



University of  
Zurich<sup>UZH</sup>

URPP Dynamics of Healthy Aging

Dynamics of Healthy Aging



# Möglichkeiten der Messung der Behandlungsqualität bei älteren Menschen

WHO Working Group on Metrics and Research Standards for Healthy Ageing

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Bern, 15.12.2017



- 1) Was kann man für wen wie messen?**  
**Population versus Individuum x Kontext**
  
- 2) Was ist ein älterer Mensch?**  
**Was sind ältere Menschen?**  
**Wann ist die Qualität der Behandlung gut?**
  
- 3) Möglichkeiten zur Messung**  
**Was wird gemessen?**  
**Charakteristika, Vor-/Nachteile**



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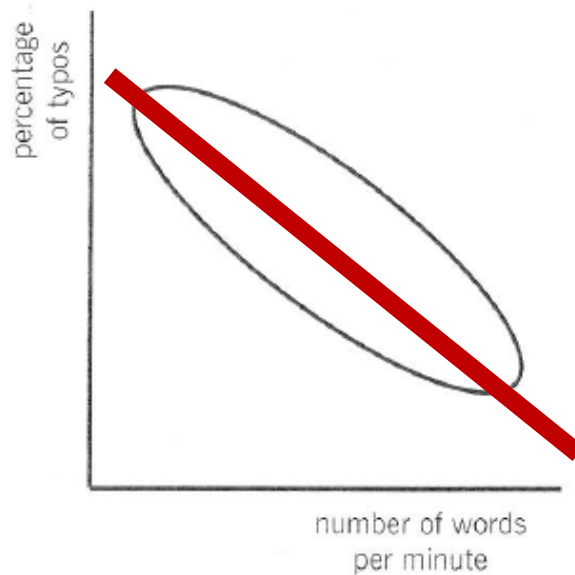


# Neu: Zwei Forschungsfragen benötigen zwei Arten von Forschung

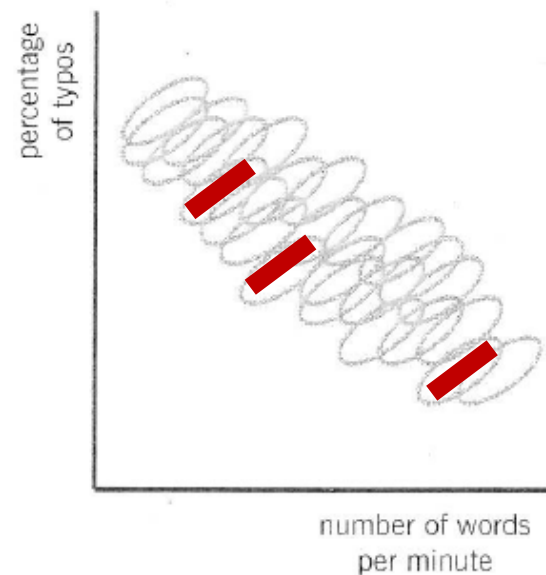
**Entscheider: Wieviele Personen sind gesund, sind es mehr oder weniger als zuvor?**

**Individuum/Kliniker: Was macht die konkrete Person vor mir im Alltag gesünder?**

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.



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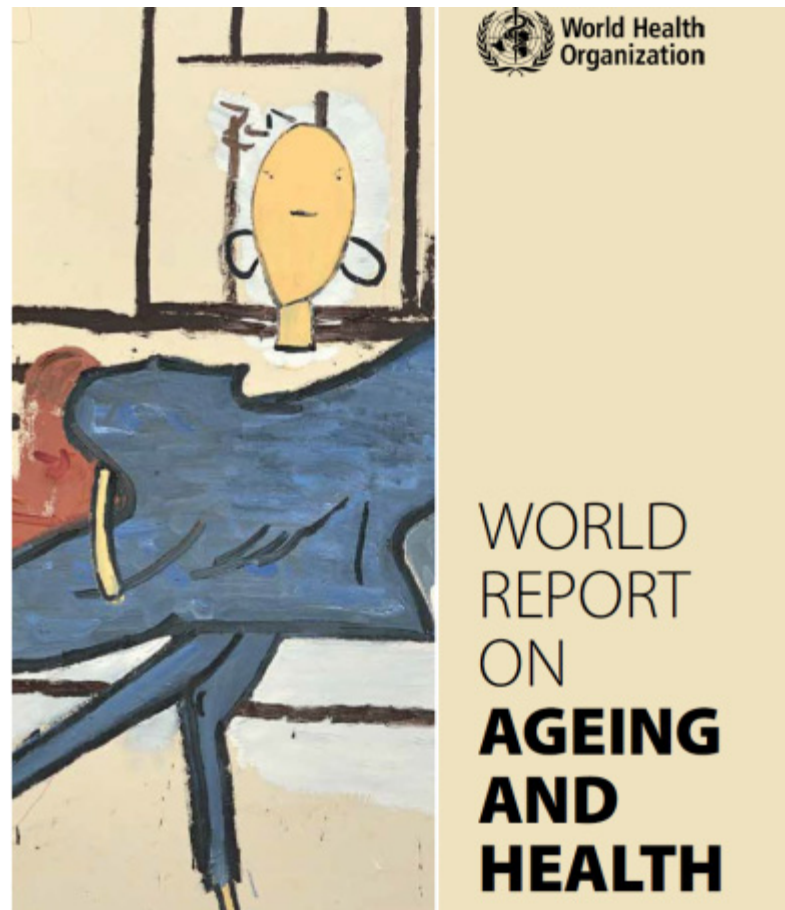
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UFSP Dynamik gesunden Alterns

