

ORIGINAL ARTICLE

ICF Core Sets for individuals with spinal cord injury in the early post-acute context

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Study design: A formal decision-making and consensus process integrating evidence gathered from preparatory studies was followed.

Objectives: The aim of this study was to report on the results of the consensus process to develop the first version of a Comprehensive International Classification of Functioning, Disability and Health (ICF) Core Set and a Brief ICF Core Set for individuals with spinal cord injury (SCI) in the early post-acute context.

Setting: The consensus conference took place in Switzerland. Preparatory studies were performed worldwide.

Methods: Preparatory studies included an expert survey, a systematic literature review, a qualitative study and empirical data collection involving people with SCI. ICF categories were identified in a formal consensus process by international experts from different backgrounds.

Results: The preparatory studies identified a set of 531 ICF categories at the second, third and fourth levels. From 30 countries, 33 SCI experts attended the consensus conference (11 physicians, 6 physical therapists, 5 occupational therapists, 6 nurses, 3 psychologists and 2 social workers). Altogether 162 second-, third- or fourth-level categories were included in the Comprehensive ICF Core Sets with 63 categories from the component *Body Functions*, 14 from *Body Structures*, 53 from *Activities and Participation* and 32 from *Environmental Factors*. The Brief Core Set included a total of 25 second-level categories with 8 on *Body Functions*, 3 on *Body Structures*, 9 on *Activities and Participation*, and 5 on *Environmental Factors*.

Conclusion: A formal consensus process-integrating evidence and expert opinion based on the ICF led to the ICF Core Sets for individuals with SCI in the early post-acute context. Further validation of this first version is needed.

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Introduction

Spinal cord injuries (SCIs) occur unexpectedly. Common activities such as driving a car, diving into a lake or walking downstairs can suddenly result in an injury totally reconfiguring the realities of daily life. Because all organ systems and

body functions below the level of the neurological lesion may be affected, SCI often requires major physical, psychological and social adaptations from injured people and their families.¹

Timely and appropriate medical and rehabilitative interventions are essential factors affecting functional recovery in traumatic SCI. Following a patient's acute care, early post-acute rehabilitation should be started as soon as possible.² It aims at improving functional outcomes and tends to hasten and promote improvements in the activities of daily living.³ Reaching this goal, however, requires an in-depth understanding of the broad range and interaction of functional problems people with SCI may experience.

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The International Classification of Functioning, Disability and Health (ICF)⁴ provides a comprehensive and universally accepted framework to classify and describe functioning, disability and health in people with all kinds of diseases or conditions, including SCI. According to the ICF, the problems associated with a disease may involve body functions and body structures and the activities and participation in life situations. Health states and the development of disability are modified by contextual factors such as environmental and personal factors.⁴ The ICF is structured hierarchically. Categories are divided into chapters, which constitute the first level of precision. Categories on higher levels (for example, third or fourth level) are more detailed. To give an example, the third-level ICF category *b7303 Power of muscles in lower half of the body* is one element of the second-level category *b730 Muscle power functions* and is indicated by the last digit '3'. The second-level category *b730 Muscle power functions* is an element of Chapter b7 *Neuromusculoskeletal and movement-related functions*. Finally, Chapter b7 *Neuromusculoskeletal and movement-related functions* is part of the ICF component *b Body Functions*. Supplementary information about the ICF model and structure is provided on the journals website.

Because the ICF can serve as the basis for a comprehensive and detailed understanding of functioning and disability, it is essential in a first step to identify which aspects of functioning and disability in people with SCI should be defined. This process is consistent with the approach that has been followed in other health conditions. Selections of ICF categories relevant for people with a specific health condition, so-called 'ICF Core Sets', have already been developed for a number of health conditions.⁵ However, in SCI different contexts have to be taken into account.

Because an 'ICF Core Set for Neurological Conditions in the Acute Context' was already developed⁶ and is currently being validated, the project aimed at developing ICF Core Sets for SCI for the early post-acute context and for the long-term context.⁷ The early post-acute context covers the first comprehensive rehabilitation after the acute SCI. The long-term context follows the early post-acute context. This definition was regarded as being applicable throughout the world irrespective of the different health systems. The Core Sets should cover both traumatic and nontraumatic SCI.

The development process of the ICF Core Sets for SCI is divided in a preparatory phase in which information was gathered from different studies and a final consensus conference.⁷ The objective of this paper was to report on the results of the consensus process-integrating evidence from preparatory studies to develop the Comprehensive ICF Core Set for SCI in the early post-acute context and the Brief ICF Core Set for SCI in the early post-acute context.

