WHO Locomotor Capacity Working Group report on initial steps towards measurements of locomotor capacity in older people

Virtual meeting
1 November 2021
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Acknowledgements

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The WHO acknowledges the kind support of the WHO Collaborating Centre for Epidemiology of Musculoskeletal Conditions and Ageing, University of Liège and the European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (ESCEO), Liège.
Executive summary

The United Nations has declared that 2021–2030 is the Decade of Healthy Ageing, with the World Health Organization (WHO) leading international action to improve the lives of older people, their families and their communities. The initiative brings together a variety of stakeholders galvanizing concerted action to: (1) change how we think, feel and act towards age and ageing; (2) develop communities in ways that foster the abilities of older people; (3) deliver person-centred, integrated care and primary health services that are responsive to older people; and (4) provide older people with access to long-term care when they need it.

To assess the impact of these actions at national, regional and global levels, WHO proposed intrinsic capacity and functional ability as outcome indicators of healthy ageing. 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 interactions between these two. Intrinsic capacity comprises all the mental and physical capacities that a person can draw on. The conceptual framework of WHO suggests that locomotor capacity be considered one of the domains of intrinsic physical capacity. However, the concept of locomotor capacity is not well defined.

To advance the measurement of locomotor capacity of older people, the Ageing and Health Unit of the Department of Maternal, Newborn, Child and Adolescent Health and Ageing (WHO headquarters, Geneva, Switzerland) and the WHO Collaborating Centre for Epidemiology of Musculoskeletal Conditions and Ageing (Liège, Belgium) jointly established a Locomotor Capacity Working Group and organized a virtual meeting with 50 experts representing all six WHO regions. The meeting was held virtually on 1 November 2021, during 11:00–13:00 CET.

The aims of the meeting were to: (1) review the attributes, as well as conceptual and operational definitions of locomotor capacity in older people; (2) discuss and determine a working definition of locomotor capacity; and (3) agree on a process for the systematic review of the psychometric properties of the measures of locomotor capacity.

The meeting was co-chaired by Professor Jean-Yves Reginster, Director of the WHO Collaborating Centre for Epidemiology of Musculoskeletal Conditions and Ageing. The outcome of the meeting was the agreement that the attributes of endurance, balance, muscle strength, muscle function, muscle power and joint function would be considered relevant in assessing locomotor capacity. Consensus was not reached during the meeting on other possible attributes, such as range of motion, for which some of the experts considered that more information from the literature is necessary. Conversely, the experts agreed that dexterity should not be considered as an attribute of locomotor capacity.

The meeting was concluded with the agreement to: (1) prepare a short editorial for submission to a scientific journal; (2) conduct a systematic literature review to explore and critically evaluate the various tools that have, to date, contributed to the appraisal of the attributes identified as relevant for assessing locomotor capacity; and (3) organize another meeting to move towards the operational definition of locomotor capacity, once the outcomes of the systematic literature review are available.
Introduction

The United Nations has declared that 2021–2030 is the Decade of Healthy Ageing, with the World Health Organization (WHO) leading international action to improve the lives of older people, their families and their communities. The initiative brings together a variety of stakeholders galvanizing concerted action to: (1) change how we think, feel and act towards age and ageing; (2) develop communities in ways that foster the abilities of older people; (3) deliver person-centred, integrated care and primary health services that are responsive to older people; and (4) provide older people access to long-term care when they need it.

To assess the impact of these actions at national, regional and global levels, WHO proposed intrinsic capacity and functional ability as outcome indicators of healthy ageing. 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 interactions between these two. Intrinsic capacity comprises all the mental and physical capacities that a person can draw on. The conceptual framework of WHO suggests that locomotor capacity be considered one of the domains of intrinsic physical capacity (1).