Zeitschiene

## 2015: 1. World Report on Aging and Health





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

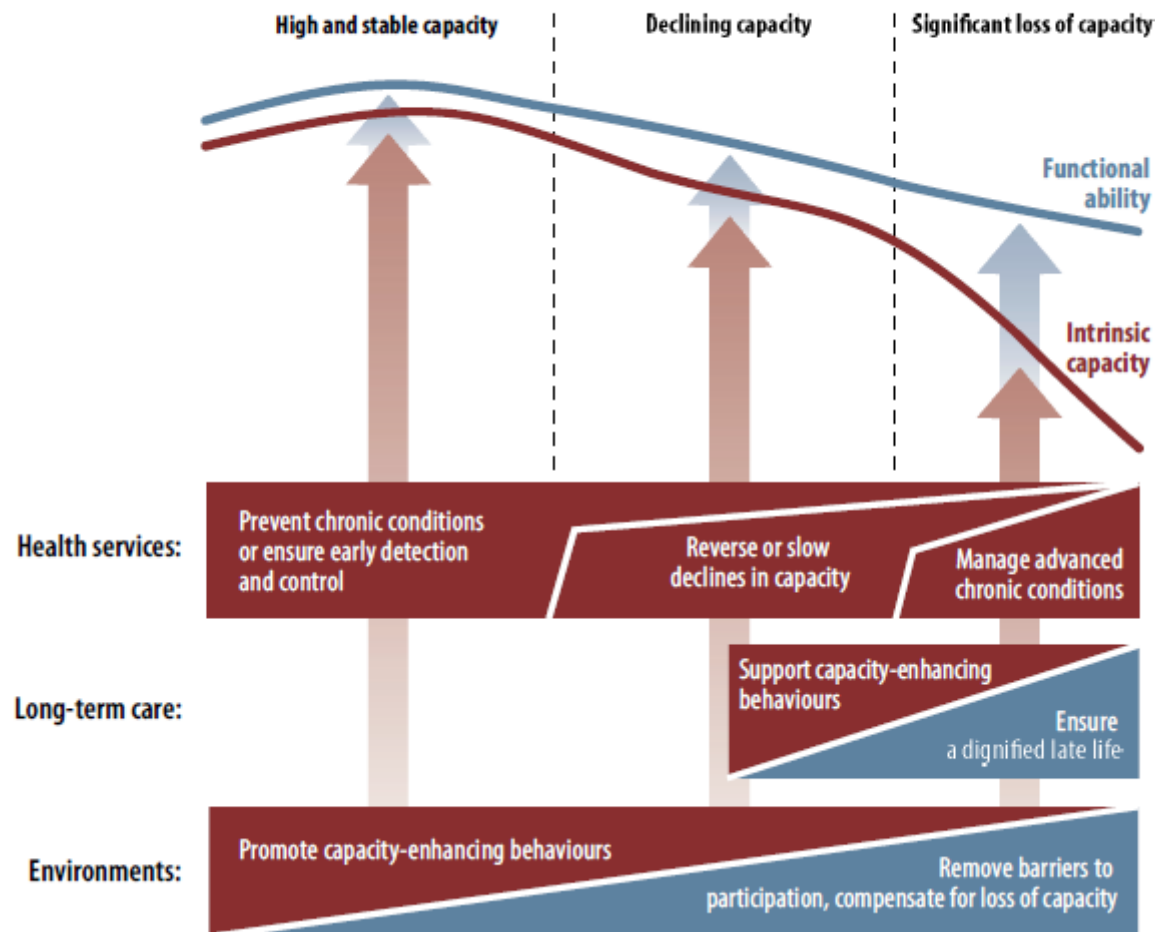
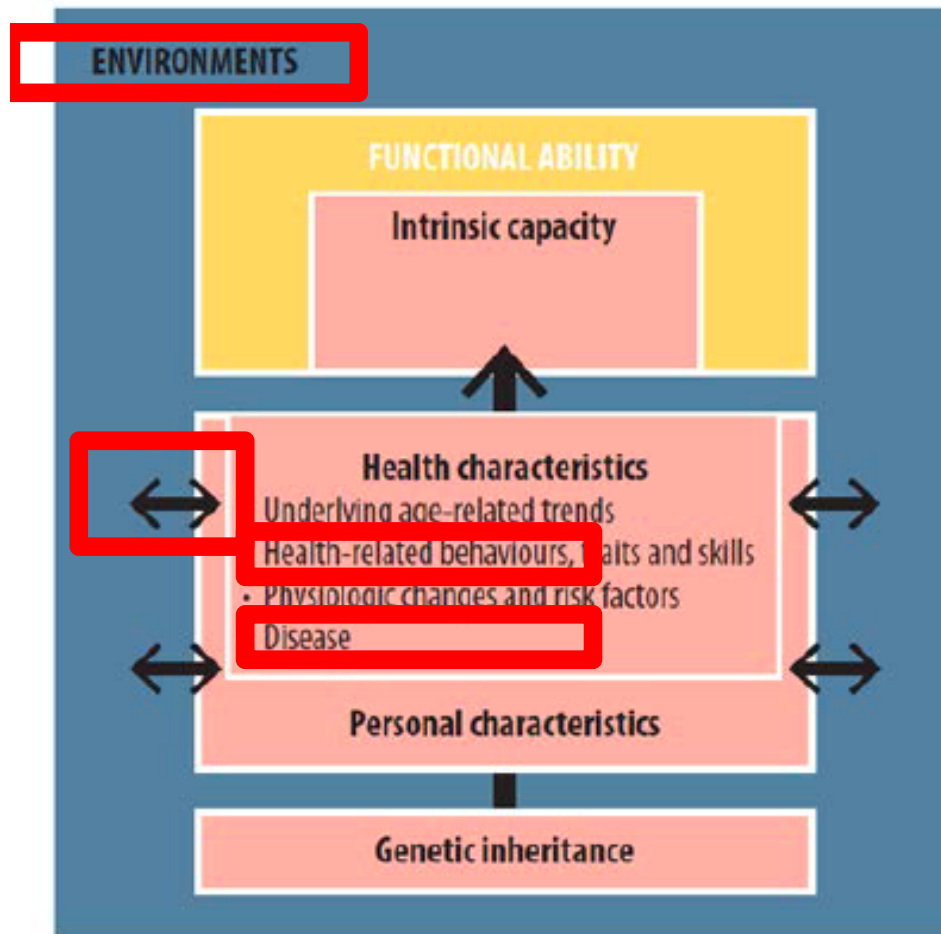




Figure 1. Healthy Ageing (source: WHO World Report on Ageing and Health, forthcoming)

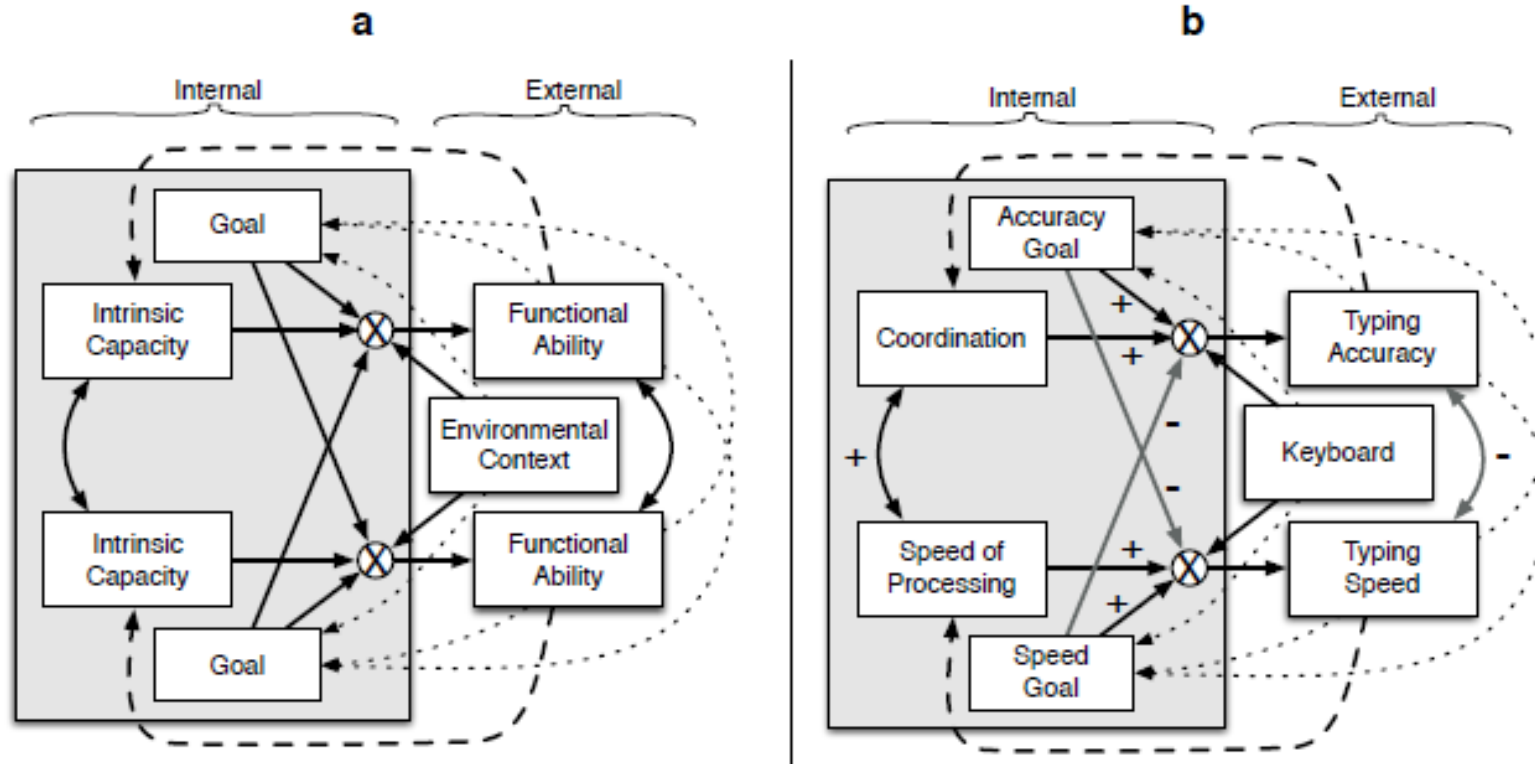


“Intrinsic Capacity” is the composite of all the physical and mental capacities of an individual.

