WHO’s new mandate to measure intrinsic capacities and functional ability across the life course

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Healthy Ageing, Natural
Natural Consequences of
Good Nutrition, 2/12/2017
Outline

1. **Mandate**
2. **Healthy Ageing**
3. **Opportunities**
Longer lives
Requires a transformation

60 years
+20 years

60 years
+20 years
WHO Global strategy and action plan on Ageing and Health 2016-2020

- National Commitment
- Age friendly communities and environments
- Health Systems aligned to older adults needs
- Long term care systems
- Monitoring, research and evidence
1. Build a Platform for Innovation and Change

2. Support country planning and action

3. Collect better global data on Healthy Ageing

4. Promote research that addresses the needs of older people

www.who.int/ageing/en
2. Healthy Ageing

- concept

- operationalization

- monitoring
Healthy Ageing is defined as "the process of developing and maintaining the functional ability that enables well-being in older age, with functional ability determined by the intrinsic capacity of the individual, the environments they inhabit and the interaction between them."
Unpacking *Healthy Ageing* – person centered

- An **inclusive concept** for all older persons, not just a few who are "successful" to be disease-free
- **Continuous phenomenon** described by trajectories of intrinsic capacities and functional ability.
- "**Functional ability** reflects the interaction between individuals and the environment they are living in."
- "**Intrinsic capacity** is determined by many factors, including underlying physiological and psychological changes, health-related behaviors and the presence or absence of disease".
- **Inequity** is responsible for a large part of the heterogeneity observed in older age.
Intrinsic capacity  Functional ability
Contrast with "exclusive" view

- "Compression of morbidity" (Fries, 1980) "rectangularization" of a population survival curve

- "Successful ageing" (Rowe and Kahn, 1997) free of disease, risk factors for disease, and disability; high physical and cognitive functioning; socially and productively engaged (elite)

- "Pin pin korori" Japanese concept meaning to die suddenly after being in very good health (Gondo 2012; Young, Minagawa, Saito 2015).

trajectory A on next slide
A. Optimal trajectory, intrinsic capacity remains high until the end of life.
B. Interrupted trajectory, an event causes a decrease in capacity with some recovery.
C. Declining trajectory, capacity declines steadily until death.

The dashed lines represent alternative trajectories.
Rational plea for "inclusiveness"

McLaughlin, Jette, Connell, 2012 (US Health & Retirement Study)

- Strictest application of Rowe and Kahn “successful ageing” : 3.3 % prevalence
- Least strict definition "high physical functioning and good cognitive functioning": 35.5 % prevalence

Kok et al. 2015 (Dutch longitudinal study)

- Physical, cognitive, emotional and social functioning indicators - close to 40% of men and 30% of women meet criteria to age well over a 16 year period
Life Course approach to Healthy Ageing

Diana Kuh, Sathya Karunanathan, Howard Bergman, Rachel Cooper,

A Normal
B Sub optimal
C Accelerated
D Combo B & C
Healthy Ageing trajectories

High and stable capacity | Declining capacity | Significant loss of capacity

Functional ability

Intrinsic capacity

World Report on Ageing and Health 2015
Policy & Action Framework

High and stable

Declines

Significant loss

Functional Ability

Intrinsic Capacity

Health System

Prevent chronic conditions or ensure early detection and control

Long term care

Reverse or slow declines in capacity

Manage advanced chronic conditions

Environment

Support capacity-enhancing behaviours

Ensure a dignified late life

Promote capacity-enhancing behaviours

Remove barriers to participation, compensate for loss of capacity

WHO 2015
Discussion

1. How can the concepts of IC and FA take stock of the importance and “natural consequences of good nutrition” for Healthy Ageing?

– to optimize IC and FA across the life course
– particularly the second half of life
Nutrition & Healthy Ageing Trajectories


• Simple formulas exist (using actual weight or ideal body weight) for estimating energy, protein and fluid needs (Manual of Clinical Dietetics. 6th ed. American Dietetics Association; 2006)


• Low protein intake induces loss of lean body mass (Houston DK, et al. Am J Clin Nutr. 2008;87:150-155; www.ars.usda.gov/SP2UserFiles/Place/12355000/pdf/0506/Table_2_NIF_05.pdf)
  - Protein intake declines with age and varies between men and women
  - Muscle loss is greatest when protein intake is lowest
  - Standard protein intake balance may not be sufficient in older people

• In frail older people, protein supplements may improve physical function, but do not necessarily increase muscle mass (Tieland M, et al. J Am Med Dir Assoc. 2012;13:720-726)


From Michel & Araujo de Carvalho unpublished
2. Healthy Ageing

- concept
- operationalize
- monitoring
Compilation of different "domains" to describe ageing among older persons, 2002 - 2017

Key findings: no standard descriptive approach, no boundary between capacities and abilities