In Integrated care for older people (ICOPE): guidance for person-centred assessment and pathways in primary care (2), locomotor capacity is broadly defined as a “person’s bodily capacity to move from one place to another”. Similarly, locomotor capacity is also defined as a person’s physical capacity to move their body in a recently published baseline report on healthy ageing (3). However, these definitions do not include any details of what attributes are to be measured or observed in an individual in order to assess locomotor capacity, or how to capture (identify, measure, assess, etc.) the value of such attributes; in other words, there currently exists no clear conceptual definition of locomotor capacity.

To address this issue, the Ageing and Health Unit of the Department of Maternal, Newborn, Child and Adolescent Health and Ageing (WHO headquarters, Geneva, Switzerland) and WHO Collaborating Centre for Epidemiology of Musculoskeletal Conditions and Ageing (Liège, Belgium) jointly established a Locomotor Capacity Working Group and organized a virtual meeting with 50 experts representing all six WHO regions on 1 November 2021, during 11:00–13:00 CET.

The primary purpose of this meeting was to develop a clear conceptual working definition of locomotor capacity, to enable the monitoring and evaluation of the impact of public health actions taken at national, regional and global levels to improve the lives of older people, their families and their communities, within the framework of the United Nations Decade of Healthy Ageing initiative.

Aims and expected outcomes of the meeting

The aims of the meeting were to: (1) Review the attributes, as well as conceptual and operational definitions of locomotor capacity in older people; (2) discuss and determine a working definition of locomotor capacity; and (3) agree on a process for the systematic review of the psychometric properties of the measures of locomotor capacity.

The specific expected outcome of the meeting was to reach agreements on (1) the relevant attributes of locomotor capacity; and (2) a draft conceptual definition of locomotor capacity.
Meeting proceedings

The virtual meeting was co-chaired by Jean-Yves Reginster, Director of the WHO Collaborating Centre for Epidemiology of Musculoskeletal Conditions and Ageing (Liège, Belgium) and Jotheeswaran Amuthavalli Thiyagarajan, Technical Officer (Epidemiologist), Ageing and Health Unit, Department of Maternal, Newborn, Child and Adolescent Health and Ageing at the WHO headquarters, Geneva.

Jean-Yves Reginster and Theresa Diaz provided the opening remarks. Jotheeswaran Amuthavalli Thiyagarajan then introduced the topic, the meeting objectives and expected outcomes. The presentation introduced the concept of locomotor capacity within the WHO framework of Healthy Ageing, particularly intrinsic capacity. He emphasized the importance of having both a clear conceptual and an operational definition of locomotor capacity. In his address, he also explained the difference between the conceptual and operational definitions, providing examples of these two different types of definitions as related to osteoporosis.

Christopher Mikton presented an overview of the national toolkit for monitoring progress during the Decade of Healthy Ageing (2021–2030) initiative. He emphasized the need for clear conceptual and operational definitions in order to determine robust indicators for assessing locomotor capacity.

In the second part of the meeting, Germain Honvo presented a conceptual framework for the definitions of locomotor capacity and related concepts, assessed according to the results of a rapid literature review. Using a combination of several search terms, he found that the current literature regarding locomotor capacity is limited, indicating that an expert consensus was probably necessary to better define this important concept.

After each presentation, experts were encouraged to ask questions and provide their views and comments. Based on the discussion points summarized below, a draft working definition was developed during the meeting. During the process of developing a working definition, the group voted on each attribute by raising their hands (virtually). Working definition attributes were largely agreed upon by all experts who participated in the meeting.

Measurement issues

The most important points discussed by the experts during the initial virtual meeting of the Locomotor Capacity Working Group are as follows.

- **Potential issues:** Locomotor capacity is often described as a person’s bodily capacity or physical capacity to move from one place to another. Although this implies the evaluation of mechanisms involved in the movement, there are three main issues with the current description identified and discussed during the meeting: (1) movement of a person from one location to another would imply moving inside the home and from the home to different locations in the community (e.g. a park); this overlaps with the ability to be mobile, which is the domain of functional ability; (2) the description does not specify all the necessary attributes that should be considered for assessment; and (3) the term “bodily capacity” is not described, so it is not clear whether it is a function of the body or a function of a person in the environment.

