

# Measuring Active and Healthy Aging (AHA)

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# Active and Healthy Aging (AHA)

- Demographic change and aging are significant features of all European countries.
- There is **no** universal **definition** for **Active and Healthy Aging**.
- **Active and Healthy Aging (AHA)** = process of optimizing opportunities for health to **increase healthy life expectancy, healthy life years** and **quality of life** for all people as they age.

*Bousquet J et al., The European Innovation Partnership on Active and Healthy Ageing: The European Geriatric Medicine introduces the EIP on AHA Column. Eur Geriatr Med. 2014;5(6):361-2.*

# European Innovation Partnership on AHA



## EUROPEAN INNOVATION PARTNERSHIP on Active and Healthy Ageing

European Commission > EIP on AHA

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### > Welcome to the EIP on AHA portal

This platform is a communication and information hub for all actors involved in Active and Healthy Ageing through Europe; the place to promote news and events, to meet and exchange ideas with peers, to look for potential partners on innovative projects. Join our growing and fruitful community and let's work together to make the EU a place of excellence in innovation for healthy ageing!



... launched by the EU Commission in 2012 to

**increase the average healthy lifespan by 2 years by 2020**

# EIP on AHA Strategic Implementation Plan

## A) Prevention and health promotion

- Finding innovative ways to ensure that patients follow their prescription and treatments.
- Finding innovative solutions to better manage our own health and prevent falls.
- Helping to prevent functional decline and frailty.

## B) Care and cure

- Promoting integrated care models for chronic diseases.

## C), D) active and independent living of elderly people

# AHA assessment needs

- Markers of failure to reach developmental potential (“**health resources**”), accelerated ageing or underlying disease processes
- Markers of function and wellbeing above average (“**health strengths**”)
- However, the EIP on AHA has been missing on a standard diagnostic tool to assess health resources and strengths.

