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ICF Case Studies

Translating Interventions into Real-life Gains – a Rehab-Cycle Approach

# SCI and Environmental Accessibility

Case Study 12



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# Preface

Functioning is a central dimension in persons experiencing or likely to experience disability. Accordingly, concepts, classifications and measurements of functioning and health are key to clinical practice, research and teaching. Within this context, the approval of the **International Classification of Functioning, Disability and Health (ICF)** by the World Health Assembly in May 2001 is considered a landmark event.

To illustrate the use of the ICF in rehabilitation practice **Swiss Paraplegic Research (SPF)** together with **Swiss Paraplegic Centre (SPZ)**, one of Europe's leading (acute and rehabilitation) centres for paraplegia and spinal cord injury (SCI), performed a series of case studies. Conducting ICF-based case studies was one approach to address SPF's aim to contribute to optimal functioning, social integration, health and quality of life for persons with SCI through clinical and community-oriented research. The ICF-based case studies project began in October 2006.

In this project, persons of different age groups and gender and who are living with SCI of varying etiology and levels of severity, were accompanied during their rehabilitation at SPZ. The rehabilitation process is then described using the Rehab-Cycle® and the corresponding ICF-based documentation tools. Since persons with SCI are faced with a number of physical, psychological and social challenges, the case studies aimed to cover a broad spectrum of these challenges. With this in mind, each case study highlighted a specific theme of SCI rehabilitation.

A booklet is published for each case study conducted. To better understand the case studies described in these booklets, find below some basic information about SCI, the ICF, ICF Core Sets, the Rehab-Cycle® and the ICF-based documentation tools.

## Spinal Cord Injury (SCI)

Spinal cord injury (SCI) is an injury of the spinal cord that results in a temporary or permanent change in motor, sensory, or autonomic functions of the injured person's body. The spinal cord is divided into four sections which can be further subdivided into individual segments:

- 8 cervical segments (C1 to C8)
- 12 thoracic segments (T1 to T12)
- 5 lumbar segments (L1 to L5)
- 5 sacral segments (S1 to S5)

The damage of the spinal cord is called lesion. Important functions such as mobility (motor functions) or sensation (sensory functions) fail below the lesion. To help determine future rehabilitation and recovery needs, the extent of a SCI in terms of sensory and motor functions is described using the American Spinal Injury Association (ASIA) impairment scale.

## International Classification of Functioning, Disability and Health (ICF)

The ICF is a classification of the **World Health Organization (WHO)** based on the integrative bio-psycho-social model of functioning, disability and health. Functioning and disability reflect the human experience related to the body functions, body structures, and activities and participation. It is viewed in terms of its dynamic interaction with a health condition, personal and environmental factors.

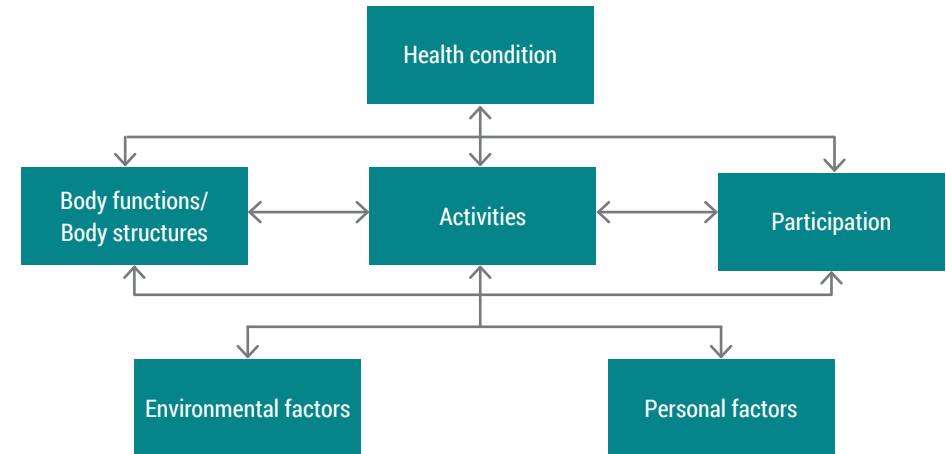


Figure 1: Bio-psycho-social model of functioning, disability and health

The ICF classification corresponds to the components of the model. Within each component, there is an exhaustive list of categories that serve as the units of the classification. ICF categories are denoted by unique alphanumeric codes and are hierarchically organised in chapter, second, third and fourth levels. When going from the chapter level to the fourth level, the category's definition becomes more detailed.

The classification also comprises so-called ICF qualifiers, which quantify the extent of a problem experienced by a person in a specific ICF category. Since environmental factors can also be facilitators, the ICF qualifier for facilitators are indicated with a plus sign.

