J Rehabil Med 2007; 39: 279–285

THE INTERNATIONAL CLASSIFICATION OF FUNCTIONING, DISABILITY AND HEALTH: A UNIFYING MODEL FOR THE CONCEPTUAL DESCRIPTION OF THE REHABILITATION STRATEGY

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An important basis for the successful development of rehabilitation practice and research is a conceptually sound description of rehabilitation understood as a health strategy based on a universally accepted conceptual model and taxonomy of human functioning. With the approval of the International Classification of Functioning, Disability and Health (ICF) by the World Health Assembly in 2001 and the reference to the ICF in the World Health Assembly's resolution on "Disability, including prevention, management and rehabilitation" in 2005, we can now rely on a universally accepted conceptual model. It is thus time to initiate the process of evolving an ICF-based conceptual description that can serve as a basis for similar conceptual descriptions and according definitions of the professions applying the rehabilitation strategy and of distinct scientific fields of human functioning and rehabilitation research. In co-operation with the Physical and Rehabilitation Medicine (PRM) section of the European Union of Medical Specialists (UEMS) and its professional practice committee, we present a first tentative version of an ICF-based conceptual description in this paper. A brief definition describes rehabilitation as the health strategy applied by PRM and professionals in the health sector and across other sectors that aims to enable people with health conditions experiencing or likely to experience disability to achieve and maintain optimal functioning in interaction with the environment. Readers of the *Journal of Rehabilitation Medicine* are invited to contribute towards achieving an internationally accepted ICF-based conceptual description of rehabilitation by submitting commentaries to the Editor of this journal.

Key words: rehabilitation, ICF, health strategy, human functioning science.

J Rehabil Med 2007; 39: 279–285

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Submitted May 4, 2005; accepted October 13, 2006

INTRODUCTION

There is an urgent need for the development of rehabilitation care and research (1–4). A globally accepted conceptual description of rehabilitation based on a unifying model of human functioning is essential for the successful development of rehabilitation practice and research (1) and the professional discipline physical and rehabilitation medicine (PRM, 5).

A number of models of human functioning and disability (3, 6) have consequently been applied in the context of rehabilitation. Some of these, like the model of the Institute of Medicine (7, 8) based on Nagi's model (9), and the model associated with the International Classification of Impairment, Disability and Handicap (ICIDH, 10) have provided bases for definitions of rehabilitation (11), the development of rehabilitation practice and research (8), and legislation and policy-making (3). The ICIDH model represented a real breakthrough in that the World Health Organization (WHO) recognized that the medical model and its associated International Classification of Diseases (ICD, 12) did not address the consequences of chronic diseases. Particularly in Europe, there was considerable interest in, and even enthusiasm for, the application of the ICIDH as a unifying framework for classifying the consequences of disease during the last 20 years of the 20th century. The Council of Europe launched its *Recommendation No. R (92) 6* on "a coherent policy for people with disabilities" based on the ICIDH and promoted the investigation of its usefulness in different areas, including rehabilitation. However, the ICIDH did not find worldwide acceptance (3, 8) and was criticized for not explicitly recognizing the role of the environment in its model and its use of negative terminology.

The successor to the ICIDH, the International Classification of Functioning, Disability and Health (ICF, 13), addresses these criticisms by incorporating environmental and personal factors as components of the contextual factors and by using more neutral concepts. Based on the ICF and the integrative bio-psycho-social model behind it, "functioning" encompasses "body functions and structures and activities and participation" and is viewed in relation to the health condition as well as personal and environmental factors. Disability is complementary to functioning and encompasses impairments, limitations in activities, and restrictions in participation.

"Body functions" are defined as the physiological functions of body systems, including psychological functions, and "body structures" refer to the anatomical parts of the body, such as organs, limbs and their components. Abnormalities of function, as well as abnormalities of structure, are referred to as impairments, which are defined as a significant deviation or loss (e.g.

 ISSN 1650-1977
DOI: 10.2340/16501977-0041

deformity) of structures (e.g. joints) and/or functions such as reduced range of motion, muscle weakness, pain and fatigue.

"Activity" is the execution of a task or action by an individual and represents the individual perspective of functioning. "Participation" refers to the involvement of an individual in a life situation and represents the social perspective of functioning. Difficulties at the activity level are referred to as activity limitation (e.g. limitations in mobility, such as walking, climbing steps, grasping or carrying). Problems an individual may experience in his or her involvement in life situations are denoted as participation restriction (e.g. restrictions in community life and recreation and leisure, but also in walking if walking is an aspect of participation in terms of a life situation).