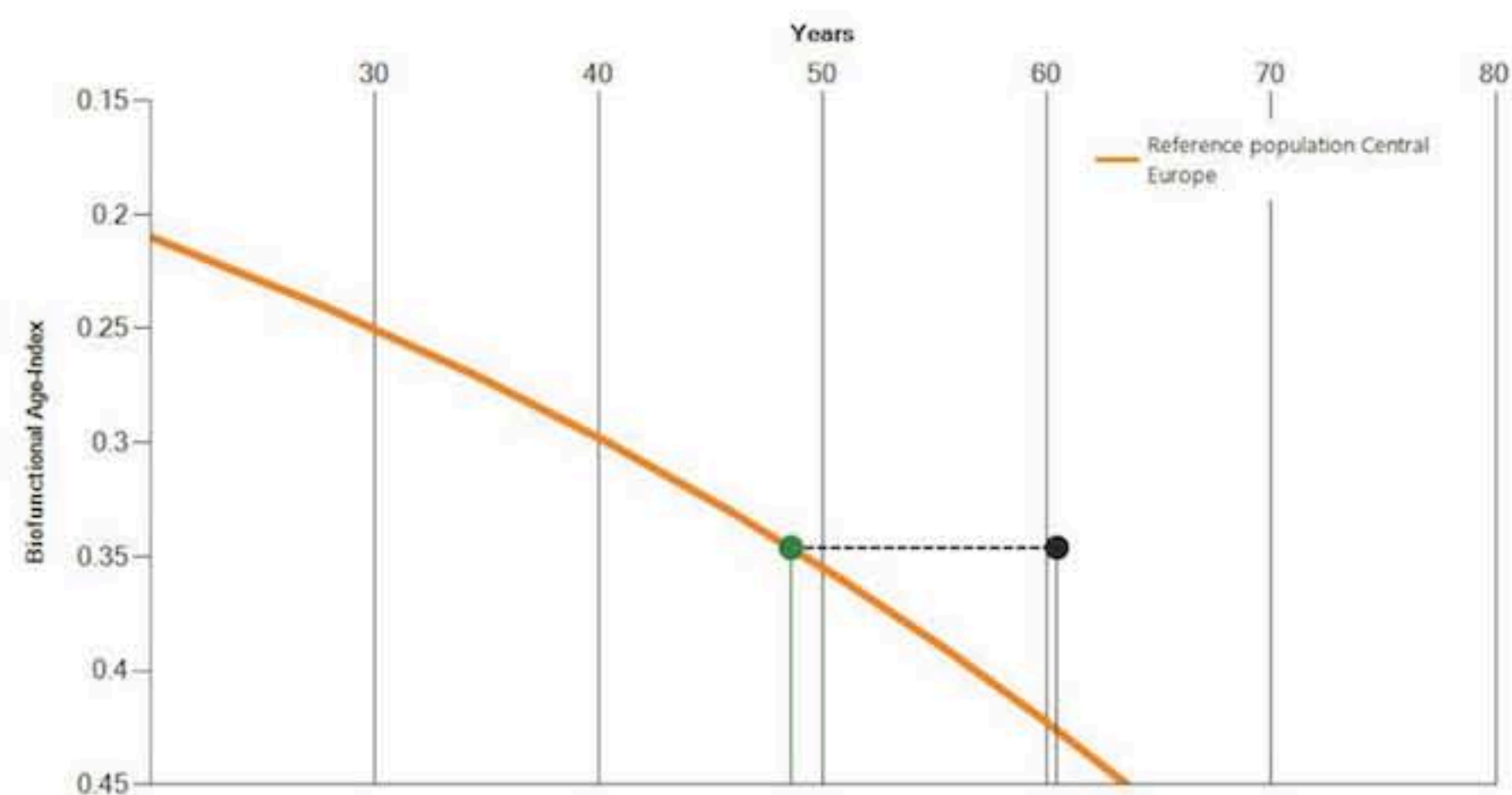