Generic Scale of ICF Qualifiers	
0	NO problem (none, absent, negligible,...) 0-4%
1	MILD problem (slight, low,...) 5-24%
2	MODERATE problem (medium, fair,...) 25-49%
3	SEVERE problem (high, extreme,...) 50-95%
4	COMPLETE problem (total,...) 96-100%
8	not specified (used when there is insufficient information to quantify the extent of the problem)
9	not applicable (used to indicate when a category does not apply to a particular person)

## ICF Core Sets

To facilitate the use of the ICF in clinical practice, it is essential to have ICF-based tools that could be integrated into the existing processes. The first step toward providing ICF-based tools for clinical practice was the development of ICF Core Sets. ICF Core Sets are shortlists of ICF categories that are considered to be most relevant for describing persons with a specific health condition or in a particular setting. In a rehabilitation setting an ICF Core Set can help guide the rehabilitation management process. ICF Core Sets have been developed for several health conditions e.g. for spinal cord injury, health condition groups e.g. for neurological conditions and for various settings. ICF Core Sets can serve as a basis when using the **ICF-based documentation tools** that follow the **Rehab-Cycle®**.

## Rehab-Cycle® and Corresponding ICF-based Documentation Tools

The Rehab-Cycle® is one approach that reflects the structured processes inherent in multidisciplinary rehabilitation management. The Rehab-Cycle® consists of an assessment phase, assignment phase, intervention phase and evaluation phase. An ICF-based documentation tool has been developed to guide each of the Rehab-Cycle® phases: the ICF Assessment Sheet, the ICF Categorical Profile, ICF Intervention Table and ICF Evaluation Display. These tools can help a multidisciplinary rehabilitation team to better understand the role of functioning within the rehabilitation process and to more comprehensively describe a person's functioning - hence support ICF-based rehabilitation management.

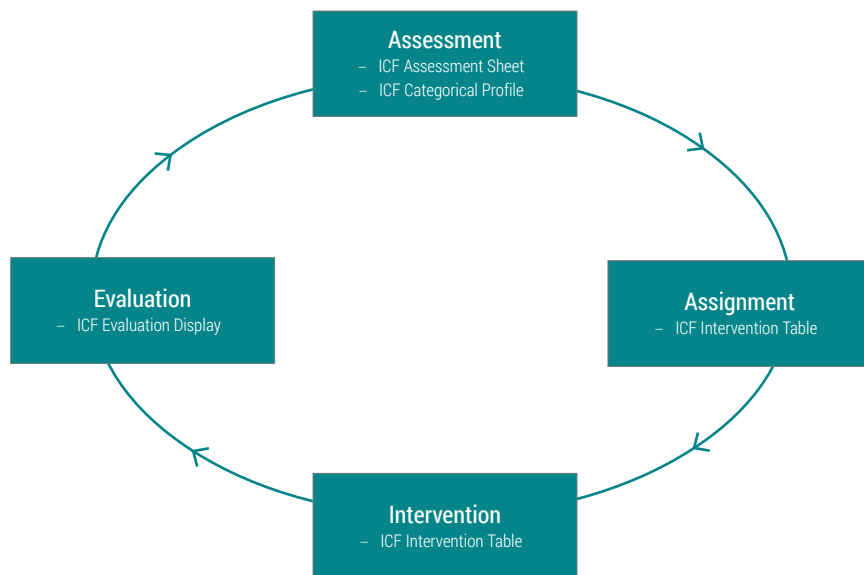


Figure 2: Rehab-Cycle®

You can find more detailed information about SCI, the ICF, ICF Core Sets, the Rehab-Cycle® and the ICF-based documentation tools on the website [www.icf-casestudies.org](http://www.icf-casestudies.org).

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## General Introduction



For persons living with a spinal cord injury (SCI) or other types of physical disabilities, accessibility is key to successful community reintegration and vitally important for overall life satisfaction.

According to article 9 of the United Nations Convention on the Rights for Persons with Disabilities (or “the Convention” from now on), accessibility is defined as enabling “persons with disabilities to live independently and participate fully in all aspects of life...”. In its Preamble, the Convention even describes accessibility as more than just being able to access physical and environmental

space; it extends to the socio-cultural domain: “recognizing the importance of accessibility to the physical, social, economic and cultural environment, to health and education and to information and communication, in enabling persons with disabilities to fully enjoy all human rights and fundamental freedoms.”<sup>1</sup> See box 1.

