
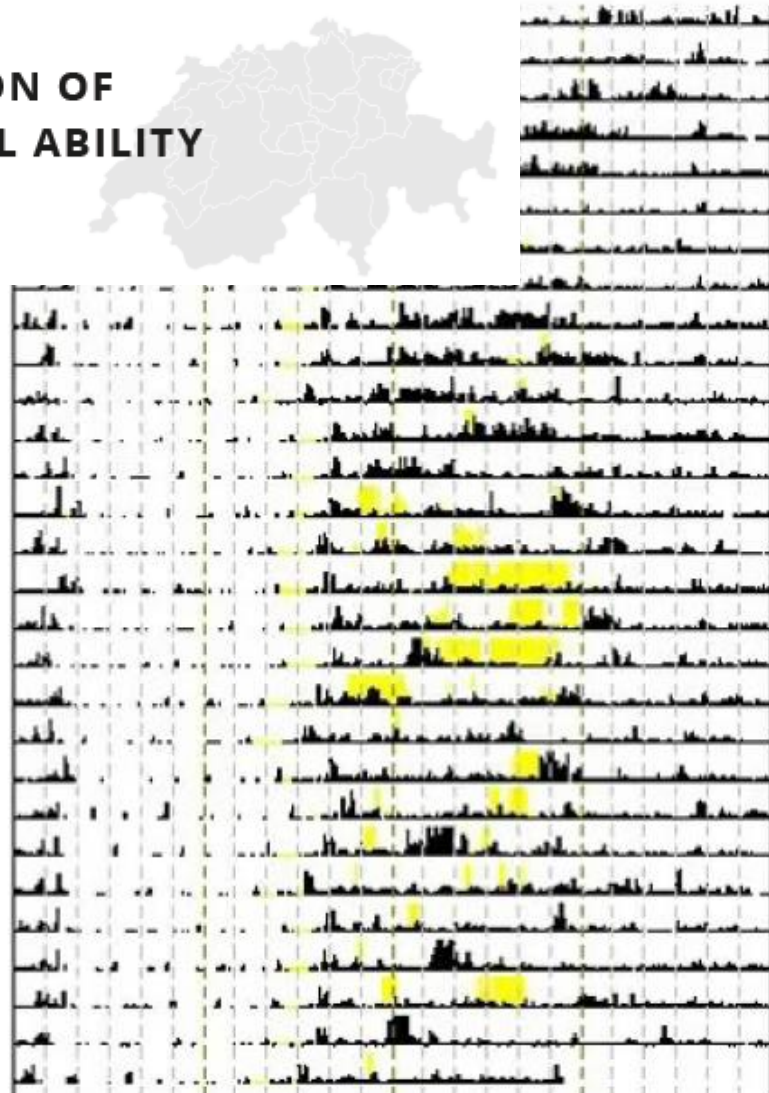
Small Data + *Big Data*

Person + Context + Interaction

Borbély 2020

![Universität Zürich UZH logo]

UFSP Dynamik gesunden Alterns

1) **From the World Report on Aging and Health 2015 to the «UN Decade of Healthy Aging 2021-2030»**

2) **Healthy Aging as the basis of Public Health: What's new?**

3) **Where do we stand 2021?**

4) **Innovation challenges for «The Decade»**

In 2020, the global population aged 60 years and over (older persons) is just over 1 billion people, representing 13.5% of the world's population of 7.8 billion. That number is 2.5 times greater than in 1980 (382 million), and is projected to reach nearly 2.1 billion by 2050.

Most determinants of healthy ageing can be shaped by policy

Universität Zürich UZH

Percentage of countries **reporting** a national plan on ageing and health

	2018	2020
Globally	45%	54%
AFR	34%	36%
AMR	46%	71%
EMR	33%	33%
EUR	58%	70%
SEAR	82%	91%
WPR	33%	33%

Percentage of countries with a national multi-stakeholder forum or committee on ageing and health, 2020

Region	2018	2020
Globally	45%	53%
AFR	30%	40%
AMR	57%	71%
EMR	38%	48%
EUR	66%	70%
SEAR	55%	55%
WPR	19%	19%

Percentage of countries reporting a national programme to foster age-friendly environments

Region	2018	2020
Globally	18%	29%
AFR	11%	17%
AMR	31%	43%
EMR	14%	19%
EUR	13%	38%
SEAR	45%	64%
WPR	11%	11%

Percentage of countries with a national policy to support comprehensive assessments of older people

Region	2018	2020
Globally	14%	31%
AFR	9%	13%
AMR	34%	49%
EMR	14%	24%
EUR	0	45%
SEAR	27%	36%
WPR	19%	19%