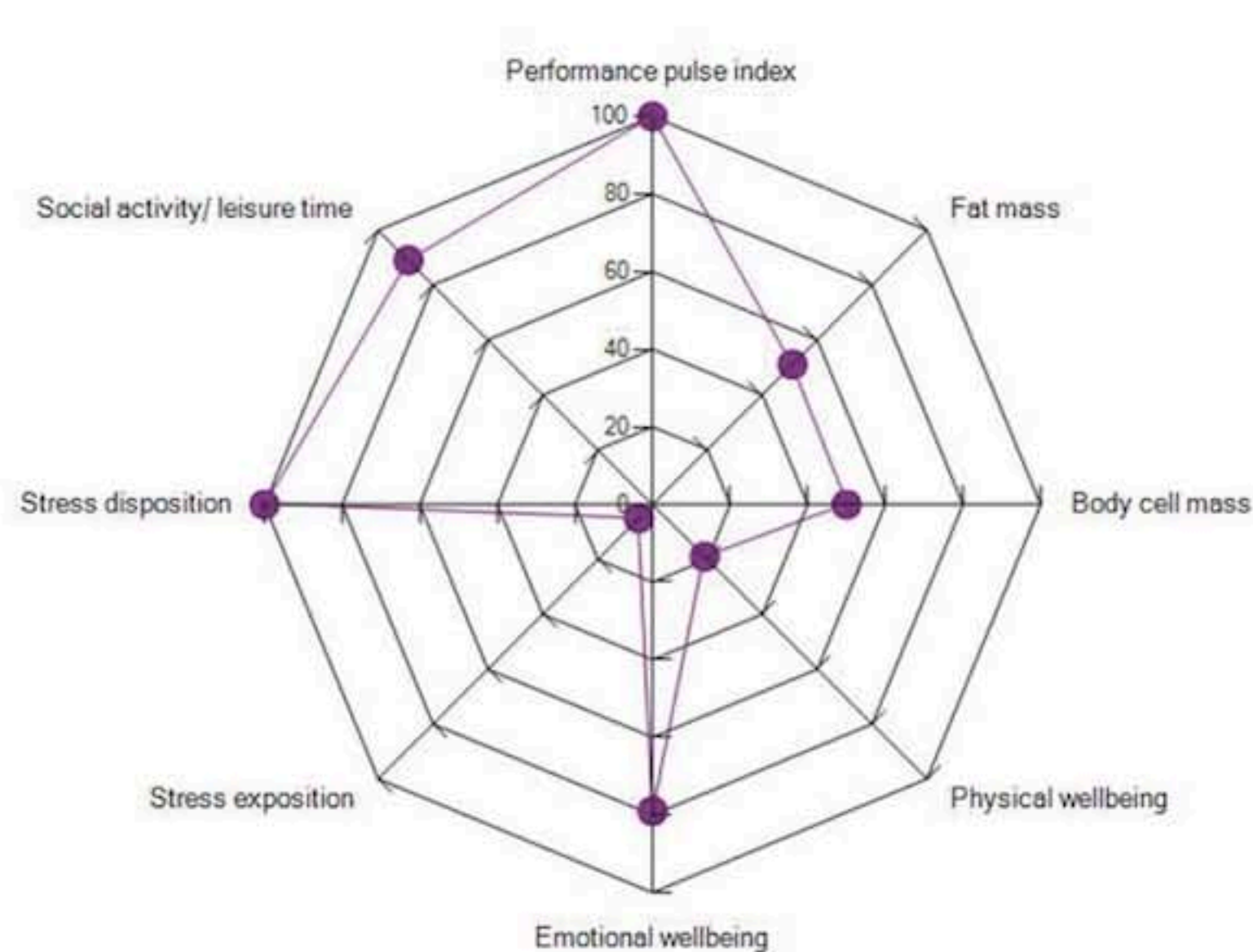
# Bio-functional status (BFS)