“Functional Ability” comprises 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 interaction between these characteristics and the individual.

Healthy ageing is not defined by a specific level or threshold of functioning or health. Healthy ageing reflects the ongoing interaction between an individual and the environments they inhabit, shaped by many factors as illustrated in Figure 1.





**Evidenzbedarf: Welche Wege führen bei jeder Person zum genau gleichen Ziel → je mehr, desto mehr Optionen,  
→ Erforschung der Wirksamkeit systematischer Koordination von Interventionen eine gute Investition**



## Gesundheit im Alter auf der Ebene jeder gesamten Person mit und ohne Symptome zu fördern

- Erfolgsmessung benötigt integrative, kontextsensitive und an funktionaler Fähigkeit orientierte Messverfahren
- Alle älteren Personen unabhängig von Einzelsymptomen eingeschlossen
- Gesundheitsbegriff weg vom statischen Symptom-Fokus, hin zu Dynamik individuell bedeutsamer Alltagsfunktionalität
- Handlungsgelegenheiten in der Umwelt Teil des gesunden Alterns



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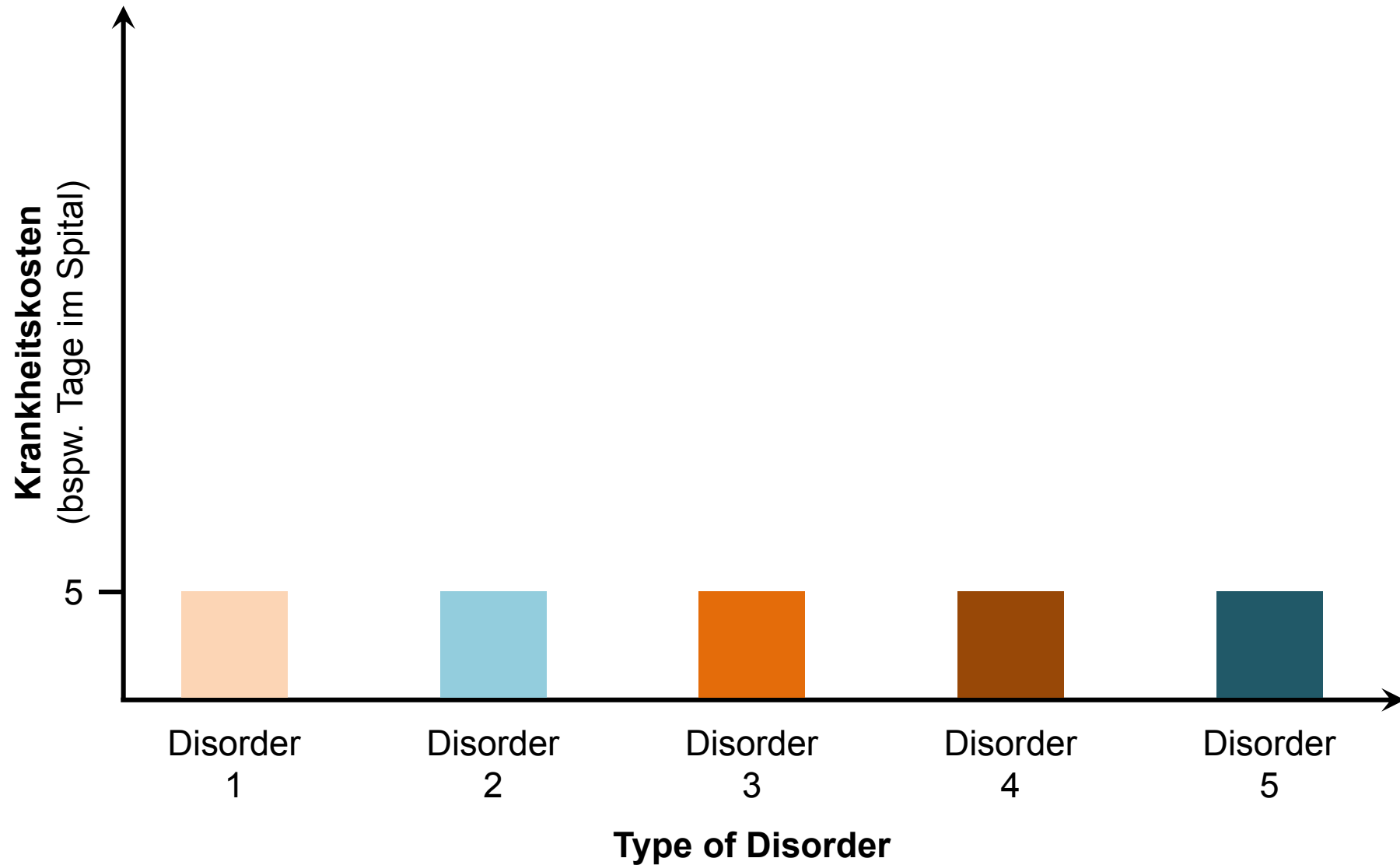
**Charakteristika, Vor-/Nachteile**



- (1) Symptome (Normabweichung, Beeinträchtigung)**
- (2) Mehrere Symptome (SF 36)**
- (3) Beeinträchtigungen basaler Alltagsfunktionen (ADL, IADL)**
- (4) Symptom-Messung durch PatientInnen (PROs)**
- (5) Funktionsbeeinträchtigungen im Alltag +1 Jahr (ICHOM)**
- (6) Eigenschaften, Funktionen und Kontexte (ICF)**
- (7) Funktionale Fähigkeits-Profile (WHO 2020)**
- (8) Fähigkeit individueller Systeme (Person x Kontext x Aktivität) zur Stabilisierung funktionaler Fähigkeiten (WHO 2022)**

**Fraglich:**

**Wer legt Outcomes fest, wer misst, für Multimorbidität geeignet?**





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**International Consortium for Health  
Outcomes Measurement**

'Frail Elderly' Working Group

March 2015

# ICHOM was formed to drive the industry towards value-based health care by defining global outcome standards

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ICHOM's three founders...