Universität Zürich UZH
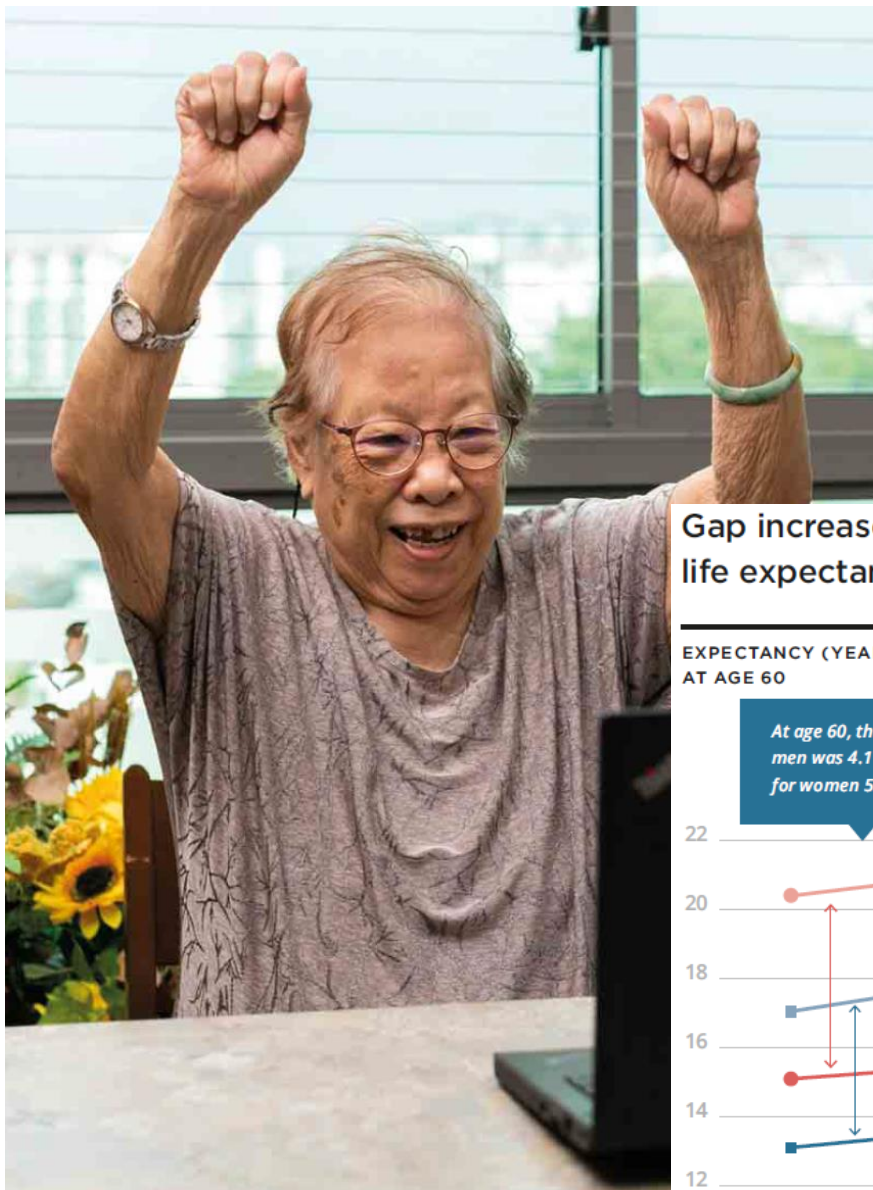
Percentage of countries reporting
**availability of longitudinal data on the
health status and needs of older people**

Region	2018	2020
Globally	18%	24%
AFR	6%	6%
AMR	20%	29%
EMR	0	5%
EUR	38%	49%
SEAR	18%	27%
WPR	11%	11%

Gap increases between life expectancy and healthy
life expectancy at age 60, 2000-2019[147]

EXPECTANCY (YEARS)
AT AGE 60
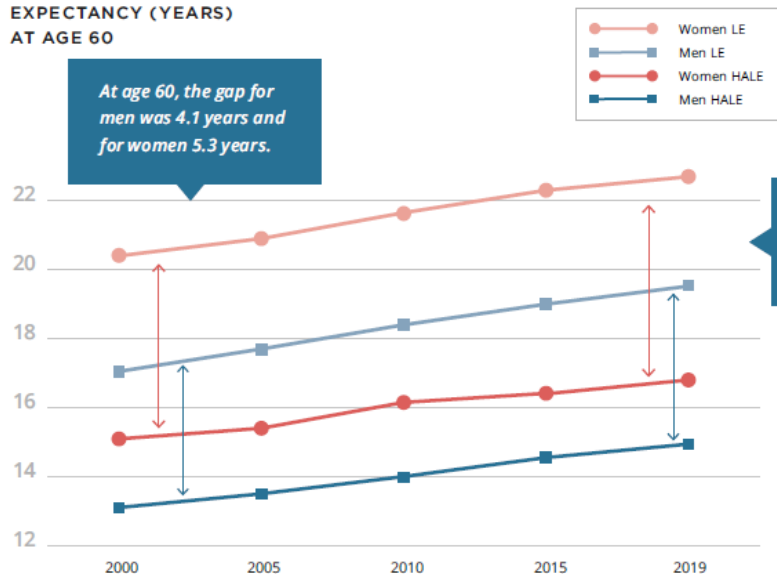
- Women LE
- Men LE
- Women HALE
- Men HALE

At age 60, the gap for
men was 4.1 years and
for women 5.3 years.