Physical strength      Sensory physiology and psychomotor strengths

Cognitive + resources      Emotional-social strength and resources



# Spider net of bio-functional status (BFS) and bio-functional age (BFA)



Chronological age (years)	60.43
Your Biofunctional age index (BFA)	48.57

Key markers demonstrating relevant individual needs for AHA.

*Meissner-Pöthig, Dagmar; Michalak, Udo (1997): Vitalität und ärztliche Intervention. Vitalitätsdiagnostik: Grundlagen - Angebote - Konsequenzen. Stuttgart: Hippokrates Verlag Stuttgart. Ries, Werner; Pöthig, Dagmar; Hunecke, Ingrid; Sauer, Ilse (1980): Untersuchungen über das biologische Alter von Menschen. In: Zeitschrift für Altersforschung 36 (4), S. 255-262. Ries, Werner; Pöthig, Dagmar (1984): Chronological and Biological Age. In: Experimental Gerontology 19, S. 211-216. Pöthig, Dagmar; Ries, Werner; Pögel, Bernhard; Roth, Norbert; Sauer, Ilse (1983): Methoden der psycho-sozialen Leistungsfähigkeitsmessung im Rahmen eines Modells zur Objektivierung des biologischen Alters. In: Zeitschrift für gesamte Innere Medizin 38 (22), S. 609-615. Pöthig, Dagmar (1981): Interdisziplinäre Untersuchungsmethoden zur Bestimmung des biologischen Alters des Menschen. In: Zeitschrift für Altersforschung 36 (2), S. 89-92. Pöthig, Dagmar; Gerdes, W.; Viol, M.; Wagner, P.; Simm, Andreas (2011): Biofunktionale Alter(n)sdiagnostik des Menschen. Potentiale und Grenzen. In: Zeitschrift für Gerontologie und Geriatrie (3), S. 198-204. Pöthig, Dagmar; Beier, Walter; Ries, Werner (1985): Zur Interpretation eines Vitalitätsmodelles aus klinisch-experimenteller Sicht. In: Zeitschrift für Altersforschung 40 (1), S. 15-22.*