The ICF provides the most recent and comprehensive model of functioning and disability. With the approval of the ICF by the World Health Assembly in 2001, we can now rely on a universal and globally accepted model and taxonomy of human functioning (3).

The ICF is suitable for rehabilitation and is likely to find wide acceptance across world regions, scientific and professional disciplines, payers and service providers, policy-makers, governmental sectors and advocacy organizations (3). It is thus time to initiate the process towards ICF-based conceptualizations and definitions of rehabilitation (1).

When describing and defining rehabilitation, it is useful and necessary to distinguish different understandings or applications. From a public health perspective, rehabilitation can be understood and described as a strategy in healthcare. Other strategies include prevention, cure and support. From the perspective of care provision, the rehabilitation strategy is instrumental for the understanding and definition of professional disciplines including the medical specialty PRM (14). From a primarily scientific perspective, the rehabilitation strategy serves as a basis for the understanding and description of distinct scientific fields, including integrative rehabilitation sciences or biomedical rehabilitation sciences and engineering (15, 16).

There is no single appropriate ICF-based definition of rehabilitation understood as a health strategy. For example, a legal definition may differ from definitions suitable from the perspective of service providers and payers, policy-makers, advocacy groups or scientists. In addition, depending on the purpose, one may, for example, wish to use a comprehensive or a brief definition. To facilitate purpose-tailored, but consistent, definitions of rehabilitation, the development of a conceptual description that can serve as reference seems most useful. An ICF-based conceptual description can be developed based on the unifying conceptual model and taxonomy of the ICF. It can be modified and further developed in an iterative process towards a globally accepted description.

The objective of this paper therefore is to develop an ICF-based conceptual description of rehabilitation understood as a health strategy. The specific aims are: (*i*) to illustrate the understanding of rehabilitation in the context of 4 health strategies; (*ii*) to introduce the ICF as unifying model for the conceptual description and definitions of rehabilitation; (*iii*) to present an ICF-based conceptual description; (*iv*) to discuss selected terms used in this description; and (*v*) to provide examples of comprehensive and brief definitions based on the conceptual description.

REHABILITATION IN THE CONTEXT OF FOUR HEALTH STRATEGIES

While clinical disciplines perform diagnostic procedures and interventions for individuals, public health develops strategies for populations. According to the *Merriam Webster Online Dictionary*, "strategy" can be defined as the "art of devising or employing plans toward a goal", "an elaborate and systematic plan of action", or a "plan of action designed to achieve a particular goal". Strategies developed from a public health perspective, e.g. in resolutions of the World Health Assembly, are an important basis for the planning of service and care provision. They are also an important basis for the work of clinical and other professional disciplines applying the strategy in the interaction with individuals.

From a public health perspective, rehabilitation can be understood as 1 of 4 main healthcare strategies: prevention, cure, rehabilitation and support (Table I). From a public health perspective, cure is often referred to as secondary prevention and rehabilitation is referred to as tertiary prevention (7).

The primary goal of prevention is population health. It achieves its goal by preventing the occurrence of health conditions. The primary goal of cure is survival. It achieves its goal by control of the disease process. The primary goal of rehabilitation is optimal functioning. It achieves its goal by applying and integrating approaches to optimize a person's capacity, approaches which build on and strengthen the resources of the person, which provide a facilitating environment, and which develop performance in the interaction with the environment. The primary goal of the supportive strategy is quality of life. It achieves its goal through the palliation of symptoms and through providing assistance (Table I).

The distinction of the 4 health strategies is a conceptually useful reduction. However, in theory, and certainly in the application in professional practice, the outlined strategies are closely related. For example, PRM physicians focus on functioning, but also consider optimal disease management.

Rehabilitation is a strategy that is being applied in the health sector. The health sector can therefore be considered the "reference", "root" or "anchor" sector. However, rehabilitation is also a truly multi-sectoral strategy. Indeed, in many situations, for example in the habilitation and rehabilitation of children with special needs, services and care are primarily provided by the educational sector rather than the health sector. Vocational rehabilitation is often provided and/or paid for by the labor or social sector. In the currently developed "Comprehensive and Integral International Convention on the Protection and Promotion of the Rights and Dignity of Persons with Disabilities" (17) a separate paragraph is therefore dedicated to rehabilitation, addressing issues not covered in the paragraph on health.