Methods

A formal decision-making and consensus process-integrating evidence was gathered from preparatory studies and expert opinion was followed.

Preparatory studies

The conference was based on the data available as on 1 October 2007. The preparatory studies included an empirical data collection applying the second-level ICF categories in 361 people with SCI in clinical rehabilitation from 14 countries, an internet-based expert survey including 144 SCI health professionals worldwide, a systematic literature review on outcomes used in 281 SCI empirical studies and a qualitative study including 21 focus groups with people with SCI from 6 countries. On the basis of these preparatory studies, a preselection of ICF categories was performed using the modified Scree test⁸ that facilitates priority determination based on a graphical examination of the frequency distribution. The ICF categories most frequently named in all four preparatory studies made up the starting point of the decision-making and consensus process. Details of the preparatory studies are described in the reference publications.^{9–12}

Recruitment of conference participants

Health professionals who expressed their interest in the project in advance as well as people who were suggested by the project steering committee constituted the pool of potential participants. A total of 154 people (58 physicians, 24 physical therapists, 27 occupational therapists, 23 nurses, 12 psychologists and 10 social workers from 38 countries) made up this pool. Participants were selected randomly under consideration of the profession and the country of origin to assure a most balanced representation of all important health professions and all world regions.

Training and information exchange

During the conference, the first meeting consisted of a 3 h training, in which all participants were familiarized with the ICF framework and classification,⁴ and were informed about the evidence from the preparatory studies. They were provided with summary sheets containing both the pre-selected ICF categories and the results of the preparatory studies (see Table 1).

Iterative decision-making process

The ICF Core Set categories were identified in an iterative decision-making process with discussions and voting in working groups and plenary sessions. The process was guided by a member of the ICF Research Branch (AC). In the process, ICF categories that were either clearly relevant or irrelevant according to preset decision rules were excluded from further discussion. The focus on the remaining controversial categories was thereby facilitated. The decision-making process consisted of two major activities.

In the first activity, the participants were asked to select ICF categories to be included in the Comprehensive ICF Core Set, that is, a list of ICF categories long enough to describe the prototypical spectrum of limitations in functioning and health of people with SCI in the early post-acute context, but at the same time short enough to be practical in comprehensive, multidisciplinary assessments.

Table 1 Fraction of the list including the results of the preparatory studies for each ICF category as presented to the participants of the consensus conference

ICF code		ICF title	Empirical study (%) n = 361	Expert survey (%) n = 144	Review (%) n = 281	Focus groups (%) n = 21
Second level	Third level					
+b130 ^a		Energy and drive functions	18 ^b	16 ^c	5 ^d	X ^e
b130		Energy and drive functions	18		1	x
	b1300	Energy level		3	3	x
	b1301	Motivation		7	1	x
+b134 ^a		Sleep functions	29	16	7	x
b134		Sleep functions	29	16	5	x
	b1340	Amount of sleep			1	
	b1341	Onset of sleep			1	
	b1342	Maintenance of sleep		1	2	x
	b1343	Quality of sleep		2	1	

^aCombines results from second- and higher-level categories.

^bIn 18% of 361 people this problem was reported.

^cOf 144 experts, 16% reported this problem.

^dIn 5% of 281 empirical studies this problem was reported.

^eThis problem was identified by at least one of the focus groups.

In the second activity, the participants were requested to select the Brief ICF Core Set from the list of ICF categories included in the Comprehensive ICF Core Set by means of a two-round ranking procedure and a final vote. The Brief ICF Core Set is a list of ICF categories long enough to describe the prototypical spectrum of limitations in functioning and health of people with SCI in the early post-acute context, but at the same time short enough to be practical in clinical studies.

The data resulting from the voting and ranking processes were continuously entered in MS Excel 2003 throughout the conference.

Results

Preparatory studies

In the empirical study, 222 second-level categories were identified. The qualitative study, the expert survey and the systematic review revealed 326, 366 and 424 second-, third- and fourth-level categories, respectively. In total, a list of 273 different second-level categories resulted from the preparatory studies. Using a modified Scree test, we selected the 215 most frequently reported categories.⁸ The list of ICF categories finally presented at the conference to the participants included 531 ICF categories at the second, third or fourth level (104 on *Body Functions*, 90 on *Body Structures*, 220 on *Activities and Participation* and 117 on *Environmental Factors*).