...launched ICHOM as a  
nonprofit

- Independent 501(c)3 organization
- Idealistic and ambitious goals
- Global focus
- Engages diverse stakeholders



**Our mission:**

*Unlock the potential of Value-Based Health Care by **defining global standard sets of outcome measures that really matter to patients** for the most relevant medical conditions and by **driving adoption and reporting** of these measures worldwide.*

# The ICHOM Strategic Agenda

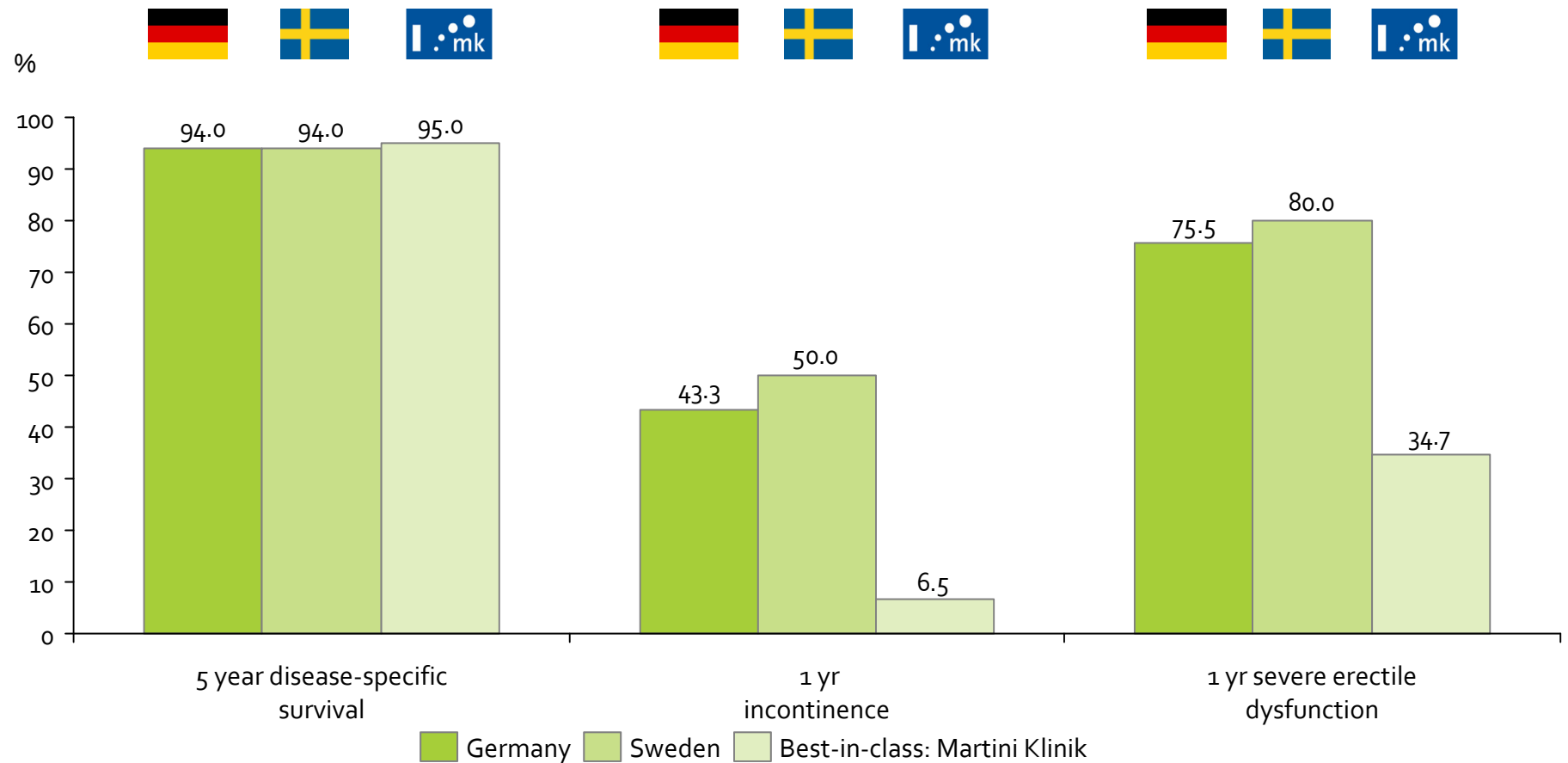
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Focus to date

- 1 Define internationally recognised Standard Sets of outcomes that matter most to patients along with corresponding case-mix factors**
- 2 Secure Standard Set adoption by value-oriented providers in major health care markets**
- 3 Facilitate an international network of value-oriented institutions to benchmark outcomes and drive improvement**
- 4 Engage payors and governments to drive wider adoption and transparency through financial incentives or reporting requirements**



# Darum machen realitätsnahe Outcomes einen Unterschied



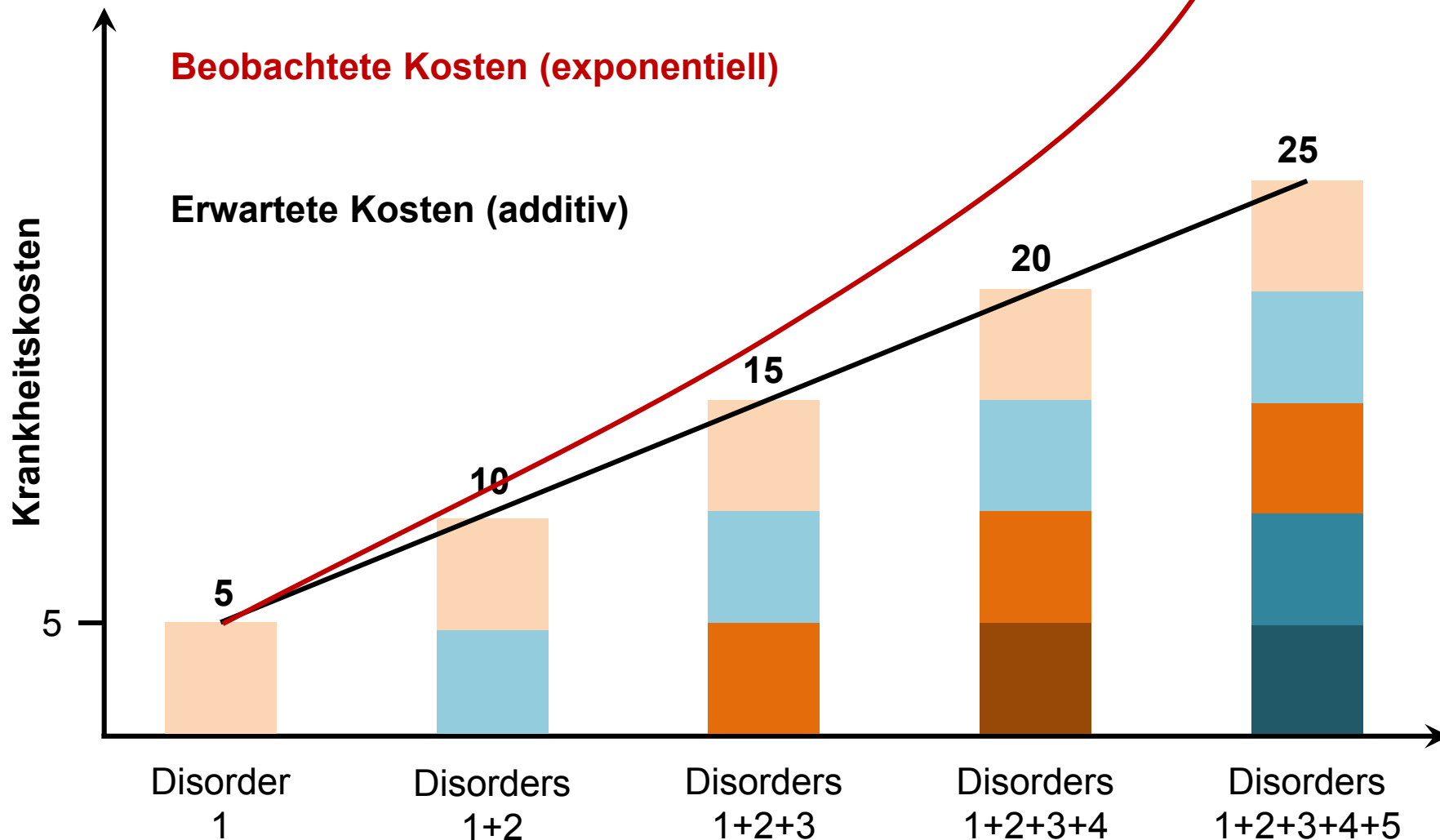
Swedish data rough estimates from graphs; Source: National quality report for the year of diagnosis 2012 from the National Prostate Cancer Register (NPCR) Sweden, Martini Klinik, BARMER GEK Report Krankenhaus 2012, Patient-reported outcomes (EORTC-PSM), 1 year after treatment, 2010