Table I. *Rehabilitation in the context of four health strategies.*

	Preventive strategy	Curative strategy	Rehabilitative strategy	Supportive strategy
Primary goal	Prevent health conditions (e.g. vaccination to prevent polio)	Cure health conditions (e.g. tuberculosis)	Restore functioning (e.g. rehabilitation after hip replacement)	Optimize quality of life (e.g. pain control in cancer)
Alternative goals	Reduce incidence of conditions (e.g. tobacco control to reduce incidence of lung cancer)	Remission (e.g. chemotherapy for cancer) Disease control (e.g. biologicals in rheumatoid arthritis) Damage control in injury	Optimize functioning (e.g. rehabilitation in chronic conditions such as multiple sclerosis; in ageing; in acute conditions with sequelae such as spinal cord injury or stroke)	Preserve autonomy (e.g. assistance to preserve independence)
Key outcomes	Health Survival	Survival Functioning	Functioning Quality of life	Quality of life Health
Related outcomes	Functioning and disability Quality of life	Quality of life Health	Health Survival	Survival Functioning
Sector	Health	Health	Health (reference or root sector) Education Labor Social affairs	Health (reference or root sector) Social affairs

The application of the rehabilitation strategy by professional disciplines and in the context of care and service provision involves a problem-solving process (5, 18–20).

THE ICF: A UNIFYING MODEL FOR THE CONCEPTUAL DESCRIPTION AND DEFINITIONS OF REHABILITATION

Past definitions of rehabilitation have been criticized for their narrow perspective based on the biomedical model and the according implication that people with disabilities should be enabled to fulfill questionable societal norms (6). Based on the biomedical model rehabilitation is seen as process of active change by which a person with disability is enabled to achieve the knowledge and skills needed to achieve optimal physical, psychological and social functioning.

This view is represented by many definitions of rehabilitation, including the WHO definition of rehabilitation from 1981 (21) and the United Nations (UN) standard rules from 1993 (22). The 1981 WHO definition referred mainly to the individual perspective when aiming at "enabling the disabled and handicapped to achieve social integration" (21). Rehabilitation as defined in the UN Standard Rules on the equalization of opportunities for persons with disability in 1993 also made the assumption that is it the individual and not the environment who has to change or who has "to do the work" when stating: "...providing them with the tools to change their lives towards a higher level of independence" (22).

While the biomedical model is often of utmost importance to enable people to achieve optimal capacity, other approaches may be equally important. They include approaches to enable relevant persons in the immediate environment encompassing family, peers and employers, to remove environmental barriers and to create a facilitating larger physical and social environment, to build on and to strengthen personal resources and to develop performance in the interaction with the environment. The rehabilitation strategy integrates and translates these approaches with the goal of achieving optimal functioning, including full inclusion and participation in all aspects of life.

Future definitions of rehabilitation should therefore take the comprehensive perspective based on the integrative model of human functioning, disability and health (6). With the approval of the WHO's framework for human functioning, disability and health, we can now for the first time rely on a universal framework and taxonomy based on the integrative model (3, 23–27). The ICF, therefore, has the potential to become the unifying conceptual model for rehabilitation (3, 23).

The ICF has been developed by WHO, and hence within the health sector. It is however cross-cutting to the other sectors. Accordingly, the ICF framework offers not only targets for health interventions but also a comprehensive range of targets for interventions across sectors. The targets for interventions outside the health sector are mainly within the environmental component of the ICF. While these interventions may be provided by, or in co-ordination with, sectors outside health, their common goal is to improve functioning of people with health conditions. This is in line with the understanding of rehabilitation as a strategy rooted in the health sector, but cross-cutting to the other sectors.

DEVELOPMENT OF A CONCEPTUAL DESCRIPTION OF THE REHABILITATION STRATEGY

The conceptual description presented here has been developed by the authors in collaboration with the professional practice committee of the European Union of Medical Specialists

(UEMS) section for PMR and acknowledged colleagues. The UEMS section of PRM endorsed the application of the ICF as a unifying conceptual model for rehabilitation and PRM on 1 April 2006 in Lausanne, Switzerland. It also decided to promote the application of the ICF as unifying conceptual model for rehabilitation and PRM by supporting the process towards "ICF-based conceptual descriptions and according brief and comprehensive definitions of the rehabilitation strategy and of the medical specialty PRM" within the next 2 years. The conceptual description of rehabilitation presented in this paper is a first step in this process.