By 2019, this increased
to 4.7 for men and
6.0 years for women.

1) **From the World Report on Aging and Health 2015 to the «UN Decade of Healthy Aging 2021-2030»**

2) **Healthy Aging as the basis of Public Health: What's new?**

3) **Where do we stand 2021?**

4) **Innovation challenges for «The Decade»**

Universität Zürich UZH

The pathway to optimize functional ability

1 CLARIFY
- Clarify what will be optimized within each domain of functional ability
- Set priorities (What is important?)

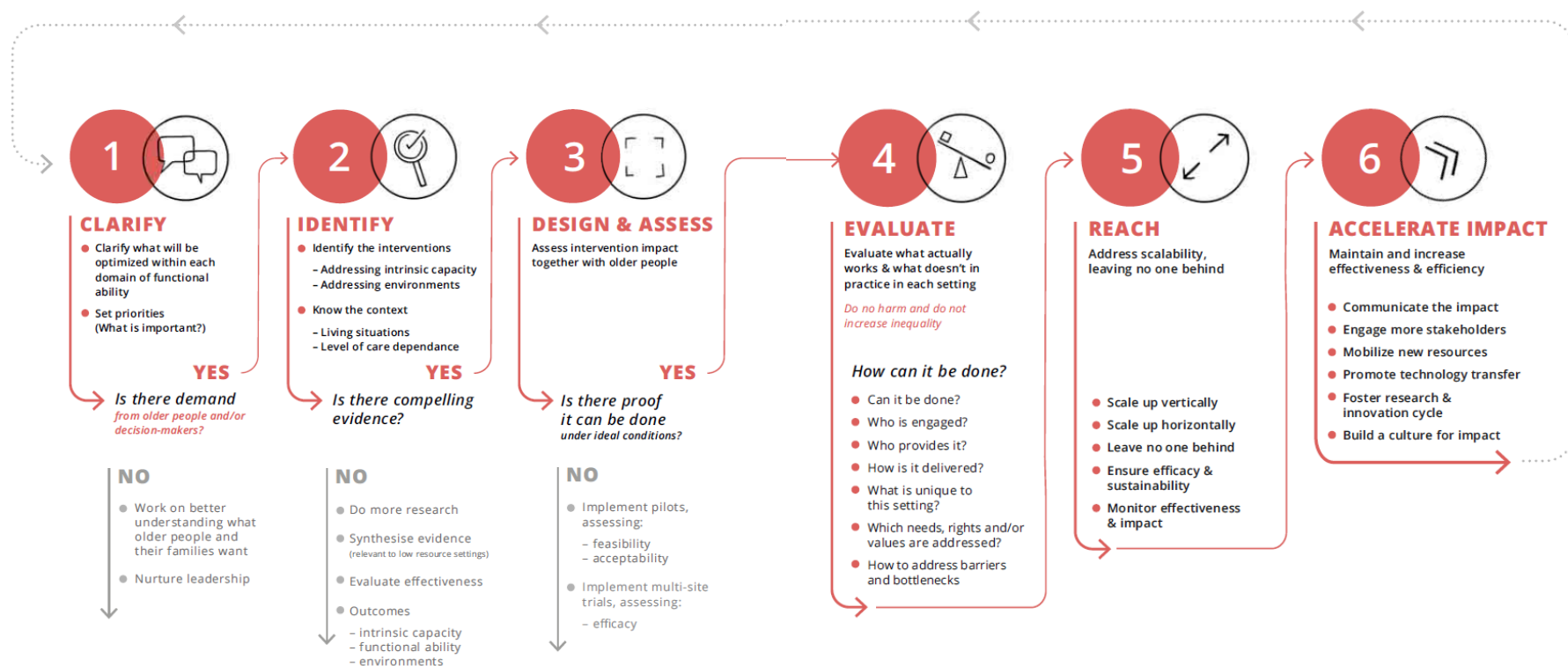**YES**
Is there demand from older people and/or decision-makers?

NO
- Work on better understanding what older people and their families want
- Nurture leadership

2 IDENTIFY
- Identify the interventions
  – Addressing intrinsic capacity
  – Addressing environments
- Know the context
  – Living situations
  – Level of care dependance

YES
Is there compelling evidence?