ICF consensus conference

The consensus process took place from 15 to 18 November 2007 at the Swiss Paraplegic Research, Nottwil, Switzerland. Thirty-three health professionals (11 physicians with various subspecializations, 6 physical therapists, 5 occupational therapists, 6 nurses, 3 psychologists and 2 social workers) from 30 different countries attended the consensus process for SCI in the early post-acute context. Two of them had an SCI. The decision-making process involved five working

groups with six to seven health professionals each. The process was facilitated by the moderator of the plenary sessions (AC) and leaders of the five working groups.

Comprehensive Core Set

Tables 2–5 show the ICF categories included in the Comprehensive ICF Core Set. The number of second-, third- and fourth-level categories in the Comprehensive ICF Core Set is 162, with 104 categories on the second level, 49 categories on the third level and 9 categories on the fourth level. The 58 third- and fourth-level categories are a further specification of 14 categories on the second level.

The 162 categories of the Comprehensive ICF Core Set are made up of 63 (38.9%) categories from the component *Body Functions*, 14 (8.6%) from the component *Body Structures*, 53 (32.7%) from the component *Activities and Participation* and 32 (19.8%) from the component *Environmental Factors*.

All chapters of the component *Body Functions* are represented in the Comprehensive ICF Core Set. From the component *Body Structures* Chapter 2 *The eye, ear and related structures*, Chapter 3 *Structures involved in voice and speech* and Chapter 5 *Structures related to the digestive, metabolic and endocrine systems* are not represented in the Comprehensive ICF Core Set. From the components *Activities and Participation* and *Environmental Factors*, respectively, all chapters are represented in the Comprehensive ICF Core Set except Chapter 1 *Learning and applying knowledge* and Chapter 2 *Natural environment and human-made changes of environment*, respectively.

Brief Core Set

Table 6 shows the second-level ICF categories ordered by rank that were selected for the Brief ICF Core Set. The Brief ICF Core Set includes a total of 25 second-level categories, which represents 24% of all second-level categories that were selected for the Comprehensive Core Set. Eight categories were chosen from the component *Body Functions* (represent-

Table 2 ICF categories of the component *Body Functions* included in the Comprehensive ICF Core Set for SCI in the early post-acute context

ICF code			Title
Second level	Third level	Fourth level	
b126			Temperament and personality functions
b130			Energy and drive functions
b134			Sleep functions
b152			Emotional functions
b260			Proprioceptive function
b265			Touch function
b270			Sensory functions related to temperature and other stimuli
	b2800		Generalized pain
		b28010	Pain in head and neck
		b28013	Pain in back
		b28014	Pain in upper limb
		b28015	Pain in lower limb
		b28016	Pain in joints
	b2803		Radiating pain in a dermatome
	b2804		Radiating pain in a segment or region
b310			Voice functions
b410			Heart functions
b415			Blood vessel functions
	b4200		Increased blood pressure
	b4201		Decreased blood pressure
	b4202		Maintenance of blood pressure
b430			Haematological system functions
b440			Respiration functions
b445			Respiratory muscle functions
b450			Additional respiratory functions
b455			Exercise tolerance functions
b510			Ingestion functions
b515			Digestive functions
	b5250		Elimination of faeces
	b5251		Faecal consistency
	b5252		Frequency of defecation
	b5253		Faecal continence
	b5254		Flatulence
b530			Weight maintenance functions
b550			Thermoregulatory functions
b610			Urinary excretory functions
	b6200		Urination
	b6201		Frequency of urination
	b6202		Urinary continence
b630			Sensations associated with urinary functions
b640			Sexual functions
b670			Sensations associated with genital and reproductive functions
b710			Mobility of joint functions
b715			Stability of joint functions
	b7300		Power of isolated muscles and muscle groups
	b7302		Power of muscles of one side of the body
	b7303		Power of muscles in lower half of the body
	b7304		Power of muscles of all limbs
	b7305		Power of muscles of the trunk
	b7353		Tone of muscles of lower half of body
	b7354		Tone of muscles of all limbs
	b7355		Tone of muscles of trunk
b740			Muscle endurance functions
b750			Motor reflex functions
b755			Involuntary movement reaction functions
b760			Control of voluntary movement functions
b765			Involuntary movement functions
b770			Gait pattern functions
b780			Sensations related to muscles and movement functions
b810			Protective functions of the skin
b820			Repair functions of the skin
b830			Other functions of the skin
b840			Sensation related to the skin

Table 3 ICF categories of the component *Body Structures* included in the Comprehensive ICF Core Set for SCI in the early post-acute context