The ICF-based conceptual description can serve as basis for the development of definitions relying on clearly defined and globally accepted terms. In response to specific needs or audiences, one may tailor an appropriate definition by combining terms from the conceptual description. Therefore, varying definitions of rehabilitation can still be consistent with respect to the core concepts. The advantage of a conceptual description serving as a reference for definitions is its easy modifiability and further development in the envisioned iterative process towards a globally accepted description.

ICF terms in the proposed ICF-based conceptual description shown in Table II are marked in bold. Examples of according comprehensive and brief definitions and comments on selected terms used in the conceptual description are presented in the following paragraphs.

Example of a comprehensive definition of rehabilitation

Rehabilitation is the health strategy that, based on the WHO's integrative model of human functioning and disability, aims to enable people with health conditions experiencing or likely to experience disability to achieve and maintain optimal functioning in interaction with the environment.

It achieves its goal by applying and integrating biomedical and engineering approaches to optimize a person's capacity, approaches that build on and strengthen the resources of the person that provide a facilitating environment, and that develop performance in the interaction with the environment.

Rehabilitation is the core strategy for the medical specialty PRM, a major strategy for the rehabilitation professions and a relevant strategy for other medical specialties and health professions, service providers and payers in the health sector. It is also a relevant strategy for professionals and service providers across sectors, including education, labor and social affairs caring for or interacting with people with health conditions experiencing or likely to experience disability.

Example of a brief definition of rehabilitation

Rehabilitation is the health strategy applied by PRM and professionals in the health sector and across other sectors that aims to enable people with health conditions experiencing or likely to experience disability to achieve and maintain optimal functioning in interaction with the environment.

Table II. *ICF-based conceptual description of rehabilitation.*

Rehabilitation is the health strategy which:

- based on WHO's **integrative model** of **human functioning and disability**
- applies and integrates
  biomedical and engineering approaches to optimize a **person's capacity**
  approaches which build on and strengthen the resources of the **person**
  approaches which provide a **facilitating environment**
  and approaches which develop a **person's performance** in the interaction with the **environment**
- over the course of a **health condition**
- along and across the continuum of care
  ranging from the acute hospital to rehabilitation facilities and the community
- and across sectors
  including health, education, labor and social affairs
- with the goal
  to enable people with **health conditions** experiencing or likely to experience **disability** to achieve and maintain optimal **functioning** in interaction with the **environment**

Rehabilitation is:

the core strategy for the medical specialty PRM
a major strategy for rehabilitation professions
a relevant strategy for other medical specialties and health professions, service providers and payers in the health sector
and a relevant strategy for professionals and service providers across sectors caring for or interacting with people with **health conditions** experiencing or likely to experience **disability**

WHO, World Health Organization; ICF, International Classification of Functioning, Disability and Health; PRM, physical and rehabilitation medicine.
ICF terms in the proposed ICF-based conceptual description are marked in bold.

COMMENTS ON SELECTED TERMS AND WORDS USED IN THE CONCEPTUAL DESCRIPTION

"rehabilitation is the health strategy"

The arguments with regard to the understanding of rehabilitation as a health strategy have been introduced in the second section of this paper.

"based on the integrative model of human functioning, disability and health"

Rehabilitation aims to optimize functioning and minimize the experience of disability of people with health conditions based on the comprehensive understanding of human functioning. The most comprehensive understanding of human functioning is based on the integrative model of human functioning, disability and health. In this model human functioning and its negative notion disability can be understood as the experience of people with a health condition with or without impairments and/or capacity limitations in the interaction with the environment and in the context of personal resources (3, 6).

"biomedical and engineering approaches to optimize capacity"

Rehabilitation achieves its goals by "approaches" that are defined in the *Merriam Webster Online Dictionary* as "ideas or corresponding actions to deal with a problem or situation".

Biomedical interventions and technology are based on knowledge generated by the natural and engineering sciences. In the context of rehabilitation, engineering can be understood as a scientifically based process aiming at the development, evaluation, modification and dissemination of rehabilitation technology. Rehabilitation technology can be understood as procedures, interfaces and assistive devices that meet the needs of people experiencing disability (28). In the context of an "approach", "engineering" thus seems the preferable term. Engineering has also been used as term in the Institute of Medicine Report on "Enabling America" (8).

