• 专题 •

# Towards the System-wide Implementation of the ICF in Rehabilitation in China

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After the approval of the International Classification of Functioning, Disability and Health (ICF)<sup>[1]</sup> and a worldwide ranging exploration of the use of the ICF in rehabilitation and health services provision in cooperation with WHO and IS-PRM<sup>[2]</sup>, it is now time for a system-wide implementation<sup>[3-7]</sup>.

The approval of the ICF in 2001 can be considered a paradigm shift of the WHO with respect to its main public health goals. The main and foremost goal of the WHO is the prevention of health conditions and the maintenance of life. However, living or living long is not enough. Society must ensure that we can live with a high level of functioning throughout our lifespan and regardless of health conditions. Beyond survival, the second

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major public health goal is therefore optimal functioning and the minimisation of disability. While the main healthcare strategies to achieve a long life are prevention and cure (treatment), the main strategies to achieve optimal functioning are rehabilitation and support<sup>[8-9]</sup>.

Rehabilitation medicine, which can be defined as the medicine of functioning in light of health conditions in consideration of the person and the interaction with the environment [10-11] can now rely on the ICF as a unifying framework [12-14]. Also, with the ICF, health statistics can become more complete and informative. The joint use of the ICF with the ICD to describe the impact of health conditions will enable a much better understanding of the burden (prevalence) and impact (ICF) of health conditions. It can guide the organisation of health systems as well as the provision of effective, adequate and economic health services [15-18].

In China, professionals from rehabilitation and other related areas have paid attention to the development and application of ICF in rehabilitation since 2001 as scholar from China had participated in the development of ICF and ICF Chinese version had been published with other five WHO official languages in 2001. Under the mechanism of WHO-FIC Collaborating Center China, a ICF Research Branch had been developed in Research Institute of Rehabilitation Information, China Rehabilitation Research Center and many progresses had been made in the development and implementation of ICF and ICF-CY in China with the cooperation of scholars from domestic and abroad such as WHO-FIC FDRG, ICF Research Branch in cooperation with the WHO FIC Collaborating Centre DIMDI, Nottwil, Switzerland, OVCI la Nostra Famiglia, Italy, China Association of Rehabilitation Medicine, China Association of Rehabilitation of Disabled Persons, etc. With the effort of ICF Research Branch of WHO-FIC CC China, a reference center of ICF in Chinese with research platform had been established and conducted many international and national research projects on ICF development, translation and standardization, update and maintaining, fieldtesting, professional training, and implementation to disability and rehabilitation. With comprehensive approaches, China had implemented ICF at four levels such as in health and disability

statistics at population level, in planning and outcome evaluation at clinical and service level, in e-health system at administrative and information level, and in social and health policy at policy-making level. There is a good example of implementation of ICF is in 2006, a national sample survey had been administrated and national disability database had been developed using ICF model.

With the development of rehabilitation medicine in China and unmet needs of patients with functioning, the policy-makers and professionals had raised their awenewss of importance of rehabilitation and tried to establish a comprehensive and competitive system of rehabilitation medicine in health and health related system in China. Therefore, ICF is the utmost useful model and ICF-based tools (Core-sets, WHO-DAS [] and other digital tools such as ClamL, ICF based online system of rehabilitation of assessment and management, etc.) can be implemented in the development of rehabilitation related policy, evaluation of unmet needs, rehabilitation planning and management, assessment of outcome and efficiency, and the development of rehabilitation information system.