NO
- Do more research
- Synthesise evidence (relevant to low resource settings)
- Evaluate effectiveness
- Outcomes
  – intrinsic capacity
  – functional ability
  – environments

3 DESIGN & ASSESS
Assess intervention impact together with older people

YES
Is there proof it can be done under ideal conditions?

NO
- Implement pilots, assessing:
  – feasibility
  – acceptability
- Implement multi-site trials, assessing:
  – efficacy

4 EVALUATE
Evaluate what actually works & what doesn't in practice in each setting

Do no harm and do not increase inequality

How can it be done?
- Can it be done?
- Who is engaged?
- Who provides it?
- How is it delivered?
- What is unique to this setting?
- Which needs, rights and/or values are addressed?
- How to address barriers and bottlenecks

5 REACH
Address scalability, leaving no one behind

- Scale up vertically
- Scale up horizontally
- Leave no one behind
- Ensure efficacy & sustainability
- Monitor effectiveness & impact

6 ACCELERATE IMPACT
Maintain and increase effectiveness & efficiency

- Communicate the impact
- Engage more stakeholders
- Mobilize new resources
- Promote technology transfer
- Foster research & innovation cycle
- Build a culture for impact

Universität
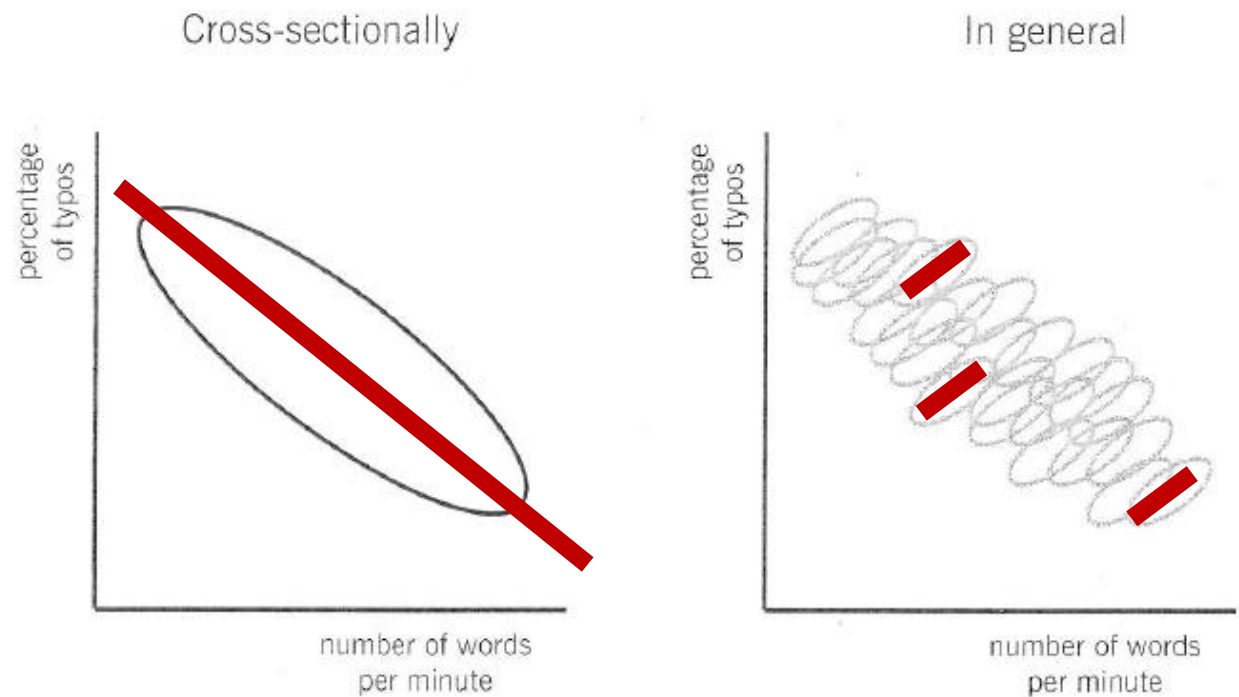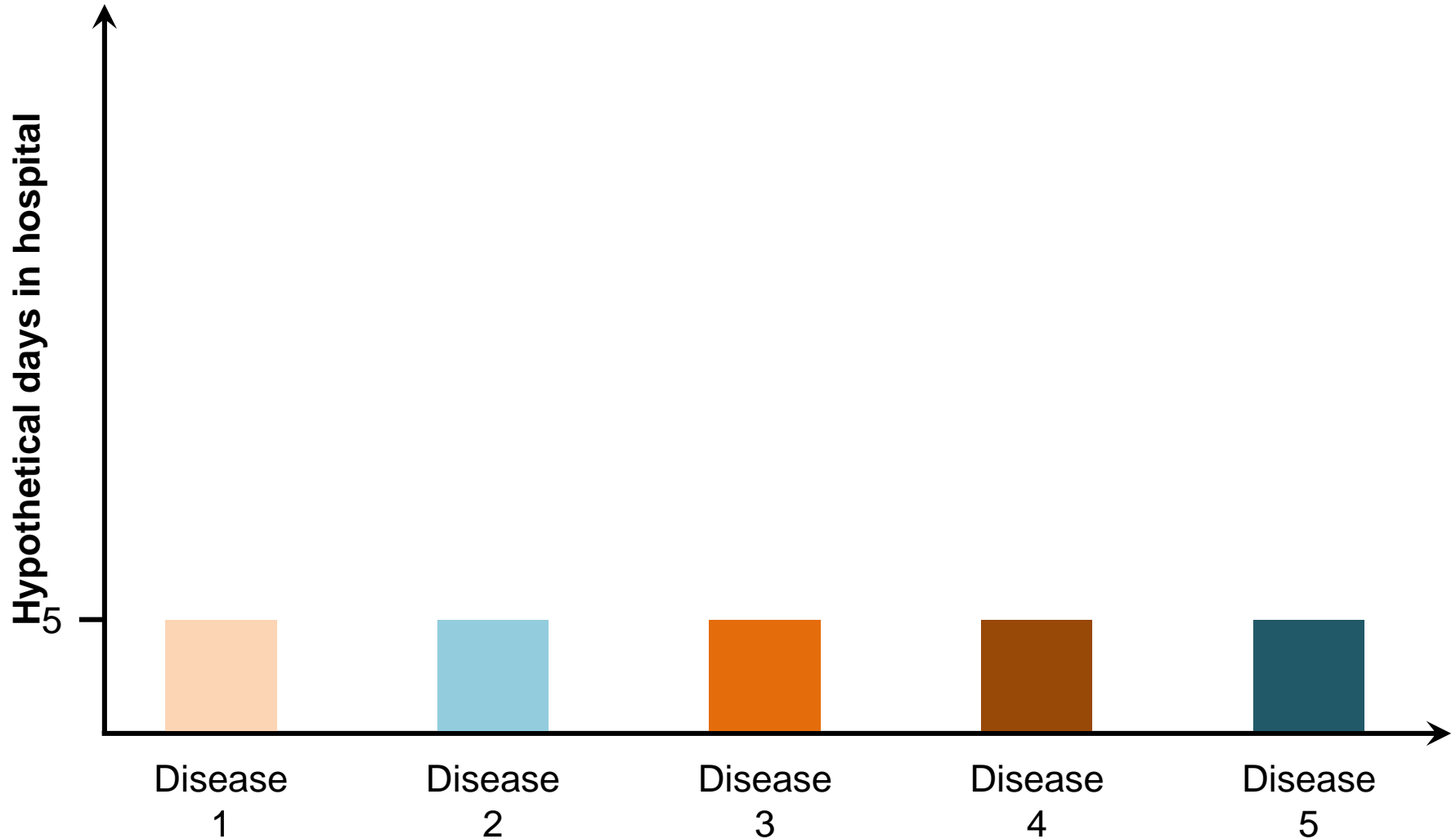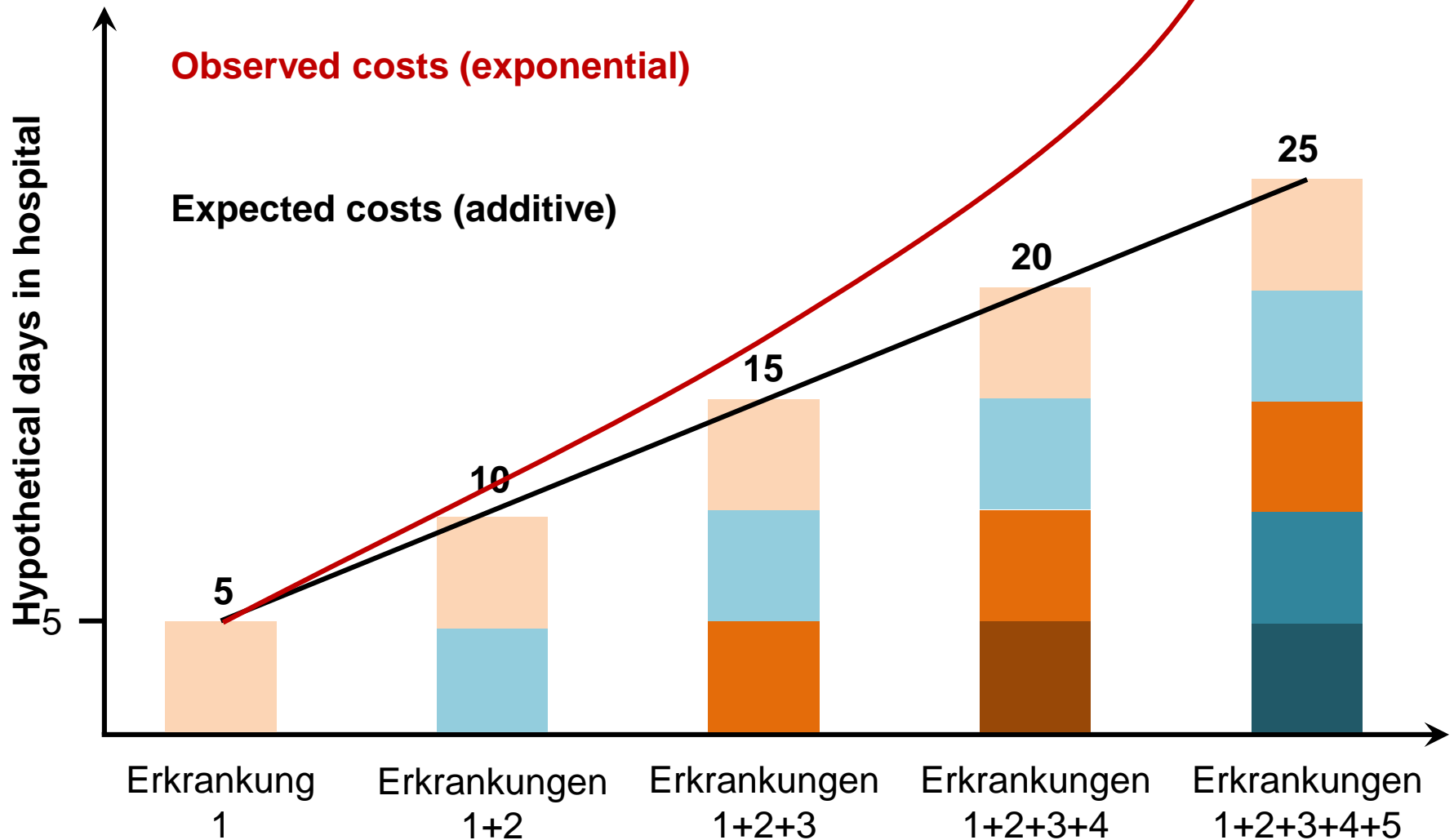Zürich^UZH