"approaches which build on and strengthen the resources of the person"

Approaches that target personal factors build on and strengthen the resources of persons with health conditions based on knowledge generated by the behavioral sciences and psychology. Resources include motivational, cognitive, emotional and behavioral resources.

"approaches which provide a facilitating environment"

People with a health condition may or may not experience disability, depending on the absence of barriers or the presence of facilitators. The removal of barriers and the development of a facilitating immediate and larger physical and social environment is, therefore, an essential approach to achieve optimal functioning.

"approaches which develop performance in the interaction with the environment"

The experience of human functioning and disability is a dynamic process of a person with a health condition in interaction with the immediate and larger environment. The integration of the other 3 approaches, e.g. by applying and combining technological, behavioral and other interventions to facilitate the interaction with the environment, is, therefore, essential to achieve optimal performance in real life.

"in all situations over the course of a health condition; along and across the continuum of care, ranging from the acute hospital to rehabilitation facilities and the community; and across sectors, including health, education, labor and social affairs"

The need to apply the rehabilitation strategy may start with the occurrence of a health condition, e.g. after an injury or at the beginning of a chronic disease (29). The rehabilitation strategy may remain relevant for care and service provision over the whole course of a health condition. The rehabilitation strategy may be applied in a wide range of settings, including the acute hospital, rehabilitation facilities and the community. The rehabilitation strategy may also be applied across the health and other sectors.

"with the goal to enable people experiencing or likely to experience disability in interaction with the environment"

The term "enable" is now generally used to describe the enabling-disabling process (8). However, it is important to recognize that the enabling process refers not only to the capacity of the person in need, but also to adaptations and modifications of the environment" including housing, assistive device, family, peers and employers (8).

The term "experience" in relation to disability is preferable to the term "with disability". The term "with disability" implies that disability is an attribute of the person in relation to the person's body functions and structures. Instead, the term "experience" implies that people with health conditions may experience disability not only with respect to impairments, but also or exclusively in their interaction with the environment. Therefore, one may, for example, experience a varying degree of disability when traveling from one place to another or when working for different employers. The understanding of disability as a dynamic process integrating the perception of impairments as well as environmental barriers is in line with the ICF, which integrates the individual and social perspective of human functioning and disability. According to this reasoning, the term "people experiencing disability" seems more appropriate and can substitute the commonly used term "people with disability". One may further differentiate the environment into an individual's immediate and the larger physical and social environment.

The term "immediate environment" means the specific and most concretely experienced physical and social settings of a person with a health condition. It thus refers to the designated micro-level, which encompasses the interaction systems an individual takes part in, e.g. family, friends, colleagues, physicians etc., the economic resources he or she is able to mobilize, and physical barriers or facilitators he or she encounters in everyday life, e.g. weather or housing conditions. The immediate environment, e.g. social support and physical conditions (30, 31) directly affects social participation and life satisfaction.

The term larger or enlarged social and physical environment focuses instead on the wider political, economic, cultural, and physical conditions (e.g. health policy, labor market, cultural stereotypes, urban development or climate) that influence the quality of the immediate social and physical environment.

When referring to the larger environment, the term "the" seems most appropriate. Instead, when referring to the immediate environment of persons with a health condition, the term "their" seems justified, since a person is always primarily interacting with his or her immediate environment.

"to achieve and maintain optimal functioning"

"Achieve" is an umbrella term that includes, for example, "regain" or "regain former functioning" or "regain partial functioning". It also includes the learning of new skills. An alternative term, e.g. used in the current draft of the "Comprehensive and Integral International Convention on the Protec-

tion and Promotion of the Rights and Dignity of Persons with Disabilities" (17), is the term "attain".

The term "maintain" refers to the preventive approach relevant to virtually all PRM interventions and intervention programs.

An alternative to the term "optimal" is "maximum". In the former UN Standard Rules on the Equalization of Opportunities for Persons with Disabilities (22) the term "optimum" has been used. Instead, in the current draft version (32) the term "maximum" is applied. The term "optimal" (superlative from "bonus") seems more appropriate as it stands for the subjective point of view (experience), as well as for a more objective perspective, like biomedical measures, while the term "maximum" (superlative from "magnus") seems to refer exclusively to an objective and quantitative standpoint.

It could be argued that the goal of rehabilitation is not only optimal functioning, but also "autonomy" and "quality of life". "Autonomy" with its domains "independence, self-determination and self-care" (33) is a key concern and becomes a pivotal concept of the "maintenance strategy". While rehabilitation can, and often does, aim to contribute to a person's autonomy, this is not the primary goal. Similarly, rehabilitation aims to contribute to a person's quality of life by improving functioning. Autonomy and quality of life are thus not specifically mentioned as additional goals.