### Szenario 1a

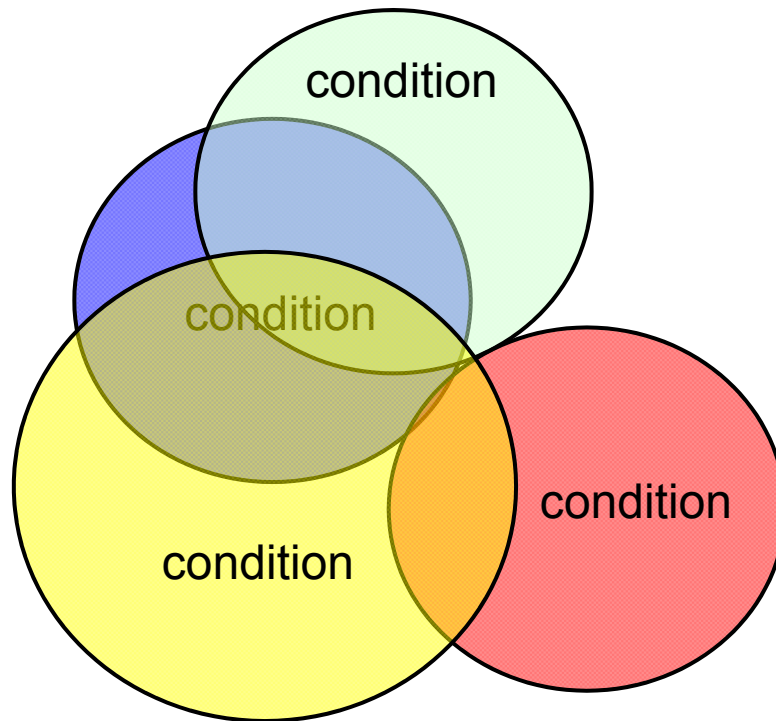
5 Erkrankungen

*(Zwischen-Personen Perspektive  
angewendet auf einzelne Person)*





## Multimorbidität



Bei jeder einzelnen Person  
systematisch einzubeziehen:

- **Disease-Medication Interactions (DMIs)**
- **Disease-Disease Interactions (DDIs)**
- **Treatment-Treatment Interactions (TTIs)**
- **Treatment-Real Life Function Impairment Interactions (TRFIs)**
- **Treatment-Context Interactions (TCIs)**
- **Treatment-Individual x Context Interactions (TlxCIs)**

# Mögliche realitätsnahe Outcomes bei älteren Menschen

Amongst many discussed, the groups felt the following were most important :

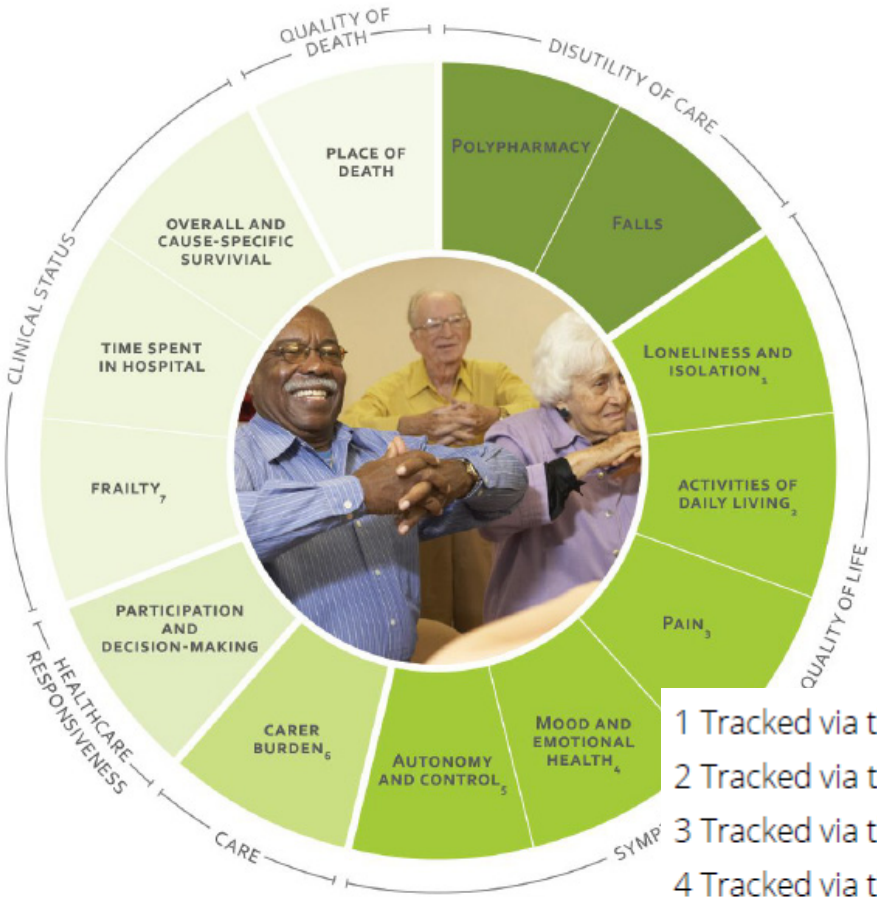
- Social and community participation
- Independence and remaining in own home
- Quality of life and wellbeing
- Avoiding inappropriate discharges and readmissions
- Isolation
- Loneliness and friendship
- Physical disabilities – hearing, vision, continence, mobility
- Hobbies and activities
- Access to 24 hour healthcare and social services
- Avoiding falls
- Delaying frailty
- Care and respite for the carer
- Malnutrition, weight loss and appetite
- Physical symptom burden
- Pain
- Sleep quality

However, there were a few new topics and points to consider:

- Survival/mortality was seen **less important as others** – instead seen as inevitable and expected
- Role in society e.g. formal/informal job or volunteering
- Consistency of medical service / single coordinator or care

<http://www.ichom.org/medical-conditions/older-person/>

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- 1 Tracked via the UCLA 3-item Loneliness Scale
- 2 Tracked via the 36-Item Short Form Survey Instrument Version 1 (SF-36)
- 3 Tracked via the SF-36
- 4 Tracked via the SF-36
- 5 Tracked via the Adult Social Care Outcomes Toolkit
- 6 Tracked by the Zarit Burden Interview 4-item screening questionnaire
- 7 Tracked via the Canadian Study on Health & Aging Clinical Frailty Scale



