



METHODOLOGICAL NOTES ON APPLYING THE INTERNATIONAL
CLASSIFICATION OF FUNCTIONING, DISABILITY AND HEALTH (ICF)
IN REHABILITATION
SPECIAL ARTICLE

Functioning: the third health indicator in the health system and the key indicator for rehabilitation

Gerold STUCKI^{1, 2, 3 *}, Jerome BICKENBACH^{1, 2, 3}

¹Department of Health Sciences and Health Policy, Faculty of Humanities and Social Sciences, University of Lucerne, Lucerne, Switzerland; ²Swiss Paraplegic Research (SPF), Nottwil, Switzerland; ³ICF Research Branch, a cooperation partner within the WHO Collaborating Centre for the Family of International Classifications in Germany (at DIMDI), Nottwil, Switzerland

*Corresponding author: Gerold Stucki, Swiss Paraplegic Research (SPF), Guido A. Zäch Strasse 4, 6207, Nottwil, Switzerland.
Email: gerold.stucki@paraplegie.ch

ABSTRACT

In this methodological note on applying the ICF in rehabilitation, we introduce functioning as the third health indicator complementing the established indicators mortality and morbidity. Together, these three provide a complete set of indicators for monitoring the performance of health strategies in health systems. When applying functioning as the third health indicator across the five health strategies, it is fundamental to distinguish between biological health and lived health. For rehabilitation, functioning is the key indicator. Since we can now code mortality and morbidity data with the ICD, and functioning data with the ICF, and since given current plans to including functioning properties in the proposed ICD-11 revision, we should in the future be able to report on all three health indicators.

(Cite this article as: Stucki G, Bickenbach J. Functioning: the third health indicator in the health system and the key indicator for rehabilitation. Eur J Phys Rehabil Med 2017;53:134-8. DOI: 10.23736/S1973-9087.17.04565-8).

Key words: Rehabilitation - Health systems plans - International Classification of Functioning, Disability and Health.

Population health is a key goal of modern society. As with systems of education and labor, health systems are now seen as societal investments rather than a cost.^{1, 2} The relevance of health for societal development has recently been reiterated in the Sustainable Development Goals (SDGs), which embody a “universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity”.³ Goal 3 of the SDGs is to “Ensure healthy lives and promote well-being for all at all ages”. Health is also instrumental for the realization of the other 16 Goals. Recently, the World Health Organization (WHO) has supplemented this goal by underscoring the need to ensure that all people obtain the health services they need without suffering financial hardship when paying for them.⁴

To monitor the response of health systems to people’s

health needs, three health indicators are relevant: mortality is the indicator for a population’s length of life and the survival of individuals with health conditions. Morbidity is the indicator for the distribution of health conditions in the population and the use of health services. The data for these two indicators can be coded with the International Classification of Diseases (ICD),⁵ currently in its 11th revision. During this revision, in addition to a mortality and morbidity advisory topic group, a functioning advisory group was added, suggesting that WHO now recognizes a third indicator of health, operationalized as a combination of biological health and lived health and captured by the term “functioning”. Functioning can serve not only as an indicator for a population’s health state and the outcome of clinical interventions and service delivery, but also as an in-

indicator for the impact on the population of the output of the health system on individual's lived experience of health. The data for this indicator can be coded with the WHO's International Classification of Functioning Disability and Health (ICF), endorsed in 2001.⁶

In this methodological note on applying the ICF in rehabilitation, we first introduce how these three health indicators can be used to monitor the performance of the five health strategies of the health system. We then explain the need to distinguish biological health from lived health when applying functioning as the third health indicator across health strategies, and next the application of this indicator. Finally, we briefly discuss the coding of functioning data with the ICF and the upcoming ICD-11.

Monitoring the performance of health strategies with health indicators

The primary objective of a health system is to achieve and maintain the highest attainable level of population health.⁷ This is achieved by means of health strategies, that is, plans designed to achieve particular health goals.⁸ Five health strategies are currently recognized. In 1978, the Declaration of Alma Ata⁹ recognized four of these strategies: promotive, preventive, curative and rehabilitative — more recently, in the context of the WHO initiative for universal health coverage: promotion, prevention, treatment, rehabilitation and palliative care have been identified as health strategies.¹⁰

It is important to recall that although health strategies provide an important foundation for health system design, in clinical practice these strategies are often combined when addressing the health needs of an individual patient. This is particularly relevant when collecting and interpreting data on health indicators at both the individual and population levels. There is vast experience with the collection of mortality and morbidity data including causes of death. With respect to the use of the ICF as an indicator for health, we are at the beginning. A first example of its application in a population is the Swiss Spinal Cord Injury (SwiSCI) Cohort Study.^{11, 12}

The successful implementation of health strategies requires the capacity and resources (input) within the health system that is sufficient to deliver services (output) that will successfully lead to outcomes such as equity, access, quality and efficiency, which in turn have

a desired impact on population health: the reduction of morbidity and mortality and optimal functioning.¹³ According to WHO's systems thinking, the capacity of a health system must be developed in terms of the six "building blocks" of a health system:¹⁴ health services delivery, health workforce, health information systems, essential medicines, health systems financing, and leadership and governance.