ICF code			Title
Second level	Third level	Fourth level	
		s12000	Cervical spinal cord
		s12001	Thoracic spinal cord
		s12002	Lumbosacral spinal cord
		s12003	Cauda equina
	s1201		Spinal nerves
s430			Structure of respiratory system
s610			Structure of urinary system
s710			Structure of head and neck region
s720			Structure of shoulder region
s730			Structure of upper extremity
s740			Structure of pelvic region
s750			Structure of lower extremity
s760			Structure of trunk
s810			Structure of areas of skin

ing 22% of selected second-level categories in the Comprehensive Core Set), three from *Body Structures* (representing 33% of selected second-level categories in the Comprehensive Core Set), nine from *Activities and Participation* (representing 33% of selected second level-categories in the Comprehensive Core Set) and five from *Environmental Factors* (representing 16% of selected second-level categories in the Comprehensive Core Set).

Discussion

The formal consensus process-integrating evidence from preparatory studies and expert knowledge at the ICF Core Set conference for SCI led to the definition of a Comprehensive ICF Core Set for SCI in the early post-acute context for multidisciplinary assessment and a Brief ICF Core Set for SCI in the early post-acute context for clinical studies.

The 162 categories (104 second-level categories) that were included in the Comprehensive Core Set reflect the numerous functional changes that occur in people with SCI in the early post-acute context. Because the ICF Core Set should be applied for all levels of spinal cord lesions, a wide range of functional problems was included in the Comprehensive Core Set. Despite keeping in mind that the Comprehensive ICF Core Set should include as many categories as necessary to comprehensively describe functioning in patients with SCI, but as few as possible to be practical, the participants frequently felt that a specific description of a problem is necessary. Thus, they included many third-level and even fourth-level categories that provide specifications of second-level categories such as *b280 Pain*, *s120 Spinal cord and related structures* or *d445 Hand and arm use*.

With respect to the four main components of the ICF, the following issues were raised:

About one-half of the second-level ICF categories of the component *Body Functions* were included in the first vote with a 100% agreement among the participants. These categories address functions typically problematic in people

with SCI, such as pain, touch function, blood pressure function, defecation function, urination function, muscle power function and muscle tone function.^{13–15}

A major point of discussion was the inclusion of the categories *b110 Consciousness functions*, *b114 Orientation functions*, *b140 Attention functions* and *b144 Memory functions*. These ICF categories were found to be related primarily to comorbid traumatic brain injury¹⁶ and consequently were excluded.

The category *b126 Temperament and personality functions* was discussed controversially and finally included with a high agreement. The most important argument was the participants' experience that a persons' personality may influence the rehabilitation and the level of participation in a positive or negative way. On the other hand, the argument came up that a persons' personality is not influenced by the SCI itself and therefore should not be included in the ICF Core Set. In addition, it was discussed to what extent personality is a persons' characteristic that should be assigned to the ICF component *Personal Factors* rather than to *Body Functions*.

The category *b152 Emotional functions* was included in the Comprehensive ICF Core Set referring to the high amount of newly injured people who meet the diagnostic criteria for depression.¹⁷

The discussion led to an exclusion of *b330 Fluency and rhythm of speech functions* on the one hand. On the other hand, the participants agreed that problems with voice functions should be addressed in the Comprehensive ICF Core Set using a more general ICF category. Although not included in the list of candidate categories, the ICF category *b310 Voice functions* was additionally selected and included in the Comprehensive ICF Core Set.

Regarding neuromusculoskeletal functions all candidate categories were included except *b720 Mobility of bone functions* that overlaps with other already included categories and was regarded as not being primarily important in the early post-acute phase.

The participants decided to include almost all third-level specifications of *b730 Muscle power functions*. The inclusion of *b7201 Power of muscles of one limb* was intensively discussed by the participants. Some participants felt that this category could be useful to describe Brown-Séquard syndrome. On the other hand, many participants argued that in the clinical examination all limbs will be screened and therefore this category is already covered by other categories. Finally, all participants agreed to exclude the category.

The selection of all four candidate ICF categories related to functions of skin underlines the importance of impaired skin function and the risk of pressure sores in people with SCI.¹⁸

The selection of *Body Structures* included those structures that are mainly affected by SCI, such as spinal cord, respiratory and urinary systems, upper and lower extremities, trunk, head and neck region, shoulder region and pelvic region and skin.³ The structures of the sympathetic and parasympathetic nervous system were finally excluded because the corresponding body functions are already represented in the Comprehensive ICF Core Set.