## The End of the Disease Era

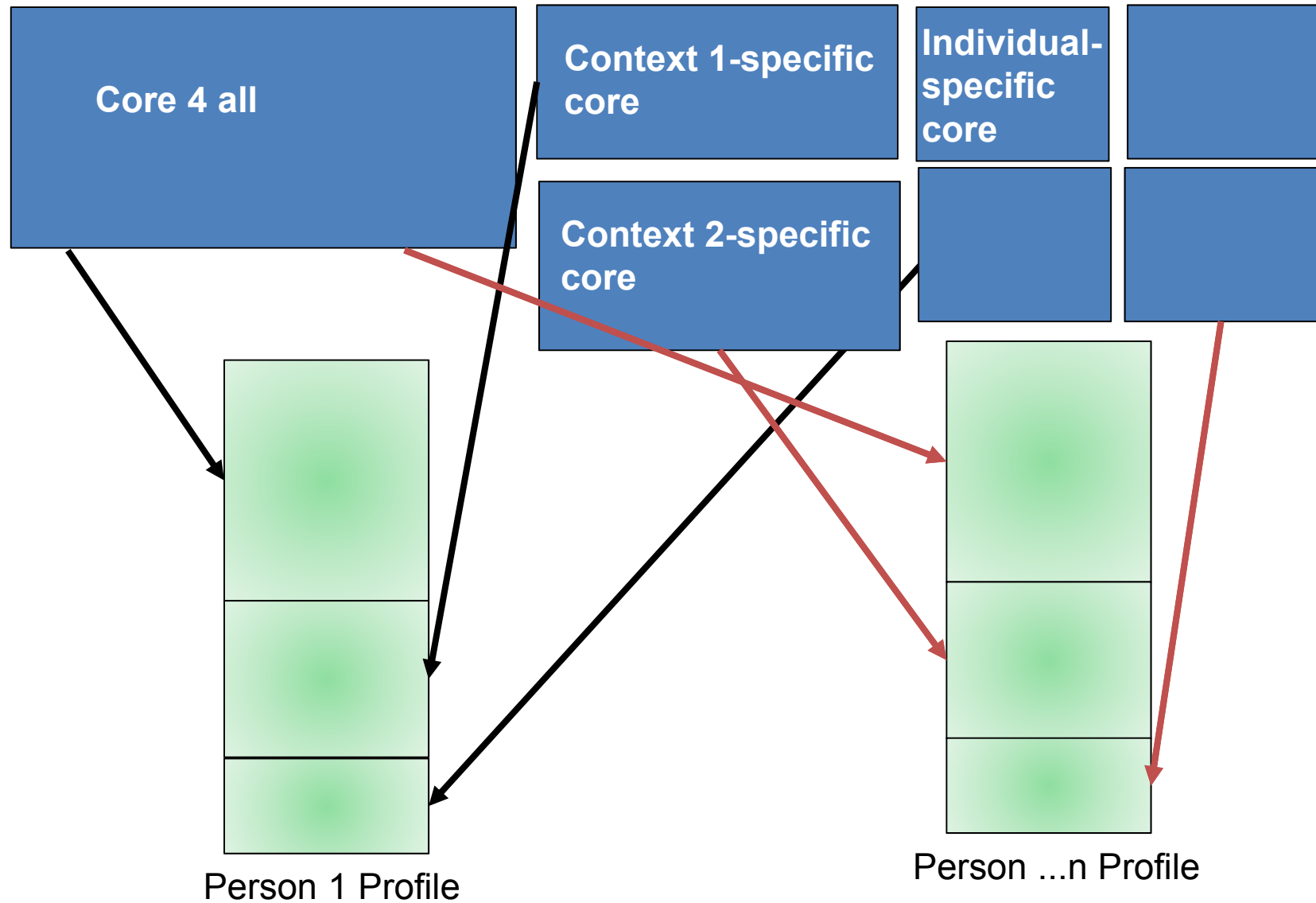
Mary E. Tinetti, MD, Terri Fried, MD

**Table 2.** Clinical Decision Making with the Disease-Oriented and Integrated, Individually Tailored Models for a 44-Year-Old Obese Man Reporting Decreased Activity Tolerance

Disease-Oriented Model	Integrated, Individually Tailored Model
<p><i>Collect clinical data</i></p> <ul style="list-style-type: none"> <li>● History (e.g., heavy tobacco and alcohol intake, occasional exercise-induced chest pain, family history of coronary artery disease)</li> <li>● Physical examination (e.g., blood pressure 158/94 mm Hg, body mass index 31.2 kg/m<sup>2</sup>, trace peripheral edema, S<sub>4</sub> on cardiac examination)</li> <li>● Laboratory and ancillary testing (e.g., blood chemistries, complete blood count, chest radiograph, electrocardiogram, echocardiogram, pulmonary function tests, exercise stress test)</li> </ul>	<p><i>Collect patient-specific data</i></p> <ul style="list-style-type: none"> <li>● Patient concerns (e.g., worried about losing job which involves heavy lifting, worried about having a myocardial infarction and dying before age 50 years like his father)</li> <li>● Patient priorities (e.g., wants to live as long as possible but does not want to take medications if they interfere with sexual functioning, energy level, or alertness; willing to trade off some increased risk of myocardial infarction or stroke to avoid these problems now)</li> <li>● Nonbiological determinants: increased smoking and alcohol and decreased physical activity after his son died in an accident; religion is source of support</li> </ul>
<p><i>Diagnoses</i></p> <ul style="list-style-type: none"> <li>● Coronary artery disease, hypertension, hypercholesterolemia, tobacco and alcohol abuse</li> </ul>	<p><i>Contributing factors impeding goals</i></p> <ul style="list-style-type: none"> <li>● Coronary artery disease, bereavement, tobacco, alcohol, depressive symptoms, employment opportunities limited by education</li> </ul>
<p><i>Management</i></p> <ul style="list-style-type: none"> <li>● Risk factor modification (e.g., counsel to stop smoking, reduce or eliminate alcohol, lose weight, begin exercise program)</li> <li>● Treat blood pressure (e.g., thiazide diuretic, beta-blocker, +/- angiotensin-converting enzyme inhibitor)</li> <li>● Treat cholesterol (e.g., statin)</li> <li>● Refer to cardiologist for further diagnosis and management</li> </ul>	<p><i>Management (based on patient's priorities)</i></p> <ul style="list-style-type: none"> <li>● Bereavement counseling through church</li> <li>● Patient selects risk factor(s) that he is willing to address (e.g., Alcoholics Anonymous meeting at church)</li> <li>● Encourage increased physical activity during daily activities rather than exercise</li> <li>● Patient willing to start with thiazide diuretic and aspirin; later agree to a low-dose beta-blocker because a higher dose makes him tired; declines antidepressant but willing to undergo counseling</li> </ul>
<p><i>Outcomes</i></p> <ul style="list-style-type: none"> <li>● Blood pressure level</li> <li>● Cholesterol level</li> <li>● Myocardial infarction, stroke, heart failure, survival</li> </ul>	<p><i>Outcomes (in order of patient's priorities)</i></p> <ul style="list-style-type: none"> <li>● Physical activity level and sexual functioning</li> <li>● Maintain employment</li> <li>● Survival, myocardial infarction</li> </ul>