Cross-sectionally

In general

FIGURE 3.1. Left: The cross-sectional relationship between typing speed and percentage of typos. Right: The within-person relationship for a number of persons.

Aus: Mehl & Conner, 2012, Handbook of Research Methods for Studying Daily Life

**Universität
Zürich**^{UZH}

UFSP Dynamik gesunden Alterns

"Complexity Trap"

Universität Zürich UZH

DEPARTMENT: PERVASIVE HEALTHCARE

Semantic Activity Analytics for Healthy Aging

Challenges and Opportunities

Mike Martin
University of Zurich and Collegium Helveticum

Robert Weibel
University of Zurich

Christina Röcke
University of Zurich

Steven M. Boker
University of Virginia

Department Editors:
Gabriela Marcu
gm472@drexel.edu

Martin, Weibel, Röcke & Boker, 2018 (*IEEE Pervasive Computing)*

As real-life activity data from many aging individuals become available, insights gleaned from such data could be leveraged to foster healthy aging. The emerging field of semantic activity analytics is addressing this challenge.

The World Health Organization (WHO) and its member states are actively promoting a global paradigm shift in healthy aging research from a disease focus to a contextualized person focus.[1] WHO's new Healthy Aging definition is, in effect, a dynamic system model and requires

Real-Time Detection of Spatial Disorientation in Persons with Mild Cognitive Impairment and Dementia

Samer Schaat[a]   Philipp Koldrack[a]   Kristina Yordanova[b]   Thomas Kirste[b]
Stefan Teipel[a, c]

[a]German Center for Neurodegenerative Diseases (DZNE), Rostock, Germany; [b]Department of Computer Science, University of Rostock, Rostock, Germany; [c]Department of Psychosomatic and Psychotherapeutic Medicine, University of Rostock, Rostock, Germany

Fig. 1. Duration of the orientation walk.