Health information is instrumental for the successful operation of all six building blocks. Most importantly, information on health indicators allows us to monitor the output of the main health strategies, making it possible for health systems to "learn".¹⁵ Because the indicators vary across health strategies and goals, health system monitoring requires the use of all indicators. Goals and indicators, as well as main use cases for the five health strategies are shown in Table I.^{16, 17}

Distinguishing biological health from lived health when using functioning as the third health indicator across health strategies

When applying functioning as the third health indicator across health strategies, it is fundamental to distinguish biological health from lived health. This distinction has been operationalized in the ICF by means of two qualifiers in the Activities and Participation component: capacity and performance.⁶

Biological health is a person's intrinsic health capacity. Its assessment includes the assessment of impairments in body functions and structure and capacity limitations across Activities and Participation. A person's biological health comprises what a person can do in light of his or her health condition and should not be confused with what a person actually does or is restricted in doing in her/his environment. This latter notion is captured by the concept of lived health. Its assessment consists of the assessment of levels of performance across Activities and Participation.

Applying functioning as an indicator across the five health strategies

Functioning as the third health indicator for prevention and health promotion

The primary goal of prevention is population health. Prevention targets risk factors characterized in the ICF

TABLE I.—*Health information for the monitoring and evaluation of the five health strategies.*

Strategy	Health goals	Health indicator	Data coding	Health information use cases
Preventive	Prevent the occurrence of health conditions	Morbidity	ICD – Health condition entities – Risk factors of health conditions	<i>Health statistics</i> Incidence of health conditions <i>Service delivery</i> Planning of public health programs
	Prevent mortality related to the occurrence of health conditions	Mortality	ICD – Health condition entities – Causes of death	<i>Health statistics</i> Years of life saved from the non-occurrence of health conditions <i>Service delivery</i> Evaluation of public health programs
	Prevent the loss of functioning related to the occurrence of health conditions	Biological Health (intrinsic health capacity)	ICF – Impairment qualifier – Capacity qualifier ICD 11 – Functioning properties ²⁰	<i>Health statistics</i> Biological health saved from the non-occurrence of a health condition <i>Service delivery</i> Evaluation of public health programs
Promotive	Optimal health	Biological Health (intrinsic health capacity)	ICF – Impairment qualifier – Capacity qualifier	<i>Health statistics</i> Incidence of impairments in body functions and structures; capacity limitations in activities and participation
Curative	Cure (full recovery) Remission Disease control	Mortality	ICD – Health condition entities – Causes of death	<i>Health statistics</i> Epidemiology of the causes of death
		Morbidity	ICD 11 – Health condition entities – Properties in development for the ICD 11	<i>Health services delivery</i> Reasons for encounters Quality and safety <i>Financing</i> Case-mix for reimbursement
		Functioning (intrinsic health capacity)	ICD 11 – Functioning properties ¹⁶	<i>Financing</i> Improved case-mix for reimbursement in the frail, disabled and co-morbid patient ¹⁷ <i>Service delivery</i> Functioning outcomes in health care performance assessment and quality and safety management
Rehabilitative	Optimal functioning	Functioning – Complete lived experience of health: biological and lived health in light of health conditions, under consideration of a person's resources, and in interaction with the environment	ICF – Impairment – Capacity qualifier – Performance qualifier	<i>Health statistics</i> Epidemiology of functioning and functioning needs <i>Governance and leadership</i> National rehabilitation policy and program planning <i>Service delivery</i> Rehabilitation quality management at the individual, service and national program level
Palliative	Optimize wellbeing	Appraised functioning (quality of life)	ICF – Appraisal of impairments and performance restrictions (qualifier not available in the ICF – one may use a satisfaction or preference qualifier)	<i>Health statistics</i> Epidemiology of appraised functioning in the end-of-life context <i>Governance and leadership</i> National palliation policy and program planning <i>Service delivery</i> Palliative care quality management at the individual, service and national program level