# Lösung: Profile als „functional ability“-Signaturen





## UFSP Dynamik Gesunden Alterns

WHO Healthy aging	Mobility profiles	Specific instruments
Environments	<ol style="list-style-type: none"> <li>1. Neighborhood green space</li> <li>2. Walking within and outside the local neighborhood: Main destinations used for walking and frequency and duration of walks to each destination (self-report)</li> </ol>	<ol style="list-style-type: none"> <li>1. Data collected from high resolution landmap true colour aerial photography (Gong, Gallacher, Palmer, &amp; Fone, 2014)</li> <li>2. Neighborhood Physical Activity Questionnaire (NPAQ; Giles-Corti, Timperio, Cutt, Pikora, Bull, Knuiiman, ... &amp; Shilton, 2006)</li> </ol>
Functional ability	Being and doing what one has reason to value with respect to mobility (self-report)	Modified version of the Schedule for the Evaluation of the Individual Quality of Life (SeiQOL; O'Boyle, Brown, Hickey, McGee, & Joyce, 1993)
Age-related trends	<ol style="list-style-type: none"> <li>1. Balance (self-report)</li> <li>2. Gait (self-report)</li> <li>3. Gait (real-life measure): Walk analysis</li> </ol>	<ol style="list-style-type: none"> <li>1. Performance Oriented Mobility Assessment (POMA; Tinetti, 1986)</li> <li>2. Telephone-based Mobility Assessment Questionnaire (TMAQ; Verghese, Katz, Derby, Kuslansky, Hall, &amp; Lipton, 2004)</li> <li>3. GaitRite (<a href="http://www.gaitrite.com/index.html">http://www.gaitrite.com/index.html</a>)</li> </ol>
Behaviors	<ol style="list-style-type: none"> <li>1. Physical activity (real-life measure): Body-mounted sensors to assess 16 different states of physical activities</li> <li>2. Physical activity (self-report): Weekly frequency and duration of various physical activities</li> </ol>	<ol style="list-style-type: none"> <li>1. Barcoding human physical activity to assess chronic pain conditions (Paraschiv-Ionescu, Perruchoud, Buchser, Aminian, 2012)</li> <li>2. CHAMPS Physical Activity Questionnaire (Stewart, Mills, King, Haskell, Gillis, &amp; Ritter, 2001)</li> </ol>
Traits	Personality traits (self-report)	NEO-FFI (Courneya, & Hellsten, 1998)
Skills	Fear of falling (self-report): Low levels of fear	Falls Efficacy Scale International (FES-I; Yardley, Beyer, Hauer, Kempen, Piot-Ziegler, & Todd, 2005)
Interactions	<ol style="list-style-type: none"> <li>1. Motives and goals (self-report): In leisure and health sports and the psychological conditions for sport commitment (e.g., Body/Appearance, Positive Exercise Experiences)</li> <li>2. Goals: Goal identification in cognitive rehabilitation (individualized intervention)</li> </ol>	<ol style="list-style-type: none"> <li>1. Berner Motiv- und Zielinventar höheres Erwachsenenalter (BMZI-HEA; <i>Motives and Goals Inventory in Old Age</i>; Schmid, Molinari, Lehnert, Sudeck, &amp; Conzelmann, 2014)</li> <li>2. Cognitive rehabilitation (Clare, 2010)</li> </ol>
	<ol style="list-style-type: none"> <li>3. Needs (structured interview): Mobility needs inside and outside the home and transportation needs of older adults with mental disorders</li> <li>4. Needs (self-report): Illness-related needs of individuals with cognitive impairment and dementia</li> </ol>	<ol style="list-style-type: none"> <li>3. Camberwell Assessment of Need for the Elderly (CANE; Reynolds, Thornicroft, Abas, Woods, Hoe, Leese, &amp; Orrell, 2000)</li> <li>4. Bedürfnisinventar bei Gedächtnisstörungen (BIG-65; <i>Needs Inventory in Memory Disorders</i>; Schmid, Eschen, Rügger-Frey, &amp; Martin, 2012)</li> </ol>



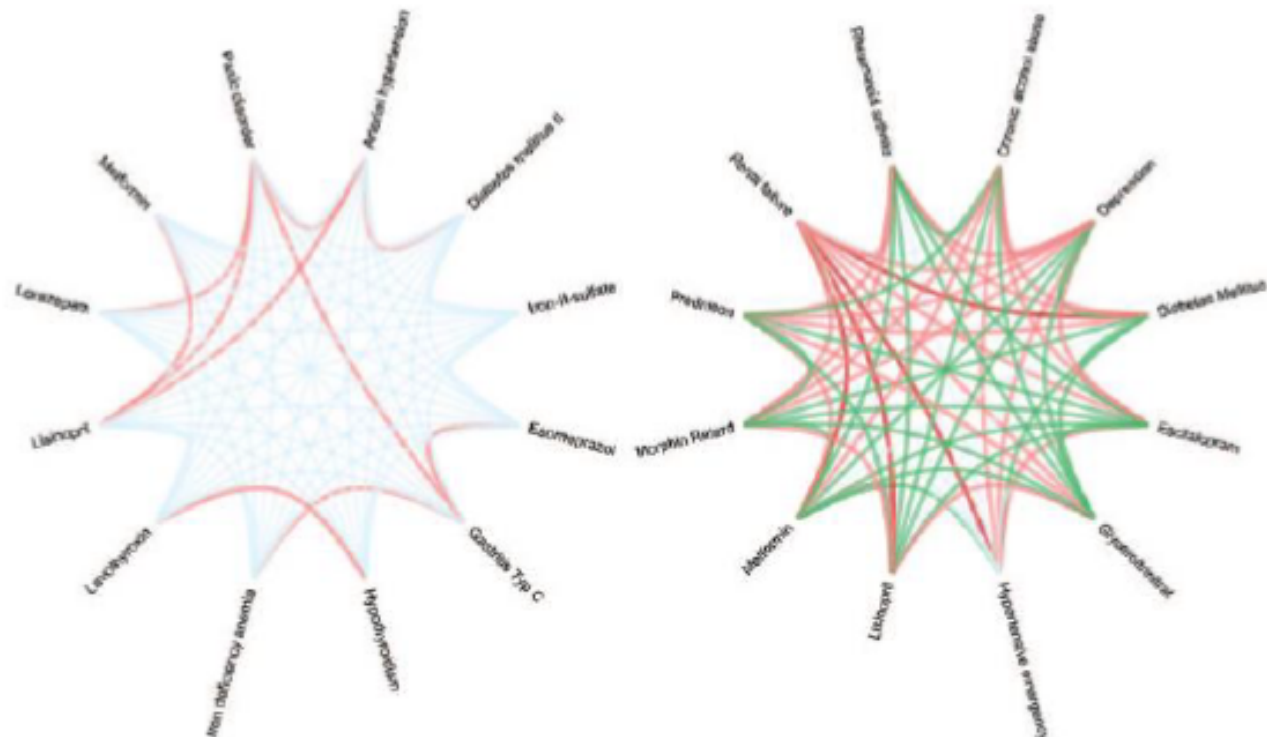


## Disease-Disease-Medication Interactions in Internal Medicine

- 176 patients admitted from the ED to the medical ward
- 166 suitable for final analysis: 8 subjects excluded due to monomorbidity, 2 aged <18 year
- 59% male, mean age: 63 ( $\pm 19$ ) years
- Mean number of diagnoses: 6.6 ( $\pm 3.4$ )
- 239 therapeutic conflicts encountered (in 49% of all patients)
- 29% of all patients *major* therapeutic conflicts
- 41% of all patients *minor* therapeutic conflicts



## Example 2: Mapping the interactions between conditions (plus person characteristics and environment)



**Figure 1.** Network graph generated from the multimorbidity interaction matrix on the basis of the participants' ratings of interaction severity, showing (A) the graph for the low conflict case with little risk of harmful interactions, and (B) the graph for the high conflict case with a high risk of harmful interactions.