# ${\bf 1} \ \ {\bf ICF\ Core\ Sets-International\ Standards\ for\ the\ Assessment\ of}$ Functioning

To facilitate the implementation of the ICF, tools for clinical practice have been developed. They include the ICF checklist and the ICF Core Sets [6-7]. ICF Core Sets are extractions of the ICF suitable for a specific health condition or a specific health care situation. The ICF Generic Set includes d450 Walking, d455 Moving around, b780 Sensations related to muscles and movement functions, d410 Changing basic body position, d415 Maintaining a body position, d445 Hand and arm use, d510 Washing oneself, d540 Dressing, b280 Sensation of pain, b140 Attention functions, b144 Memory functions, d710 Basic interpersonal interactions, d910 Community life, b210 Seeing functions, d110 Watching, b130 Energy and drive functions, b134 Sleep functions, b152 Emotional functions, d230 Carrying out daily routine, d850 Remunerative employment and e225 Climate; el10 Products or substances for personal consumption, e120 Products and technology for personal indoor and outdoor mobility and transportation, e320 Friends, e155 Design, construction and building products and technology of buildings for private use, e150 Design, construction and building products and technology of buildings for public use, e310 Immediate family, e450 Individual attitudes of health professionals, e135 Products and technology for employment, e580 Health services, systems and policies, e325 Acquaintances, peers, colleagues, neighbours and community members, e425 Individual attitudes of acquaintances, peers, colleagues, neighbours and community members, e460 Societal attitudes, e540 Transportation services, systems and policies, e455 Individual attitudes of healthrelated professionals, e330 People in positions of authority, e570 Social security services, systems and policies, e590 Labour and employment services, systems and policies, e420 Individual attitudes of friends, e340 Personal care providers and personal assistants, e355 Health professionals, e410 Individual attitudes of immediate family members, e115 Products and technology for personal use in daily living, e360 Other professionals, e440 Individual attitudes of personal care providers and personal assistants, e575 General social support services, systems and policies [15-16]. It allows the description and comparison of functioning along the continuum of care, over the lifespan, across health conditions and health care systems (Table 1: List of ICF categories in the ICF Generic Set). Complementing the ICF Generic Set, specific ICF Core Sets have been developed for the acute, post-acute and long-term context (Table 2: ICF Core Sets) [6-7].

# 2 Methodological Developments — Mapping the ICF to the World of Measurements

Methodological studies have explored how to best measure single ICF categories using information from established clinical tests or patient questionnaires. Towards this goal, methods for quantitative mapping have been developed<sup>[19-20]</sup>. Also, the methods for the qualitative mapping of clinical tests and questionnaires to ICF categories have been updated<sup>[21-22]</sup>. It has also been explored, whether and how it is possible to develop ICF Core Set-based scores across ICF categories<sup>[23-25]</sup>.

These methodological developments allow for the qualitative and quantitative mapping of the world of clinical tests and measurement instruments to the ICF. They allow users with diverse needs to choose or develop their own most suitable operationalization of 1) single ICF categories and 2) scoring algorithms across ICF categories.

### 3 ICF Core Set-based Scores

When developing scores, users may have different perspectives including the micro-level (clinical practice — interventions by professionals), the meso-level (service provision and payment — provided in hospitals and in the community) and the macro-level (policy making — by ministries). (Figure 1).

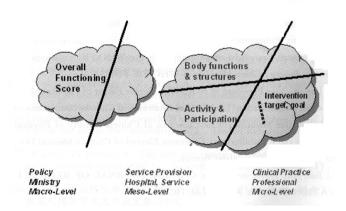


Figure 1: ICF and ICF Core Set-based scoring algorithms suitable for different purposes

On the level of clinical practice (micro-level), the goal is to measure intervention targets and goals relevant for intervention management by health professionals including PRM specialists, physiotherapists, occupational therapists and psychologists. In this situation we need to develop scores which are directly relevant and sensitive to change with respect to the health intervention target, e.g. improving muscle strength (b730: "functions related to the force generated by the contraction of a muscle or muscle groups") related to the intervention goal, e.g. optimal walking function (d450: "moving along a surface on foot, step by step, so that one foot is always on the ground, such as when strolling, sauntering, walking forwards, backwards, or sideways").

On the level of service provision (meso-level), it is preferable to develop scores for the different ICF components including scores for impairments of body functions and structures as well as scores for activity and participation limitations. They allow for example for the planning and management of a multi-disciplinary rehabilitation program within a hospital or community context.

Finally, for policy (macro-level), e.g. for health systems' planning by ministries, the most suitable score aims to broadly cover functioning as a whole and hence to integrate the information across the ICF components body functions and structures as well as activity and participation.

Table 1 List of ICF categories in the ICF Generic Set

	ICF code	Title	ICF code	Title
Mobility	d450	Walking	e320	Friends
	d455	Moving around	e155	Design, construction and building products and technology of buildings for private use
	b780	Sensations related to muscles and movement functions	e150	Design, construction and building products and technology of build- ings for public use
	d410	Changing basic body position	e310	Immediate family
	d415	Maintaining a body position	e450	Individual attitudes of health professionals
	d445	Hand and arm use	e135	Products and technology for employment
Self Care	d510	Washing oneself	e580	Health services, systems and policies
	d540	Dressing	e325	Acquaintances, peers, colleagues, neighbours and community members
Pain and Discomfort	b280	Sensation of pain	e425	Individual attitudes of acquaint- ances, peers, colleagues, neigh- bours and community members
Cognition	b140	Attention functions	e460	Societal attitudes
	b144	Memory functions	e540	Transportation services, systems and policies
Interpersonal Activities	d710	Basic interpersonal interactions	e455	Individual attitudes of health-related professionals
	d910	Community life	e330	People in positions of authority
Vision	b210	Seeing functions	e570	Social security services, systems and policies
	d110	Watching	e590	Labour and employment services, systems and policies
Sleep and Energy	b130	Energy and drive functions	e420	Individual attitudes of friends
	b134	Sleep functions	e340	Personal care providers and personal assistants
Affect	b152	Emotional functions	e355	Health professionals
General tasks and demands	d230	Carrying out daily routine	e410	Individual attitudes of immediate family members
	d850	Remunerative employment	e115	Products and technology for personal use in daily living
Environmental Factors	e225	Climate	e360	Other professionals
	e110	Products or substances for personal consumption	e440	Individual attitudes of personal care providers and personal assistants
	e120	Products and technology for per- sonal indoor and outdoor mobility and transportation	e575	General social support services, systems and policies