*“...accessibility is defined as enabling ‘persons with disabilities to live independently and participate fully in all aspects of life’... more than just being able to access physical and environmental space; it extends to the socio-cultural domain...”*

This broad definition of access and accessibility is impacted directly by a person’s degree of mobility, the use of assistive devices, as well as a range of

environmental factors that can pose as facilitators and/or as barriers.

### Box 1 | The Convention

In 1987, a global meeting of experts recommended that the United Nations (UN) General Assembly drafts an international convention for eliminating discrimination of persons with disabilities. The Convention was adopted in 2006, establishing a critical human rights instrument with an “explicit social development dimension.” It regards persons with disabilities as having the right to freely make decisions about their own lives as members of society. It lays out the basic rights of persons with disabilities around the world, emphasising autonomy and self-determination.<sup>1</sup>

As of January 2016, the Convention has been signed by 160 countries and ratified by 161.<sup>2</sup> In signing the Convention countries confirm that they intend to become parties to the

Convention; however, they are not obliged to take further action. Countries that ratify the Convention have a legal obligation to enact specific legislation that ensures persons with disabilities the rights outlined in the Convention.

There is also an optional protocol to the Convention that recognises the Committee on the Rights of Persons with Disabilities to hear individual complaints. This optional protocol was adopted in May 2008.<sup>2</sup>

Although accessibility is a central theme throughout the Convention, article 9 of the Convention outlines specific measures regarding accessibility that would guarantee the rights of persons with disabilities.

### Box 2 | Article 9: Accessibility

To fully appreciate the spirit of article 9 on accessibility, the complete text is provided in verbatim below:<sup>1</sup>

*To enable persons with disabilities to live independently and participate fully in all aspects of life, States Parties shall take appropriate measures to ensure to persons with disabilities access, on an equal basis with others, to the physical environment, to transportation, to information and communications, including information and communications technologies and systems, and to other facilities and*

*services open or provided to the public, both in urban and in rural areas. These measures, which shall include the identification and elimination of obstacles and barriers to accessibility, shall apply to, inter alia:*

1. Buildings, roads, transportation and other indoor and outdoor facilities, including schools, housing, medical facilities and workplaces;
2. Information, communications and other services, including electronic services and emergency services



States Parties shall also take appropriate measures to:

1. Develop, promulgate and monitor the implementation of minimum standards and guidelines for the accessibility of facilities and services open or provided to the public;
2. Ensure that private entities that offer facilities and services which are open or provided to the public take into account all aspects of accessibility for persons with disabilities;
3. Provide training for stakeholders on accessibility issues facing persons with disabilities;
4. Provide in buildings and other facilities open to the public signage in Braille and in easy to read and understand forms;
5. Provide forms of live assistance and intermediaries, including guides, readers and professional sign language interpreters, to facilitate accessibility to buildings and other facilities open to the public;
6. Promote other appropriate forms of assistance and support to

persons with disabilities to ensure their access to information;

7. Promote access for persons with disabilities to new information and communications technologies and systems, including the Internet,
8. Promote the design, development, production and distribution of accessible information and communications technologies and systems at an early stage, so that these technologies and systems become accessible at minimum cost.

In addition to article 9, the Convention highlights accessibility in other ways. Article 21 for example mentions accessible multimedia, information and communication technology, article 27 addresses accessibility as related to work and employment, article 29 and 30 touches upon the role of accessibility in ensuring the right of persons with disabilities to participate in public life (e.g. voting) and in cultural life, recreation and sports (e.g. theatre, tourism, etc.).

## The Convention and Thailand

The Convention was signed by Thailand in March 2007 and ratified in July 2008, establishing an important legal framework with the potential of positively impacting the lives of the approx. 1.9 million Thais living with disabilities.<sup>3</sup> Consequently, the Thai government has undertaken numerous efforts to develop disability policies that aim to improve the quality of life of persons with disabilities, promote anti-discrimination and increase access to social welfare, services and assistive devices. Even before Thailand ratified

the Convention, it adopted the *Persons with Disabilities Empowerment Act of 2007*; it modified existing disability legislation to satisfy the objectives of the Convention.<sup>3,4,5</sup>

In this legislation empowerment is defined as, among other things, “support for full and efficient social participation under accessible and barrier-free environment for persons with disabilities”.<sup>5</sup> This has been elaborated in the several national action plans following the enactment of

the legislation. In the 4th National Plan on the Empowerment of Persons with Disabilities (2012-2016) the government, including local authorities, is obligated “to create and provide accessible and

usable environments, buildings, places and transportations...usable products, equipment, assistive devices and technologies for daily living of persons with disabilities”.<sup>6</sup>