Schaat, Koldrack, Yordanova, Kirste & Teipel, 2019
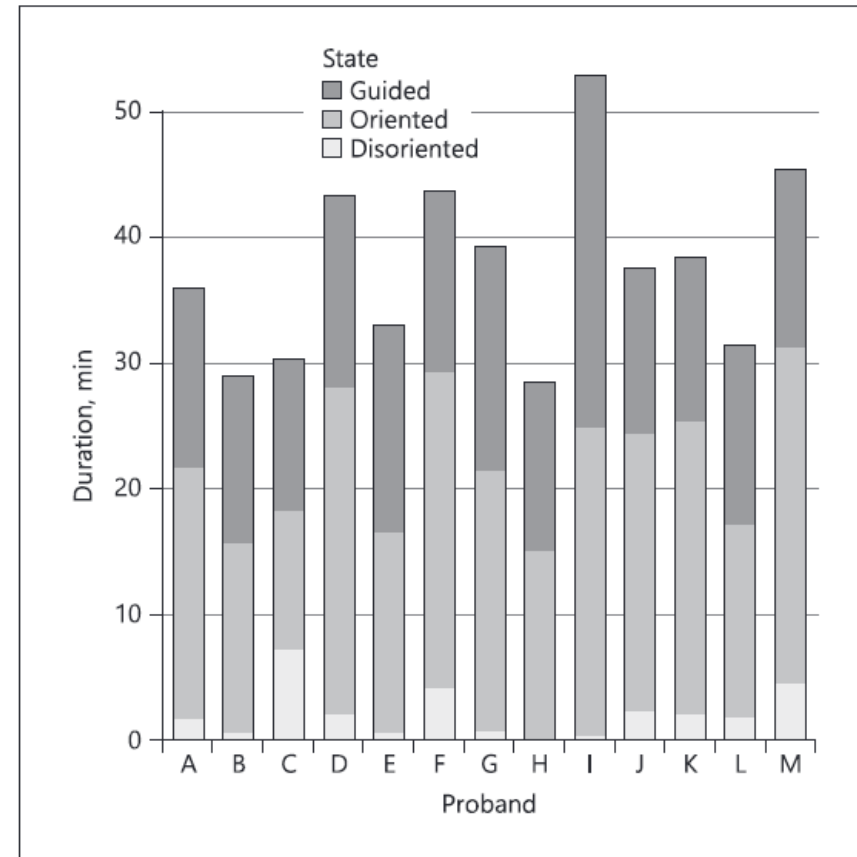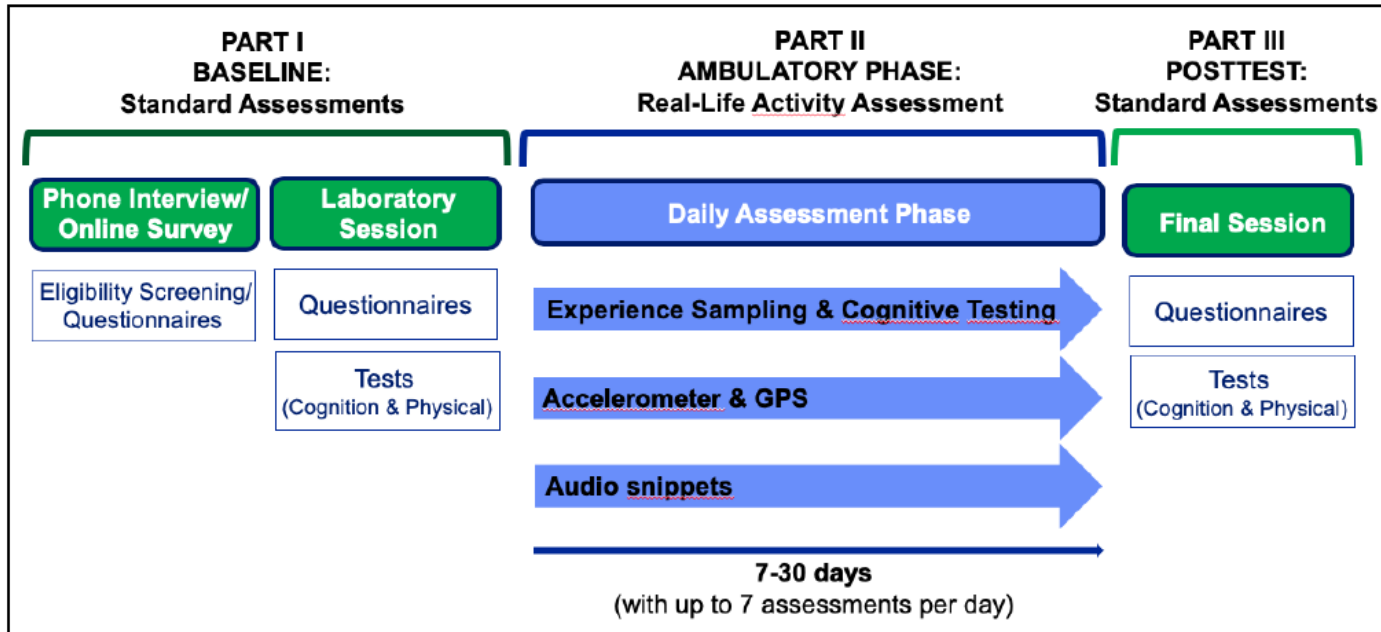
General protocol framework

Figure 1. *General Design of Multi-Country Study on Healthy Ageing*

Adaptations to country contexts to ensure comparable data:
Instruments, Observation periods, Extraction, Analytics