# Table 2 List of ICF Core Sets

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	ICF Core Set	Publication		
Acute context	Neurological conditions	Ewert T, Grill E, Bartholomeyczik S, Finger M, Mokrusch T, Kostanjsek N, Stucki G. ICF core set for patients with neurological conditions in the acute hospital. Disabil Rehabil. 2005; 27 (7/8); 367—337		
	Musculoskeletal conditions	Stoll T, Brach M, Huber EO, Scheuringer M, Schwarzkopf SR, Kostanjsek N, Stucki G. ICF core set for patients with musculoskeletal conditions in the acute hospital. Disabil Rehabil. 2005; 27(7/8): 381-387		
	Cardiopulmonary conditions	Boldt C, Grill E, Wildner M, Portenier L, Wilke S, Stucki G, Kostanjsek N, Quittan M. ICF core set for patients with cardiopulmonary conditions in the acute hospital. Disabil Rehabil. 2005; 27(7/8): 375-380		
Early post-acute context	Neurological conditions	Stier-Jarmer M, Grill E, Ewert T, Bartholomeyczik S, Finger M, Mokrusch T, Kostanjsek N, Stucki G. ICF core set for patients with neurological conditions in early post-acute rehabilitation facilities. Disabil Rehabil. 2005; 27(7/8): 389—395		
	Musculoskeletal conditions	Scheuringer M, Stucki G, Huber EO, Brach M, Schwarzkopf SR, Kostanjsek N, Stoll T. ICF core set for patients with musculoskeletal conditions in early post-acute rehabilitation facilities. Disabil Rehabil. 2005; 27(7/8): 405-410		
	Cardiopulmonary conditions	Wildner M, Quittan M, Portenier L, Wilke S, Boldt C, Stucki G, Kostanjsek N, Grill E. ICF core set for patients with cardiopulmonary conditions in early post-acute rehabilitation facilities. Disabil Rehabil. 2005; 27(7/8): 397-404		
	Geriatric patients	Grill E, Hermes R, Swoboda W, Uzarewicz C, Kostanjsek N, Stucki G. ICF core set for geriatric patients in early post-acute rehabilitation facilities. Disabil Rehabil. 2005; $27(7/8)$ : $411-417$		
	Spinal cord injury	Kirchberger I, Cieza A, Biering-Sørensen F, Baumberger M, Charlifue S, Post MW, Campbell R, Kovindha A, Ring H, Sinnott A, Kostanjsek N, Stucki G. ICF core sets for individuals with spinal cord injury in the early post-acute context. Spinal Cord. 2009; 48: 297—304		
Long-term context	Chronic widespread pain	Cieza A, Stucki G, Weigl M, Kullmann L, Stoll T, Kamen L, Kostanjsek N, Walsh N. ICF core sets for chronic widespread pain. J Rehabil Med 2004; 44: 63-68		
	Low back pain	Cieza A, Stucki G, Weigl M, Disler P, Jäckel W, van der Linden S, Kostanjsek N, de Bie R. ICF core sets for low back pain. J Rehabil Med 2004; 44: 69-74		
	Osteoarthritis	Dreinhöfer K, Stucki G, Ewert T, Huber E, Ebenbichler G, Gutenbrunner C, Kostanjsek N, Cieza A. ICF core sets for osteoarthritis. J Rehabil Med 2004; 44:75—80		
	Osteoporosis	Cieza A, Schwarzkopf S, Sigl T, Stucki G, Melvin J, Stoll T, Woolf AD, Kostanjsek, Walsh N. ICF core sets for osteoporosis. J Rehabil Med 2004; 44:81—86		
	Rheumatoid arthritis	Stucki G, Cieza A, Geyh S, Battistella L, Lloyd J, Symmons D, Kostanjsek N, Schouten J. ICF core sets for rheumatoid arthritis. J Rehabil Med 2004; 44:87—93		
	Chronic ischemic heart disease	Cieza A, Stucki A, Geyh S, Barteanu M, Quittan M, Simon A, Kostanjsek N, Stucki G, Walsh N. ICF core sets for chronic ischaemic heart disease. J Rehabil Med 2004; 44: 94-99		
	Diabetes mellitus	Ruof J, Cieza A, Wolff B, Angst F, Ergeletzis D, Omar Z, Kostanjsek N, Stucki G. ICF core sets for diabetes mellitus. J Rehabil Med 2004; 44:100-106		
	Obesity	Stucki A, Daansen P, Fuessl M, Cieza A, Huber E, Atkinson R, Kostanjsek N, Stucki G, Ruof J. ICF core sets for obesity. J Rehabil Med 2004; 44:107-113		
	Obstructive pulmonary diseases	Stucki A, Stoll T, Cieza A, Weigl M, Giardini A, Wever D, Kostanjsek N, Stucki G. ICF core sets for obstructive pulmonary diseases. J Rehabil Med 2004; 44:114-120		
	Depression	Cieza A, Chatterji S, Andersen C, Cantista P, Herceg M, Melvin J, Stucki G, de Bie R. ICF core sets for depression. J Rehabil Med 2004; 44:128—134		
	Breast Cancer	Brach M, Cieza A, Stucki G, Fuessl M, Cole A, Ellerin BE, Fialka-Moser V, Kostanjsek N, Melvin J. ICF core sets for breast cancer. J Rehabil Med 2004; 44:121-127		
	Stroke	Geyh S, Cieza A, Schouten J, Dickson H, Frommelt H, Omar Z, Kostanjsek N, Ring H, Stucki G. ICF core sets for stroke. J Rehabil Med 2004; 44:135-41		
	Ankylosing spondy- litis	Boonen A, Braun J, van der Horst Bruinsma IE, Huang F, Maksymowych W, Kostanjsek N, Cieza A, Stucki G, van der Heijde D. ASAS/WHO ICF core sets for ankylosing spondylitis (AS): how to classify the impact of AS on functioning and health. Ann Rheum Dis. 2010;69 (1):102—107		
	Spinal cord injury	Cieza A, Kirchberger I, Biering-Sørensen F, Baumberger M, Charlifue S, Post MW, Campbell R, Kovindha A, Ring H, Sinnott A, Kostanjsek N, Stucki G. ICF core sets for individuals with spinal cord injury in the long-term context. Spinal Cord. 2010; 48(4): 305-312		
	Systemic lupus erythematosus	Aringer M, Stamm TA, Pisetsky DS, Yarboro CH, Cieza A, Smolen JS, Stucki G. ICF core sets: how to specify impairment and function in systemic lupus erythematosus. Lupus. 2006; 15 (4): 248-253		
	Multiple sclerosis	Kesselring J., Coenen M., Cieza A., Thompson A., Kostanjsek N., Stucki G. Developing the ICF core sets for multiple sclerosis to specify functioning. Multiple Sclerosis. 2008;14(2): 252-4.		