Table 4 ICF categories of the component *Activities and Participation* included in the Comprehensive ICF Core Set for SCI in the early post-acute context

ICF code		Title
Second level	Third level	
d230		Carrying out daily routine
d240		Handling stress and other psychological demands
d360		Using communication devices and techniques
	d4100	Lying down
	d4103	Sitting
	d4104	Standing
	d4105	Bending
	d4106	Shifting the body's centre of gravity
	d4153	Maintaining a sitting position
	d4154	Maintaining a standing position
d420		Transferring oneself
d430		Lifting and carrying objects
d435		Moving objects with lower extremities
	d4400	Picking up
	d4401	Grasping
	d4402	Manipulating
	d4403	Releasing
	d4450	Pulling
	d4451	Pushing
	d4452	Reaching
	d4453	Turning or twisting the hands or arms
	d4455	Catching
	d4500	Walking short distances
	d4501	Walking long distances
	d4502	Walking on different surfaces
	d4503	Walking around obstacles
d455		Moving around
	d4600	Moving around within the home
	d4601	Moving around within buildings other than home
	d4602	Moving around outside the home and other buildings
d465		Moving around using equipment
d470		Using transportation
d475		Driving
d510		Washing oneself
d520		Caring for body parts
	d5300	Regulating urination
	d5301	Regulating defecation
	d5302	Menstrual care
d540		Dressing
d550		Eating
d560		Drinking
d570		Looking after one's health
d610		Acquiring a place to live
d620		Acquisition of goods and services
d630		Preparing meals
d640		Doing housework
d660		Assisting others
d760		Family relationships
d770		Intimate relationships
d850		Remunerative employment
d870		Economic self-sufficiency
d920		Recreation and leisure
d930		Religion and spirituality

A broad range of categories of the ICF component *Activities and Participation* was selected by the participants reflecting the diversity of problems associated with SCI. The inclusion of many third-level categories of Chapter 4 *Mobility high-*

Table 5 ICF categories of the component *Environmental Factors* included in the Comprehensive ICF Core Set for SCI in the early post-acute context

ICF code		Title
Second level		
e110		Products or substances for personal consumption
e115		Products and technology for personal use in daily living
e120		Products and technology for personal indoor and outdoor mobility and transportation
e125		Products and technology for communication
e130		Products and technology for education
e135		Products and technology for employment
e140		Products and technology for culture, recreation and sport
e150		Design, construction and building products and technology of buildings for public use
e155		Design, construction and building products and technology of buildings for private use
e165		Assets
e310		Immediate family
e315		Extended family
e320		Friends
e325		Acquaintances, peers, colleagues, neighbours and community members
e330		People in positions of authority
e340		Personal care providers and personal assistants
e355		Health professionals
e360		Other professionals
e410		Individual attitudes of immediate family members
e415		Individual attitudes of extended family members
e420		Individual attitudes of friends
e425		Individual attitudes of acquaintances, peers, colleagues, neighbours and community members
e440		Individual attitudes of personal care providers and personal assistants
e450		Individual attitudes of health professionals
e460		Societal attitudes
e515		Architecture and construction services, systems and policies
e525		Housing services, systems and policies
e540		Transportation services, systems and policies
e555		Associations and organizational services, systems and policies
e570		Social security services, systems and policies
e575		General social support services, systems and policies
e580		Health services, systems and policies

lights the need for a detailed description of mobility problems by health professionals.

The candidate categories addressing education as well as work and employment were predominantly regarded as less relevant for persons with SCI in the early post-acute phase and were excluded from the Comprehensive ICF Core Set. However, some participants reported that aspects of work and employment are addressed very early in SCI rehabilitation in their countries and voted for the inclusion of the category *d850 Remunerative employment*. Finally, this category was included with an agreement of 59% among the participants.

Regarding *Environmental Factors* there was a general agreement that the support provided by the family, friends and care providers as well as their attitudes have a considerable impact on the functioning of people with SCI in the early post-acute phase and therefore corresponding ICF categories should be considered in the Core Set.