Name	Leipzig Cohort Study 1984 (LeCS-84)	Bern Cohort Study 2014 (BeCS-14)
<b>Design</b>	Multi-centre, cross-sectional, observational, non-interventional, randomized trial	Single-centre, cross-sectional, observational, non-interventional, non-randomized trial
<b>Number of participants</b> • Female • Male	365 197 168	624 462 162
<b>Inclusion criteria</b>	1) Age 18-75 years; 2) Signed declaration of consent	1) Age 18-65 years 2) Signed declaration of consent
<b>Exclusion criteria</b>	1) Acute illness (fever, acute pain etc.) 2) Illiteracy 3) Forced participation	1) Pregnancy 2) Acute illness (fever, acute pain etc.) 3) Illiteracy 4) Forced participation
<b>Assessments</b>	1) Bio-functional status (BFS) 2) Bio-functional age (BFA)	1) Personal and family history 2) Bio-functional status (BFS) 3) Bio-functional age (BFA) 4) Various questionnaires
<b>Validity</b> 1) Singular sex specific age correlation coefficients 2) Factor analysis Singular age-weighted factors; Overall commonality of age	$r_{total} 0.69 - \geq 0.20;$ $r_{men} 0.850, r_{women} 0.852$  $0.80 - \geq 0.20$  0.76	not tested
<b>Objectivity</b> (n = 18 test persons)	0.96	not tested
<b>Reliability</b> (n = 18 test persons)	0.93	not tested



# Bern Cohort Study 2014 (BeCS-14)

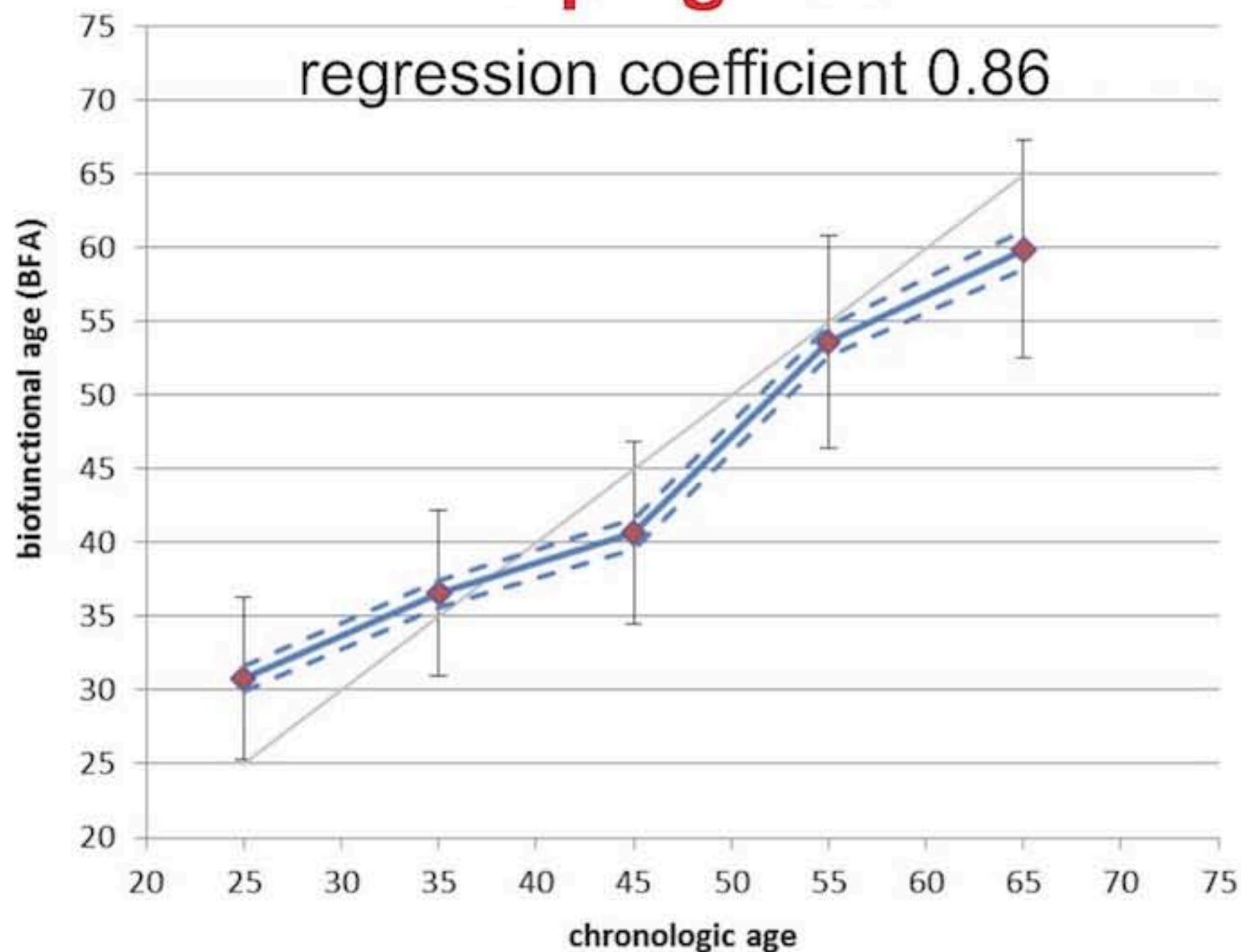
## Aim of the first publication:

- 1) To compare BFA between BeCS-14 and LeCS-84
- 2) To analyse the qualitative differences within BFS subdomains between the two populations
- 3) To fit BFS and BFA into a complex AHA assessment model incorporating the ICF

# BFA modeling

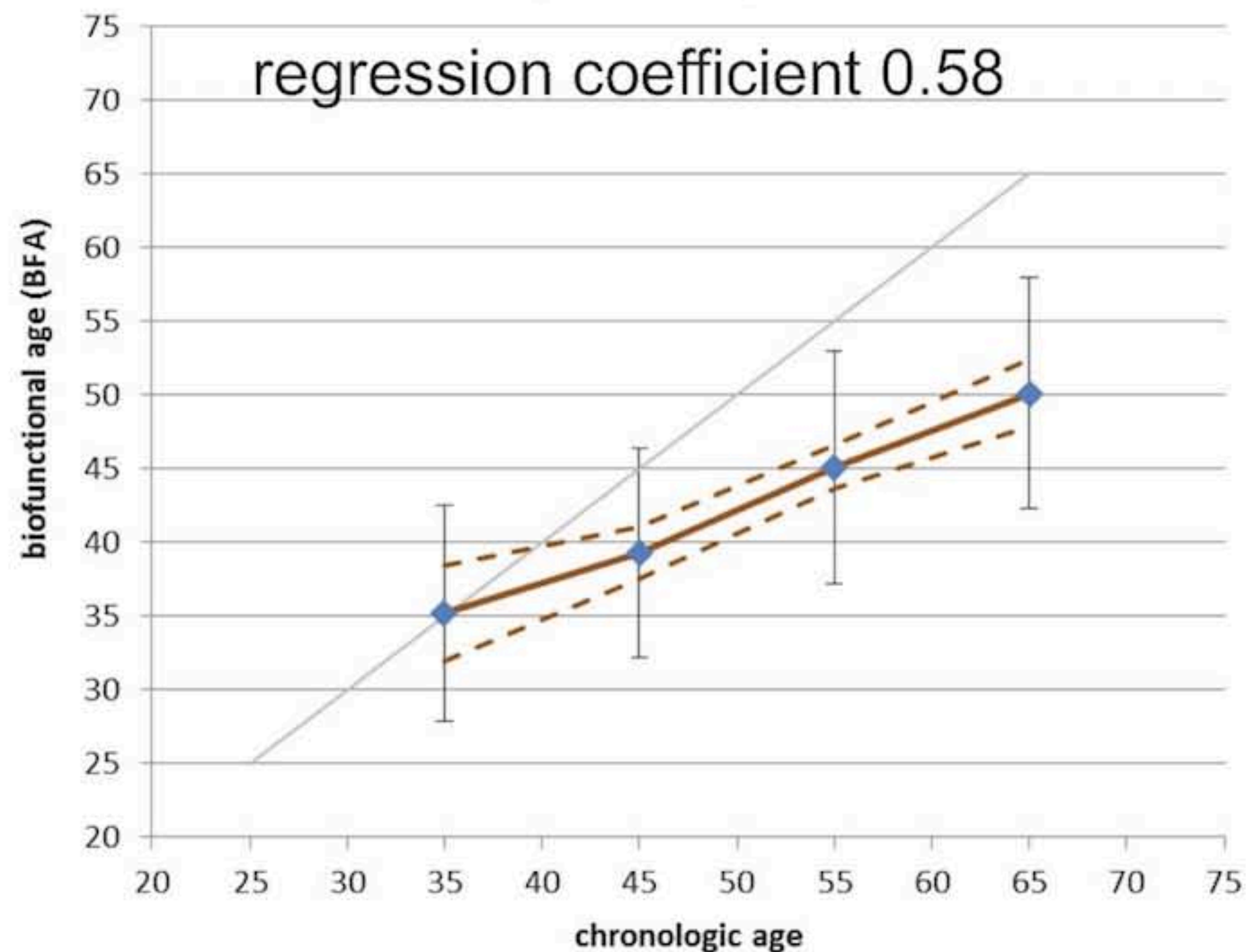
## Leipzig 1984

regression coefficient 0.86



## Bern 2014

regression coefficient 0.58



Modeling bio-functional age (BFA) in LeCS-84 and BeCS-14 cohorts (females only).