Head and neck canc-Tschiesner U, Rogers S, Dietz A, Yueh B, Cieza A. Development of ICF core sets for head and neck cancer. Head Neck. 2010; 32(2): 210-20 Vieta E, Cieza A, Stucki G, Chatterji S, Nieto M, Sánchez-Moreno J, Jaeger J, Grunze H, Ayuso-Mateos JL. Developing core sets for persons with bipolar disorder based on the interna-Bipolar disorders tional classification of functioning, disability and health. Bipolar Disord. 2007; 9(1-2): 16-Bernabeu M, Laxe S, Lopez R, Stucki G, Ward A, Barnes M, Kostanjsek N, Reed G, Tate R, Traumatic brain in-Whyte L. Zasler N. Cieza A. Developing core sets for persons with traumatic brain injury based on the international classification of functioning, disability, and health. Neurorehabil Neural Reiurv pair. 2009; 23(5): 464-467 Escorpizo R, Ekholm J, Gmünder HP, Cieza A, Kostanisek N, Stucki G. Developing a core set Vocational rehabilito describe functioning in vocational rehabilitation using the international classification of functiotation ning, disability, and health (ICF). J Occup Rehabil. 2010 Jun 1. [Epub ahead of print] Peyrin-Biroulet L, Cieza A, Sandborn WJ, Kostanjsek N, Kamm MA, Hibi T, Lémann M, Inflammatory bowel Stucki G. Colombel JF. Disability in inflammatory bowel diseases: developing ICF core sets for patients with inflammatory bowel diseases based on the international classification of functiodisease ning, disability, and health. Inflamm Bowel Dis. 2010; 16(1): 15-22 Kohler F, Cieza A, Stucki G, Geertzen J, Burger H, Dillon MP, Schiappacasse C, Esquenazi A, Kistenberg RS, Kostanjsek N. Developing core sets for persons following amputation based Amputation on the international classification of functioning, disability and health as a way to specify functioning. Prosthet Orthot Int. 2009; 33(2): 117-129 Danermark B, Cieza A, Gangé JP, Gimigliano F, Granberg S, Hickson L, Kramer SE, McPherson B, Möller C, Russo I, Strömgren JP, Stucki G, Swanepoel D. International classifi-Hearing Loss cation of functioning, disability, and health core sets for hearing loss: a discussion paper and invitation. Int J Audiol. 2010; 49(4): 256-262