Switzerland, Hong Kong, Mexico, Italy, Spain, Netherlands, US, Australia, India, South Africa

XAI for Healthy Aging Analytics

Data and findings

Reconstruction of Daily Spatio-Temporal Lifelines

uTrail data participant #4
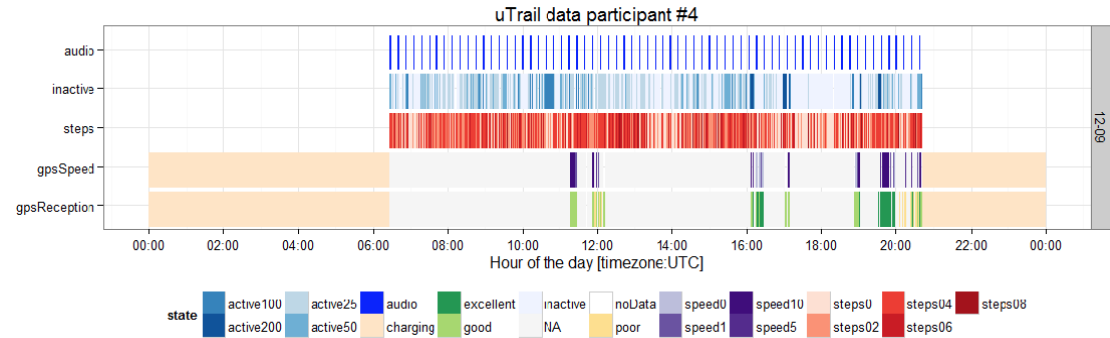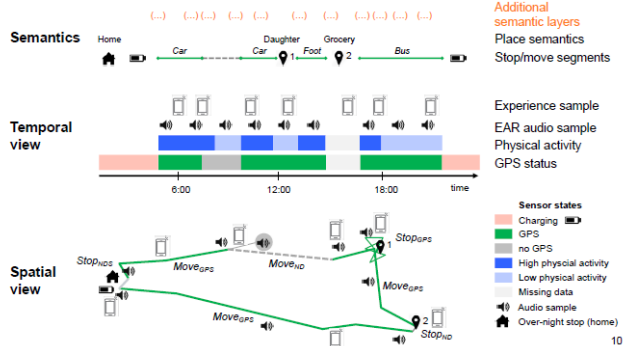
CH: N = 153, 65-91, 55% Women, up to 300 days
ME: N = 80, 65+, lower levels of education, up to 15 days
HK: N = 158, 65+

Age range 24-93, applicable with low education, MCI
Coverage over 80%
«Invisible» activities and support made visible, practically useful

Semantic Activity Analytics (XAI for Health Analytics)**:**
    - Automated sound, movement, location data annotation
    - Situation-identification, e.g. orientation, social interaction
    - Activity pattern indicators
    - Activities x contexts

Universität Zürich[UZH]

UFSP Dynamik gesunden Alterns

Scenarios for the end of the

«UN Decade of Healthy Aging 2021-2030»

Universität Zürich UZH

UFSP Dynamik gesunden Alterns

SCENARIOS TOWARDS HEALTHY AGEING

Reaching Goals 2021-2030

3 WHAT IMPROVEMENTS COULD WE EXPECT BY 2030?

SCENARIO 1
Deterioration

The situation relative to the baseline increases significantly the number of older adults who cannot meet their basic needs – especially those who have few opportunities whether by age, gender, location or other markers of inclusion or exclusion.

- Health and social services for older adults are cut back
- Out-of-pocket payments for health and social services increase
- A greater proportion of households suffer from catastrophic payments for health services
- Pension benefits decrease
- Pandemic response and recovery is not inclusive of older adults
- Unequal pace of global progress

SCENARIO 2
Stagnation

The situation remains largely unchanged with some deterioration. Unequal pace of global progress remains.

- Out-of-pocket expenditures are maintained
- Pension benefits remain unchanged, without flexibility for those who wish to work longer
- No improvements in coverage of quality affordable services for older adults
- Legislation to address age-based discrimination neither introduced nor enforced
- Attitudes towards older adults remain unchanged
- Delayed recovery and unequal inclusion of older adults in pandemic response
- Policy-making remains in silos for most countries

SCENARIO 3
Improvement

Significant improvement reflecting the ability of older adults to meet their basic needs relative to the baseline, a rebound after the pandemic, and improved access to services.

- Integrated care for older persons that builds intrinsic capacity expanded, long-term care systems developed and included in UHC
- Attitudes towards older adults change positively
- Faster recovery and inclusive response, mitigating the pandemic's disruptions
- Accelerated improvements in the meaningful and inclusive engagement of older adults
- Governments, civil society and the private sector work together to optimize functional ability
- Better distribution of global investments and progress