It could also be argued that the use of the term "functioning" is too global or broad. Instead, one may refer specifically to the components of human functioning including body functions and structures, activities and participation. We have referred to the use of the umbrella term "functioning" instead of its specific components to keep the conceptual description as brief and stringent as possible. Also, at least currently there is no clear differentiation between activity and participation (7, 34).

"Rehabilitation is the core strategy for the medical specialty PRM and a major strategy for rehabilitation professions ...."

By definition and as indicated in the name of the specialty, rehabilitation is the core strategy for the medical specialty PRM. It is a major strategy for health professions often referred to as the "rehabilitation professions" (including physiotherapy and occupational therapy). It is also a relevant strategy for other medical specialties (16).

Similar to the 3 other strategies – prevention, cure and support – rehabilitation is in principle a relevant strategy for all medical specialties and health professions, service providers and payers in the health sector. It is also a relevant strategy for professionals and service providers across sectors, including education, labor and social affairs caring for or interacting with people with health conditions experiencing or likely to experience disability.

In some settings, including the acute hospital (29) or the community, the rehabilitation strategy may be applied by health and other professionals not specialized in rehabilitation. They include staff physicians and nurses who are the "generalists" in the acute hospital (29). Rehabilitation efforts in the community are often delivered by professionals outside the health sector, sometimes in collaboration with rehabilitation professionals. Rehabilitation efforts are also provided by professionals working for health, indemnity and social insurers who often serve as guides and partners for people with health conditions and their significant others, employers, service providers and payers.

CONCLUSION

The ICF-based conceptual description of rehabilitation as a health strategy presented here is intended to initiate the process towards a commonly accepted conceptual description that can serve as a basis for situation and need tailored brief and comprehensive definitions.

The conceptual description of rehabilitation as a health strategy can serve as basis for, and hence facilitate, ICF-based conceptual descriptions and definitions of the medical specialty PRM (5) and other rehabilitation professions. Similarly, it may serve as reference for any professional discipline involved in rehabilitation within or outside the health sector and for service providers, payers or legislators. And finally, it may serve as common reference for conceptual descriptions of distinct scientific fields of human functioning and rehabilitation research (14, 15).

The development of an ICF-based conceptual description and according brief and comprehensive definitions is a dynamic and iterative process. Considering the wide range of professional disciplines involved in rehabilitation care and research this will be a challenge (35). In the context of envisioned new ICF-based conceptual descriptions and definitions of PRM (5) and the rehabilitation professions it may become clear that the common underlying ICF-based conceptual description of rehabilitation needs to be modified or expanded. Similarly, the envisioned development of conceptual descriptions and definitions of distinct scientific fields of human functioning and rehabilitation research (14, 15, 36) may require the adaptation of the presented conceptual description.

We aim to contribute to the process of developing an ICF-based conceptual description of rehabilitation by inviting the readers of the *Journal of Rehabilitation Medicine* to submit commentaries to the Editor commenting specifically on the suitability of the ICF as a unifying model for the conceptual description of rehabilitation understood as a health strategy and on the terms used in the ICF-based conceptual description presented here.

ACKNOWLEDGMENTS

The authors thank Susanne Stucki; Drs Eva Grill, Thomas Ewert and Manfred Wildner from the University of Munich; Dr Jan Reinhardt from Swiss Paraplegic Research; Drs Somnath Chatterji, Bedirhan Üstün and Nenad Kostansjek from the Classification and Terminology (CAT) team at the WHO; and Drs Federico Montero and Chapal Kashnabis from the Disability and Rehabilitation (DAR) team at the WHO for their thoughtful comments.

This paper has been written in co-operation with the UEMS-PRM-section and its professional practice committee (Christoph Gutenbrunner, chair; members: Tamas Bender, Mihai Berteanu, Pedro Cantista, Nicholas Christodoulou, Hermina Damjan, Gordana Devcerski, Veronika Fialka-Moser, Alessandro Giustini, Zafer Hascelik, Eero Kyllönen, Fernando

Parada, Timo Pohjolainen, Hildegun Snekkevik, Marianthi Tzara, Daniel Uebelhart, Enrique Valera, Aivars Vetra, Jiri Votava, Anthony Ward).

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