This document is protected by international copyright laws. No additional reproduction is authorized. It is permitted for personal use to download and save only one copy of this Article. It is not permitted to make additional copies (either sporadically or systematically, either printed or electronic) of the Article for any purpose. It is not permitted to distribute the electronic copy of the article through online internet and/or intranet file sharing systems, electronic mailing or any other means which may allow access to the Article. The use of all or any part of the Article for any Commercial Use is not permitted. The production of derivative works from the Article is not permitted. The production of reprints for personal or commercial use is not permitted. It is not permitted to remove, cover, overlay, obscure, block, or change any copyright notices or terms of use which the Publisher may post on the Article. It is not permitted to frame or use framing techniques to enclose any trademark, logo or other proprietary information of the Publisher.

by means of personal and environmental factors. The goal of prevention is to prevent the occurrence of health conditions and premature mortality. This is typically reported as years of life saved from premature mortality from one or more health conditions. Functioning can serve as an additional indicator⁸ and may be reported as biological health — intrinsic health capacity — preserved thanks to the non-occurrence of health conditions.

Health promotion aims to improve people's intrinsic health capacity. It is not concerned with a particular health condition but rather targets the range of known risk factors including those of the most burdensome health conditions.¹⁸ Health promotion is not concerned with how intrinsic health capacity plays out in people's real life. The key indicator for health promotion is thus functioning, from the perspective of biological health.

Functioning, the key indicator for rehabilitation

Functioning is the key indicator for rehabilitation.^{8, 19} Both perspectives of biological and lived health are fundamental for the evaluation of rehabilitation interventions. This is because rehabilitation aims to optimize a person's functioning by improving both biological health and lived health in concert. This is achieved by providing the best treatment for health conditions — and so developing a person's intrinsic health capacity — by strengthening a person's psychological resources, by creating a facilitating physical and social environment, and finally and most importantly, by translating the potential from these improvements into better lived health.^{8, 20, 21}

Functioning, a health indicator for the curative strategy

The curative strategy aims at the restoration of full health, and if this is not possible, at remission or disease control. The first and foremost concern of the curative strategy is survival, both in the context of acute and chronic health conditions. The key indicator for cure is thus mortality.

Secondly, cure is concerned with the optimal management of a health condition including the minimization of complications (temporally closely related to the occurrence of an index health condition) and comorbidities (either unrelated to, or temporally more distant

consequences of an index health condition, perhaps mediated by environmental risk factors). The second indicator for the curative strategy is thus morbidity.

Finally, the curative strategy is concerned with optimal patient-centred outcomes, that is, people's health capacity to live a full life. People's actual living experience is obviously relevant for clinical decision making, at least insofar as the person's life is affected by their health state. But what people do or are restricted from doing in their actual environment cannot be the primary outcome of a curative intervention since performance is determined by many external factors that go far beyond what a health strategy could possibly affect (e.g. income levels, social position, climate). The third indicator of cure thus is functioning from the perspective of biological health.

In this context we may recall that the Food and Drug Agency (FDA) in the United States, and the European Medicine Agency (EMA), when approving drugs now require not only the demonstration of an improvement in biological parameters but also the benefit for person's functioning. To be able to statistically demonstrate a potential advantage of one drug over another in an ethically required sample that is as small as possible, it is thus paramount for clinical trials to reduce the influence of the environment as much as possible and to evaluate benefits in terms of biological health.

Functioning, a proxy indicator for palliation

The aim of the palliative strategy is to optimize well-being in the context of dying. Functioning undoubtedly contributes to this goal, and for this reason functioning may serve as proxy indicator. Beyond reporting a person's biological and, more importantly, lived health, one should also consider reporting a person's appraisal — a person's valuation or preference for a certain level of functioning.

Coding of the health indicator functioning with the ICF and the ICD

Functioning information is ideally coded with the ICF. It will also be possible to code functioning information as functioning properties in the upcoming ICD-11.¹⁶ It remains to be seen, however, how this coding will be implemented. It is already clear that the func-

tioning properties will only include domains of Activities and Participation. Also, there will be no distinction made between capacity and performance. (The practical aspects of coding functioning information for health statistics and reimbursement¹⁷ along the continuum of services dedicated to the different health strategies will be the subject of a future methodological note.)

Conclusions

With WHO's introduction of the notion of functioning we now can rely on a third health indicator that complements the established health indicators of mortality and morbidity. Together these provide a complete set of indicators for the monitoring of the performance of health strategies in the health system. When applying functioning as the third health indicator across the five health strategies it is fundamental to distinguish biological health from lived health. For rehabilitation, functioning is the key indicator. With the possibility of coding mortality and morbidity data with the ICD and functioning data either with the ICF and or in terms of functioning properties in the upcoming ICD-11, we can now rely on data for each of the three health indicators.