Michel & Sadana, JAMDA, 2017
WHO ICF Classification Tool

WHO Data Collection & Measurement Tools

WHO Study on Global AGEing and Adult Health (SAGE)

Basis to operationalize IC and FA, Measure, and Compare
ICF's Bio-psycho-social model

- Health
  - Body Functions and Structures
    - Impairments "Intrinsic"
  - Activities
    - Limitations "Intrinsic/Functional"
  - Participation
    - Restrictions "Functional"

- Personal Factors
- Environmental Factors
<table>
<thead>
<tr>
<th>Body functions</th>
<th>Body structures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental</td>
<td>Eye, ear, related</td>
</tr>
<tr>
<td>Sensory</td>
<td>&quot; &quot; structures of</td>
</tr>
<tr>
<td>Voice, speech</td>
<td>&quot; &quot; structures of</td>
</tr>
<tr>
<td>Cardio-, heama-, immuno-,</td>
<td>&quot; &quot; structures</td>
</tr>
<tr>
<td>respiratory</td>
<td>Genitourinary, reproductive structures</td>
</tr>
<tr>
<td>Digestive, metabolic, endocrine</td>
<td>&quot; &quot; structures</td>
</tr>
<tr>
<td>Neuromusculoskeletal, movement,</td>
<td></td>
</tr>
<tr>
<td>muscle</td>
<td></td>
</tr>
<tr>
<td>Skin and related</td>
<td></td>
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<tr>
<td>Nervous</td>
<td></td>
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</tbody>
</table>
ICF information matrix

**Body functions**
- Mental
- Sensory
- Voice, speech
- Cardio-, heama-, immuno-, respiratory
- Digestive, metabolic, endocrine
- Neuromusculoskeletal, movement, muscle
- Skin and related
- Nervous

**Body structures**
- Eye, ear, related
- " " structures of
- " " structures of
- " " structures
- Genitourinary, reproductive structures
- " " structures
ICF information matrix

**Activities**
- Learning & applying knowledge
- General tasks and demands
- Communication
- Mobility
- Self care

**Participation**
- Domestic life
- Interpersonal interactions and relationships
- Major life areas
- Community, social and civic life
"Maintaining good nutrition status & healthy ageing can be a challenge owing to the growing complexity/capacity of obtaining, preparing, and eating foods in sufficient quantity and quality"

- Hélène Payette, presentation at WHO, 21 Nov 2017
Example 1:
5 domains & measurement modes,
Intrinsic capacities "clinical perspective"

- **Vitality** (Grip strength, FEV, Haemoglobin, DHEAS)
- **Sensory** (Near vision, distance vision, hearing)
- **Locomotor** (Gait speed, chair stand)
- **Cognitive** (Memory, verbal fluency, letter cancellation)
- **Psychosocial** (Self report: Depression, self-realization, pleasure, sleep)
Measured tests grouped to different domains through factor analysis (empirically driven) from ELSA longitudinal survey.

Beard et al. forthcoming using ELSA.
**Example 2: 8 domains & measurement modes, Intrinsic Capacities, WHO 2015**

<table>
<thead>
<tr>
<th>Domains (self-reported):</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Mobility</td>
</tr>
<tr>
<td>• Vision (with aids)</td>
</tr>
<tr>
<td>• Cognition</td>
</tr>
<tr>
<td>• Affect</td>
</tr>
<tr>
<td>• Sleep and energy</td>
</tr>
<tr>
<td>• Pain and discomfort</td>
</tr>
<tr>
<td>• Self-care</td>
</tr>
<tr>
<td>• Interpersonal activities</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(measured tests):</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mental</strong> (cognitive):</td>
</tr>
<tr>
<td>- Verbal recall</td>
</tr>
<tr>
<td>- Digit span - digits forward and digits backward</td>
</tr>
<tr>
<td>- Verbal fluency</td>
</tr>
<tr>
<td><strong>Physical:</strong></td>
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<tr>
<td>- Timed walk - normal and rapid walk (with aids)</td>
</tr>
<tr>
<td>- Grip strength - each hand</td>
</tr>
</tbody>
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WHO SAGE WAVE 1
Domains of capacity

Self reported questions and measured tests grouped to different domains as designed (concept driven, also reflecting past empirical findings) with data collected through SAGE survey Wave 1 – soon Wave 2 and Wave 3

Chatterji et al. work in progress
Intrinsic capacity, cross sectional

Source: World Report on Ageing and Health

Data Source: SAGE wave 1, cross sectional data, 6 countries, 2007-2010
Distribution of intrinsic capacity score
(WHO world population standard, 50+, both sexes)

Source database: SAGE, WHO
Intrinsic capacity score distribution for ages 50+, Russia

- Private sector workers, male: 62.4
- Private sector workers, female: 57.6
- Informal sector workers, men: 54.8
- Informal sector workers, women: 48.1
- 90+, lowest wealth quintile, least educated: 35.8
- 50-54 yrs, highest wealth quintile, most educated: 66.2
Intrinsic capacity score distribution for ages 50+, India

- Private sector workers, male: 54.06
- Private sector workers, female: 47.44
- Informal sector workers, men: 48.2
- Informal sector workers, women: 42.5
- 90+, lowest wealth quintile, least educated: 26.0
- 50-54yrs, highest wealth quintile, most educated: 62.2

Frequency distribution

Intrinsic capacity score
Discussion

2. For multi-domain profiles of Healthy Ageing to include good nutrition, **what should be described and measured?**

- Useful in clinical or community settings, where people live
How to track recommended dietary protein intake by older adults?