Table 6 ICF categories included in the Brief ICF Core Set for SCI in the early post-acute context

ICF component	Rank	ICF code	Title
Body Functions	1	b730	Muscle power functions
	2	b620	Urination functions
	3	b525	Defecation functions
	4	b280	Sensation of pain
	5	b440	Respiration functions
	6	b735	Muscle tone functions
	7	b152	Emotional functions
	8	b810	Protective functions of the skin
Body Structures	1	s120	Spinal cord and related structures
	2	s430	Structure of respiratory system
	3	s610	Structure of urinary system
Activities and Participation	1	d420	Transferring oneself
	2	d410	Changing basic body position
	3	d445	Hand and arm use
	4	d530	Toileting
	5	d550	Eating
	6	d450	Walking
	7	d510	Washing oneself
	8	d540	Dressing
	9	d560	Drinking
Environmental Factors	1	e310	Immediate family
	2	e355	Health professionals
	3	e115	Products and technology for personal use in daily living
	4	e120	Products and technology for personal indoor and outdoor mobility and transportation
	5	e340	Personal care providers and personal assistants

Although the relevance and applicability specifically of those categories that are assigned to Chapter 5 *Services, Systems and Policies* may vary across countries and cultures, the participants were able to agree on the most important categories and selected seven categories out of this chapter.

The Brief ICF Core Set includes 25 second-level categories that were selected out of the second-level categories of the Comprehensive ICF Core Set using a two-step ranking procedure and a final cutoff decision. The spectrum and number of ICF categories included in the Brief ICF Core Set seem to fulfill the needs of single health professions who want to get a brief profile of functional problems of a person with SCI. In specific cases when the information provided by categories of the Brief Core Set is not sufficient, additional categories out of the Comprehensive Core Set can be chosen. This method of applying the Brief Core Set can also compensate the loss of presentation of several chapters in the Brief Core Set that is associated with the reduction of the number of categories. Although the chapters of the component *Body Functions* are represented in the Brief Core Set with only one exception, two or more chapters are not included from the remaining components.

It is striking that the component *Activities and Participation* is represented by a considerable number of categories that exclusively pertain to Chapter 4 *Mobility* and Chapter 5 *Self-Care*. During the ranking procedure, it became clear that it was difficult for the participants to put these categories into a rank order because they were missing arguments for, for example, preferring *d550 Eating* to *d560 Drinking*. The idea came up to include these items on the chapter level. The participants who supported this proposal emphasized that other ICF categories with lower rank such as *d465 Moving around using equipment* could be included in this case.

However, other participants pointed out that a judgment on the chapter level would be too unspecific and less useful. Finally, 53% of the participants refused this proposal. As a consequence, *d465 Moving around using equipment* is not included in the Brief Core Set although wheelchair driving may be an important goal of the early post-acute rehabilitation phase.¹⁹

Some more general limitations of the consensus conference should be mentioned. The participants consisted of SCI health professionals of whom two were affected by an SCI. Therefore, a poor representation of consumers could be criticized. Furthermore, the majority of participants came from industrialized countries and as a consequence the perspective of developing countries may not be sufficiently considered in the ICF Core Sets for SCI.

Validation studies will provide further information about the content validity of the ICF Core Sets for SCI. They will also show whether specific subsets of people with SCI, for example those with paraplegia versus tetraplegia or complete versus incomplete lesion will differ. Besides validation, strategies for the implementation of the ICF Core Sets for SCI in clinical practice are currently developed. Using case studies of individuals with SCI, the application of the ICF Core Sets for SCI in rehabilitation practice is presented on website <http://www.ICF-casestudies.org>. In addition, a handbook for users will be developed. Also, content comparisons of the ICF Core Sets proposed in this paper with other ICF Core Sets, such as the ICF Core Sets for stroke, are being performed. Those comparisons will help to describe the content validity of the different Core Sets. Finally, because the ICF Core Sets for SCI define which areas of functioning should be measured but not how they should be measured, an operationalization of the ICF categories included in the

ICF Core Sets for SCI would be useful. The International SCI Data Sets may complement the ICF Core Sets for SCI on this point because they provide specific information about how the relevant information could be assessed.²⁰

In conclusion, a formal consensus process-integrating evidence and expert opinion based on the ICF framework and classification led to the definition of ICF Core Sets for SCI in the early post-acute context. Both the Comprehensive Core Set for multidisciplinary, comprehensive assessment and the Brief Core Set for research and clinical practice are preliminary and need to be tested and validated in the coming years with the ultimate goal of finally defining a universal, valid and accepted tool for clinical practice, clinical studies and health reporting.

Postscript

Professor Haim Ring (Julio Ring), our friend and colleague and author of this paper, died on 15 September 2008. Haim always supported and motivated the process of developing ICF Core Sets. He built bridges among disciplines and health professions. He also brought world regions and countries to work together. We will always be endlessly thankful for having the opportunity of being close to this inspiring spirit.

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Supplementary Information accompanies the paper on the Spinal Cord website (<http://www.nature.com/sc>).