References

1. Brundtland GH. From the World Health Organization. The war against disease: investing in health, investing in our common future. *JAMA* 2002; 287:444.
2. Brundtland GH. World summit on sustainable development. *BMJ* (Clinical research ed). 2002;325:399-400.
3. United Nations Development Programme. Sustainable development goals; 2016 [Internet]. Available from: <http://www.undp.org/content/undp/en/home/sustainable-development-goals.html> [cited 2016, Nov 7].
4. World Health Organization. Research for universal health coverage: World health report; 2013 [Internet]. Geneva. Available from: http://apps.who.int/iris/bitstream/10665/85761/2/9789240690837_eng.pdf [cited 2016, Nov 7].
5. World Health Organization. The International Classification of Diseases; [Internet]. Available from: <http://www.who.int/classifications/icd/en/> [cited 2016, Nov 7].
6. World Health Organization. The International Classification of Functioning, Disability and Health. Geneva: WHO; 2001.
7. World Health Organization. The Constitution of the World Health Organization [Internet]. Available from: http://www.who.int/governance/eb/who_constitution_en.pdf [cited 2016, Nov 7].
8. Stucki G, Cieza A, Melvin J. The International Classification of Functioning, Disability and Health (ICF): a unifying model for the conceptual description of the rehabilitation strategy. *J Rehabil Med* 2007;39:279-85.
9. World Health Organization. Declaration of Alma-Ata; 1978 [Internet]. Available from: http://www.who.int/publications/almaata_declaration_en.pdf [cited 2016, Nov 7].
10. World Health Organization. Universal Health Coverage; [Internet]. Available from: <http://www.who.int/mediacentre/factsheets/fs395/en/> [cited 2016, Nov 7].
11. Stucki G, Post MWM, editors. The Swiss Spinal Cord Injury (SwiSCI) Cohort Study. *Am J Phys Med Rehabil* 2011;90(11 Supplement):S1-S96.
12. Bickenbach J, Tennant A, Stucki G, editors. Describing the lived experience of Swiss persons with spinal cord injury. *J Rehabil Med* 2016;48:113-244.
13. World Health Organization. Monitoring, evaluation and review of national health strategies. A country-led platform for information and accountability. Geneva: WHO; 2011.
14. World Health Organization. Systems Thinking for Health Systems Strengthening. Geneva: WHO; 2009.
15. Institute of Medicine. Best Care at Lower Cost: The Path to Continuously Learning Health Care in America. Washington DC: National Academies Press; 2013.
16. Selb M, Kohler F, Robinson Nicol MM, Riberto M, Stucki G, Kennedy C. ICD-11: a comprehensive picture of health, an update on the ICD-ICF joint use initiative. *J Rehabil Med* 2015;47:2-8.
17. Hopfe M, Stucki G, Marshall R, Twomey CD, Ustun TB, Prodinge B. Capturing patients' needs in casemix: a systematic literature review on the value of adding functioning information in reimbursement systems. *BMC Health Serv Res* 2016;16:40.
18. Murray CJ, Vos T, Lozano R, Naghavi M, Flaxman AD, Michaud C, et al. Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet* 2012;380:2197-223.
19. Stucki G. The Olle Hook Lectureship 2015: The World Health Organization's paradigm shift and implementation of the International Classification of Functioning, Disability and Health in rehabilitation. *J Rehabil Med* 2016;48:486-93.
20. Meyer T, Gutenbrunner C, Bickenbach J, Cieza A, Melvin J, Stucki G. Towards a conceptual description of rehabilitation as a health strategy. *J Rehabil Med* 2011;43:765-9.
21. Gutenbrunner C, Meyer T, Melvin J, Stucki G. Towards a conceptual description of Physical and Rehabilitation Medicine. *J Rehab Med* 2011;43:760-4.

Conflicts of interest.—The authors certify that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript.

Acknowledgements.—The authors thank Prof. Alarcos Cieza for the invaluable discussion relevant for the presented framework of health indicators for the health strategies, following a first framework published that was co-authored with Dr. Cieza.⁸ The authors thank Dr. Birgit Prodinge, Melissa Selb, Prof. John Melvin and Prof. Sara Rubinelli for their critical comments and Cristiana Baffone and Susanne Stucki for their critical comments and support in the preparation of the manuscript.

Article first published online: January 26, 2017. - Manuscript accepted: January 18, 2017. - Manuscript revised: January 13, 2017. - Manuscript received: November 14, 2016.