#### 4 Educational Materials

The implementation of the ICF and ICF Core Sets requires suitable educational materials. With respect to the ICF, they include the newly-approved WHO ICF web-based training tool (www.icf-research-branch.org). With respect to the ICF Core Sets and ICF-based rehabilitation management they include a case study learning tool (www.icf-casestudies.org). This case study learning tool illustrates the use the ICF in patients with SCI as well as the Rehabilitation Cycle in rehabilitation management [26-27]. Manuals for the ICF Core Sets are currently being developed.

#### 5 System-wide implementation

Considering the current state of the ICF and ICF-based tools and educational materials, it seems timely to now tackle the system-wide implementation of the ICF in the health sector, first focussing on rehabilitation. How to implement the ICF in the rapidly developing Chinese health care system including rehabilitation, has been addressed in a recent summit on rehabilitation medicine held in Beijing from 17—19 September 2010. At this summit, the leaders of rehabilitation in China have closely collaborated with the Ministry of Health and the Beijing Health Bureau. It became clear that the ICF is ready for a system-wide implementation. However, it also became clear that the successful implementation requires a major and concerted effort with standardized approaches and tools such as a effective information system.

It was recognised that "one model may not fit all" in the Chinese health care system. For example, when using the ICF Core Sets, one may consider diverse operationalizations of single ICF categories and scoring algorithms across categories. However, to maintain the advantages of the ICF as a common language, it will be essential to insist on the system-wide reporting of the ICF Generic Set and to provide guidelines on when and

how to apply specific ICF Core Sets. It is also important to identify and provide information on suitable measurement instruments for single ICF categories. There also is a clear need to develop educational materials including manuals. It was also recognized that these activities could and should be complemented by research efforts to continuously improve the ICF Core Sets and related, purpose-tailored operationalizations of ICF categories and measurement instruments (so called "FIM-type scoring algorithms).

### 6 Concerted effort

In this special section of the Chinese Journal of Rehabilitation Theories and Practice, we have compiled a series of articles which can serve as reference materials for the Chinese effort towards a system-wide implementation of the ICF in the health system focusing on rehabilitation. We encourage the readers of the journal to write letters to the Editor and to submit articles on empirical and qualitative studies in the context of the implementation effort,

It is important to note that the Chinese initiative for a system-wide implementation of the ICF can rely on the support of the Functioning and Disability Reference Group (FDRG) of the WHO Family of International Classification Network as well as the International Society of Physical and Rehabilitation Medicine (ISPRM)<sup>[2-3]</sup>. Both organizations encourage and welcome the Chinese initiative and wish that the Chinese effort can serve as a model for other countries in the world who are aiming towards a system-wide implementation of the ICF in rehabilitation.

## 7 Standardized Approaches, Procedures and Tools

In regard to the modern rehabilitation conceptual scheme and rehabilitation practice, it is necessary to consider the standardized approaches and procedures for the rehabilitation professionals with different academic background in different clinical setting with the ICF and its tools. With the standardised approaches and procedures of ICF based assessment and management, rehabilitation professionals can get evidence-based, sound and reliable data for rehabilitation management. It is also possible to compare rehabilitation performances across sectors and among different countries. ICF Core-sets had been standardized and tested in many countries and validated as a useful tools in rehabilitation practices. It expects that Chinese professionals can improve their performances in rehabilitation practices with Translation and Standardization of ICF Core-sets in Chinese, the development of information system of rehabilitation based on ICF Core-sets, and capacity building of professionals.

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