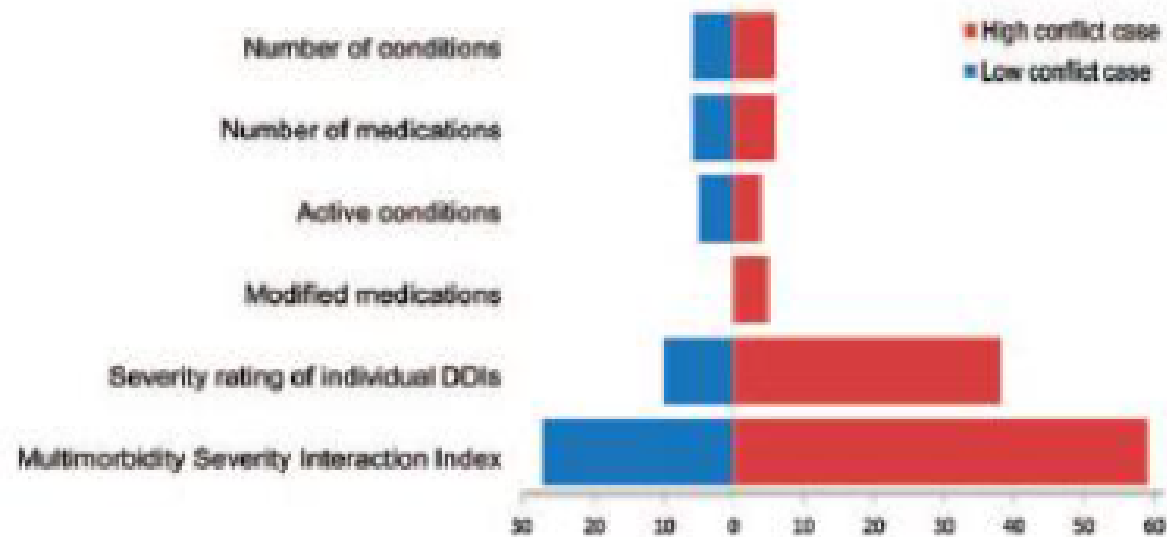
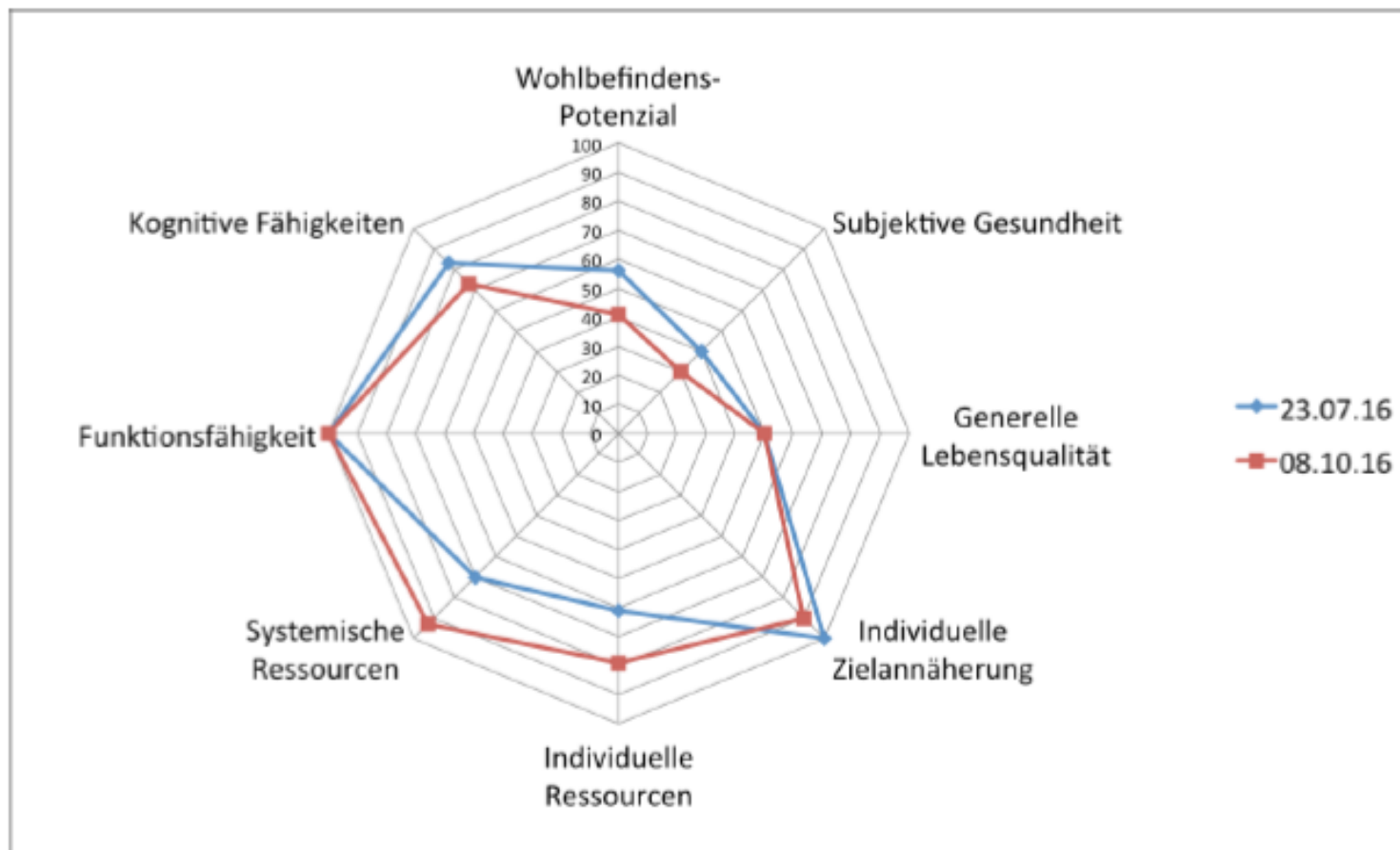


Figure 3. The figure illustrates the composition of the MISI, based on one physician's ratings of a low conflict case (right side of main panel) and a high conflict case (left side of main panel).

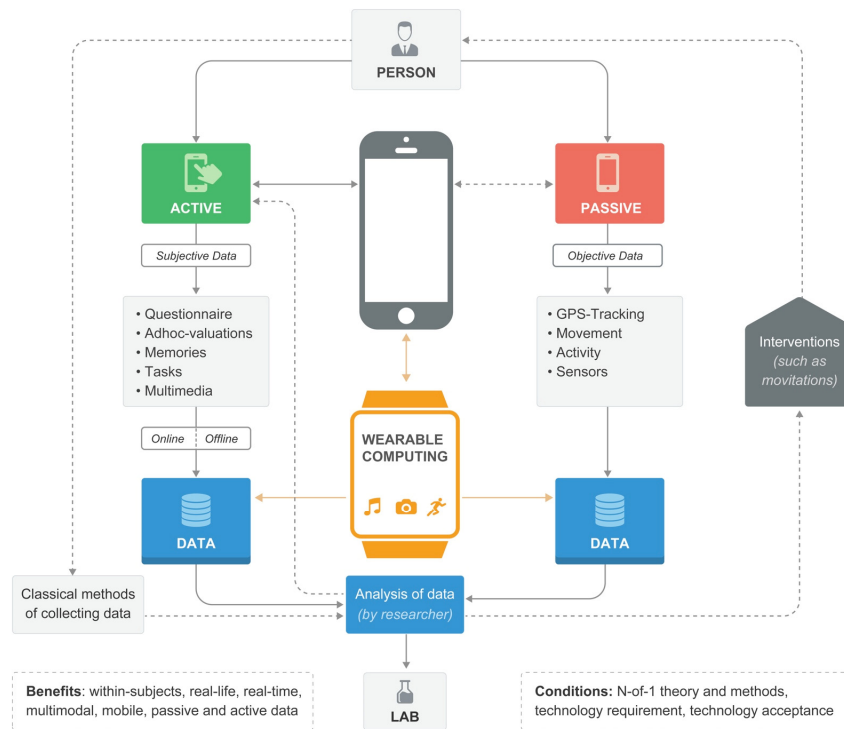


## Example 1: Mapping and analyzing the possibility/capability space





# Ausblick: Behandlungseffekte bei Multimorbidität im Alltag messen und Bedeutung extrahieren



Mobilität

Sozial Aktivität

Geistige Aktivität

Bewegung

Schlaf

...



- (1) Qualitätsmessung der Behandlung älterer Menschen hängt von Modell «des älteren Menschen» ab**
- (2) Messverfahren unterscheiden sich in Symptom-Fokus, Funktions-Fokus, Alltags-Realitäts-Fokus, Einbezug Kontext und Person x Kontext-Wechselwirkung**
- (3) Messverfahren unterscheiden sich danach, wer die Mess-Kriterien definiert und wer die Messung übernimmt**
- (4) Je nach Fragestellung müssen unterschiedliche Instrumente zum Einsatz kommen.**
- (5) Wichtige Unterscheidung: Epidemiologische Fragestellung versus individuelle Fragestellung**