- **Mobility versus locomotor capacity:** Differently, mobility is a domain of functional ability that captures how a potential (locomotor capacity) is actualized in real life when interacting with the environment. Locomotor capacity is a domain of intrinsic capacity and mainly relates to the individual’s body function, whereas mobility reflects the interaction between an individual and their environment.
Based on the discussion above, the Working Group proposed a conceptual working definition that defines locomotor capacity as “a state (static or dynamic over time) of the musculoskeletal system that encompasses endurance, balance, muscle strength, muscle function, muscle power and a joint function of the body.”

**Defining mobility:** it is essential to better define mobility before defining the concept of locomotor capacity. The concepts have some aspects in common; for instance, in some WHO documents, gait speed is a measure of locomotor capacity but, for example, asking older people whether they can walk 100 m is considered a measure of mobility. The WHO representatives emphasized that a Working Group on Mobility is currently considering the conceptual and operational definitions of the ability to be mobile.

**Attributes of locomotor capacity:** experts agreed that locomotor capacity could be defined using at least the following attributes: endurance, balance, muscle strength, muscle function, muscle power and joint function of the body.

**Assessment of locomotor capacity:** experts suggested that the term “capacity” refers to the highest possible level of functioning in a given domain at a given moment in time. Consequently, an assessment tool would require a test that puts the particular locomotor aspect under stress. There was some discussion regarding whether locomotor capacity could be captured by performance-based tests or reported directly by older people.

**Working definition of locomotor capacity**

A systematic review of measures of locomotor capacity will be undertaken in the coming months to develop operational definitions for the monitoring and evaluation of public health actions focusing on older people. Further meetings and work are planned to elaborate the operational definition of locomotor capacity.
References


# Annex 1: Meeting agenda

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<td><strong>Session 1</strong></td>
<td><strong>Opening remarks</strong></td>
<td>Chair: Jean-Yves Reginster</td>
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<td></td>
<td>Welcome and introduction</td>
<td>Co-chair: Jotheeswaran Amuthavalli</td>
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<tr>
<td>11:00–11:15</td>
<td>Theresa Diaz</td>
<td>Thiyagarajan</td>
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<td></td>
<td>Objective of the meeting and expected outcomes</td>
<td>Jotheeswaran Amuthavalli Thiyagarajan</td>
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<td>11:20–11:25</td>
<td>National toolkit for monitoring the Decade of</td>
<td>Chris Mikton</td>
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<td>Healthy Ageing</td>
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<td>11:25–11:35</td>
<td>Question and answer session</td>
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**Session 2**  

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<td></td>
<td><strong>Conceptual definition of locomotor capacity</strong></td>
<td>Chair: Jean-Yves Reginster</td>
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<td></td>
<td>Conceptual framework and definitions</td>
<td>Co-chair: Jotheeswaran Amuthavalli</td>
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<td>11:35–11:50</td>
<td>Germain Honvo</td>
<td>Thiyagarajan</td>
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<td>11:50–12:50</td>
<td>Discussion (attributes and indicator definition)</td>
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<td>12:50–13:00</td>
<td>Conclusion</td>
<td>Jotheeswaran Amuthavalli Thiyagarajan</td>
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<td>Chris Mikton</td>
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Annex 2: List of participants

Invited experts and co-authors (name, academic affiliation, country)

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Declaration of interests:

Declaration of interest for external contributors acting on their individual capacity has been collected, assessed, and managed as per WHO policy. All invited experts participated in the meeting in their individual expert capacity and did not represent any governments, any commercial industries or entities, any research, academic or civil society organizations, or any other bodies, entities, institutions or organizations. The experts involved in the development of this document declared no conflict of interest.