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# ICD and ICF

- **Mortality** rate

a measure for the rate at which deaths occur in a given population

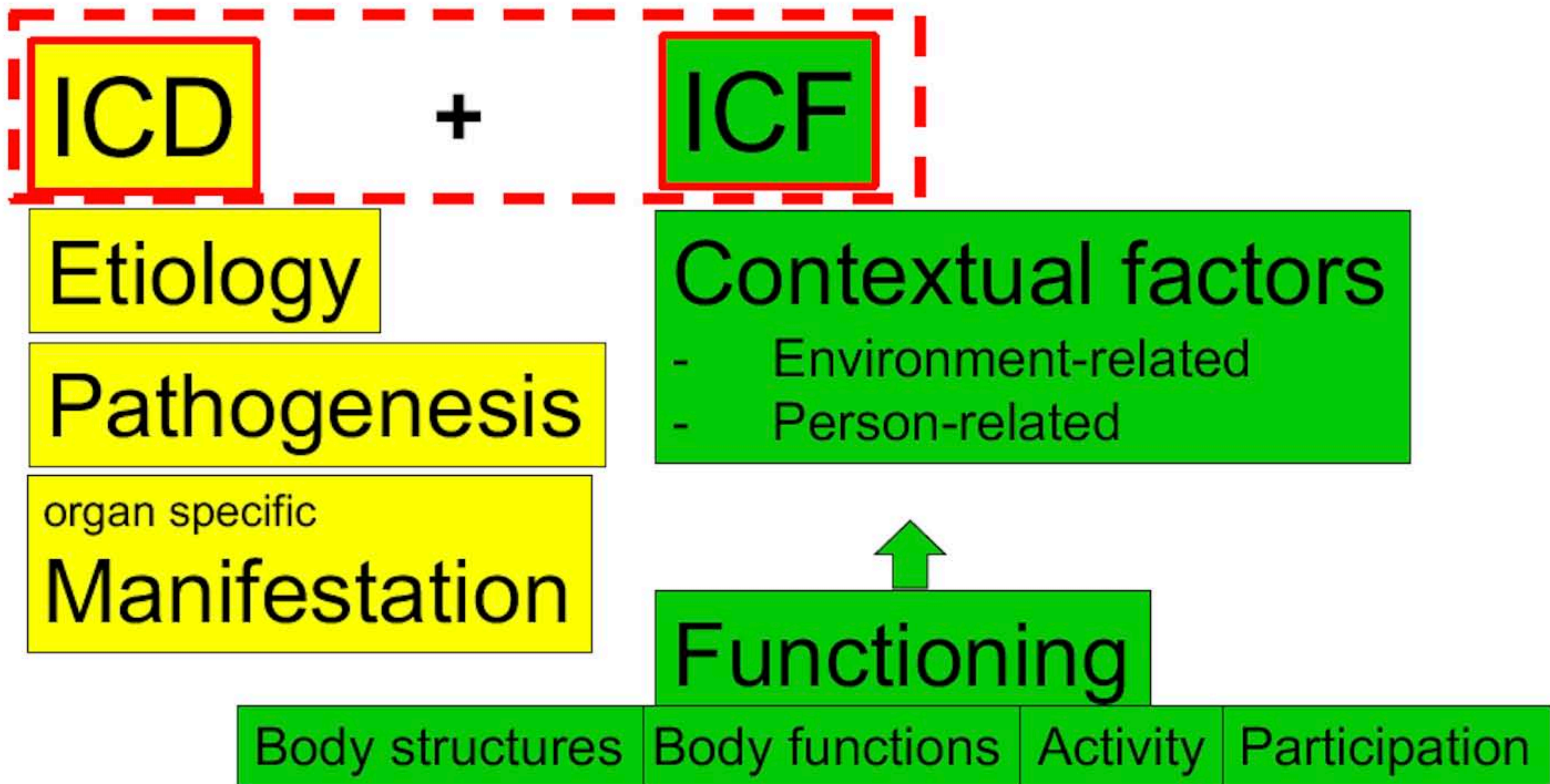
- **Morbidity (ICD)**

diseased state, disability, or poor health due to any cause

- **Function / Quality of Life (ICF): WHO 2001**

International Classification of Functioning, (Dis)Ability and Health

# ICD and ICF



# AHA > ICF > Assessment

- To break down AHA key domains to BFS dimensions
- To fit in the ICF (personal contextual factors)

**BFS assessment reflects AHA domains and integrates the ICF at the same time!**

European Level: AHA key domains	German-Swiss-Level: Supplementary allocation to personal contextual factors	Operational Level: Measurement of functions and capabilities of the AHA-dimensions	Single methods
<b>Key domain: Physical and cognitive capability across the life course</b>		<u>BFS dimensions</u> : Physical strengths and resources	
		<u>BFS dimension</u> : Sensory physiology and psychomotor strength and resources	
		<u>BFS dimension</u> : Cognitive and mental strength and resources	
<b>Key domain: Psychological and social wellbeing</b>		<u>BFS dimension</u> : Emotional-social strength and resources	
<b>General approach</b>		<u>BFS dimension</u> : Summative Score, hr-QoL across the life course	

Stute P et al., The journal of nutrition, health & aging 2017

# AHA > ICF > Assessment

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<u>Key domain:</u> Physical and cognitive capability across the life course		<u>BFS dimensions:</u> Physical strengths and resources	
<b>Body function: b420</b>		Systolic and diastolic blood pressure	sphygmometry
<b>Body functions: b410, b730, b4550; Activity: d469</b>	Factors of cardiovascular and respiratory function: i2201  Behavioural patterns and exercise habits: i456	Resting heart rate, pulse rate difference, performance time, performance pulse index	submaximal ergometry (by squats or bike)

# Conclusion

- The **BFS/BFA assessment tool** follows **EIP-AHA** requirements.
- The **BFS/BFA assessment tool** is **ICF** compatible.
- It can be used on an **individual** as well as on a **population level** for assessing **strengths and resources** (case management) and guiding patient-centered care management in AHA.
- However, it remains to be developed how the assessed health strengths/health resources-profiles may be integrated into **health/disease change management**.



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