Reduced ability to use available protein
(e.g., insulin resistance, immobility, high splanchnic extraction)

Decreased usual protein intake
(e.g., anorexia, GI problems)

Greater need for protein
(e.g., inflammatory disease, oxidative modification of proteins)

Loss of capacities & functional ability
(muscle, bone, immune systems)

Source: J P Michel
2. Healthy Ageing

- concept
- operationalization
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Intrinsic capacity, wealth quintiles

Source: World Report on Ageing and Health

Data Source: SAGE wave 1, cross sectional data, 6 countries

Economic gradient across quintiles
Intrinsic capacity, India and Russia, men and women 50 plus

Data Source: SAGE wave 1, cross sectional data, 2 countries
How to measure nutrition across the life course in primary care settings

Screening tools: determinants / indicators of risk of malnutrition

Body composition: muscle mass / protein malnutrition

Muscle function: muscle strength / protein malnutrition

- Grip strength measures changes in muscle mass and function, and thus some aspects of nutritional status

H. Payette, presentation at WHO, 21 Nov 2017
Grip strength, India and Russia, men and women 50 plus

Data Source: SAGE wave 1, cross sectional data, 2 countries
Physical capacity across the life course, stratified by wealth, Australian longitudinal cohort study on women's health

Source: Lee et al., International J Epidemiology, 2005 reproduced in the WHO World Report on Ageing and Health, 2015
Put in place policies and actions to:

- Narrow differences by socio-economic levels as early as possible
- Delay onset of decline and slope of decline
- Level up range of capacities across the life-course

Source: World Report on Ageing and Health

Source: Lee et al., International J Epidemiology, 2005
3. Opportunities
Evaluation of Blood Biomarkers Associated with Risk of Malnutrition in Older Adults: A Systematic Review and Meta-Analysis

Zhiying Zhang,1,2 Suzette L. Pereira,3

Nutritional Screening in Community-Dwelling Older Adults: A Systematic Literature Review

Gerald F Combs, Jr.1 Paula R Trumbo,2 Michelle C McKinley,3 John Milner,4 Stephanie Studenski,5 Takeshi Kimura,6 Steven M Watkins7 and Daniel J Raifon8

Biomarkers in nutrition: new frontiers in research and application

Published online 2017 Aug 3. doi: 10.3390/nu9080829

Published online 2013 Mar 11. doi: 10.1111/nyas.12069

The American Journal of Clinical Nutrition

Dietary screening tool identifies nutritional risk in older adults1,2,3

Regan L Bailey, Paige E Miller, Diane C Mitchell, Terryl J Hartman, Frank R Lawrence, Christopher T Sempos, and Helen Smiciklas-Wright
Evidence to inform policies and change practice?

- Low effectiveness in improving professional practices / patient outcomes

- Little evidence that nutrition screening improves professional practices (Omidvari AH et al., The Cochrane Library, 2013; issue 6)

- Need high quality studies to assess **effectiveness** of nutrition screening

- Hélène Payette, presentation at WHO, 21 Nov 2017
Integrated care for older people
Guidelines on community-level interventions to manage declines in intrinsic capacity

- Improve musculoskeletal function, mobility and vitality
- Maintain sensory capacity
- Prevent severe cognitive impairment and promote psychological well-being
- Manage age-associated conditions such as urinary incontinence
- Prevent falls
- Support caregivers
Publications addressing *Healthy Ageing* & sub set on nutrition-related terms in title or abstract, 2002-October 2017

Source: PubMed
New WHO report on Healthy Ageing

Linked up research call

Decade for Health Ageing 2020-2030
Discussion

1. Approach to take stock of good nutrition within Healthy Ageing

2. Within multi-domain profiles of Healthy Ageing – what to describe, how to measured and monitored

3. Opportunities to collaborate, to help launch the Decade by 2020
WHO International Consortium on Healthy Ageing Metrics & Evidence work plan

2017/18  Conceptual clarification established

2018   Mapping and re-analysis of existing data

2019/20  Carry out calibration and innovation studies including projection tools, and new data collection

2020  Recommend instrument for measuring Healthy Ageing and produce baseline for Decade
Thank you

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www.who.int/ageing