## What Does Accessibility Mean for Persons with SCI?

The degree of accessibility a person with SCI has impacts on his or her participation in daily life and overall ability to reintegrate into the community.<sup>7,8,9</sup> This is especially true for developing countries. For example, a study that examined the accessibility needs of persons with disabilities in developing countries encountered reports from persons with physical disabilities being denied access to public transportation due to structural barriers such as steps and stairs, seating in buses or trains that were ill-suited for persons with physical disabilities, turnstiles and high ticket booths. In addition, unpaved or poorly maintained sidewalks and road surfaces sometimes prevented wheelchair users from leaving their home except for essential trips.<sup>10,11</sup>

Accessibility has also shown to be strongly related to life satisfaction.<sup>12,13</sup> In a large-scale study using data from the United States National Spinal Cord Injury Database (NSCID), Whiteneck et al. found that environmental factors are a major predictor of life satisfaction in persons with SCI, and that barriers in the natural environment (i.e. physical and structural surroundings) and transportation are among the top 5 most problematic

environmental factors faced.<sup>13</sup> Moreover, the 2013 report *International Perspectives on Spinal Cord Injury* published by the World Health Organization (WHO) concludes that “barriers to services and environments restrict participation and undermine quality of life”.<sup>9</sup>

While tremendous efforts have been made to improve accessibility in the past decades, as clearly seen in the example of Thailand,<sup>5,6</sup> there are still many communities in countries all over the world where the physical environment remains inaccessible for persons with SCI.<sup>9,14</sup> This also applies to Thailand, especially in the rural areas.<sup>4</sup>

This case study of Mr. Wun, a young man living with SCI, will illustrate the importance of environmental accessibility for full participation of a person with SCI in Thailand. The case study will describe the rehabilitation of Mr. Wun using the framework of the World Health Organization’s International Classification of Functioning, Disability and Health (ICF)<sup>15</sup> and the Rehab-Cycle® approach. See section “Rehab-Cycle® and corresponding ICF-based documentation tool” on page 6.

## Mr. Wun's Story



Mr. Wun fell asleep while driving without a safety belt, resulting in a serious motor vehicle accident and a spinal cord injury (SCI).

Twenty-two years old at the time of the accident, Mr. Wun underwent emergency surgery to stabilise his spine. Afterwards he was diagnosed with C6 tetraplegia with an American Spinal Injury Association (ASIA) Impairment Scale grade A. This meant that **Mr. Wun had paralysis in the hands, trunk and legs with no motor or sensory functioning from the hip and below.** Mr. Wun remained in the intensive care unit (ICU) for four months, where the medical interventions focused on healing the impairments in his body structures and in improving his body functions. To assist him with respiration after the surgery, a temporary tube was placed through his neck into his trachea (called a "tracheostomy tube"). Unfortunately, this caused difficulties in swallowing ("dysphagia"). Consequently, a second tube (known as a "percutaneous endoscopic gastrostomy tube" or "PEG tube") was placed directly in his stomach for feeding; this minimised his need to swallow.

In Thailand, families of persons with SCI are generally expected to take over much of the person's care soon after his or her condition is stabilised. Thus, Mr. Wun was discharged from the ICU and was brought to his mother's home, where she, a trained nurse, took responsibility for his care and rehabilitation with the assistance of two household servants. Mr. Wun's mother and the housekeepers adapted the house and the surrounding area for wheelchair access.

A physical therapist (PT) treated Mr. Wun three times a week and oversaw the majority of his treatment in the eight months following his return home. During this period, Mr. Wun faced many challenges including poor upper and lower extremity functioning, bladder and bowel incontinence, respiratory impairments, and severe limitations in mobility. Additionally, the fistula (an abnormal tube-like connection between parts of the body) that remained after the removal of

his tracheostomy tube led to difficulties in both speaking and eating.

Mr. Wun quickly discovered that **one of the greatest difficulties that impacted his quality of life was a lack of accessibility.** While his family's financial resources were sufficient to enable major adaptations in both the indoor and outdoor areas of the Wun family property (e.g. installing ramps and making rooms and the bathroom facilities accessible), the world beyond Mr. Wun's home remained out of reach. His wheelchair was heavy and cumbersome, and manoeuvring it outdoors or about town was extremely difficult. High steps, unpaved sidewalks and roads, and inaccessible public transportation are environmental barriers that Mr. Wun had not been able to overcome. Even if transported directly to public areas, it did not take long to find new barriers. For example, wheelchair-accessible public toilets were a rarity.

*"Moving around inside the house is no problem. But I am inside 24 hours a day. My biggest problem is... not being able to get around beyond our property."*

Mr. Wun

One year following his SCI, Mr. Wun was admitted for the first time to a nearby hospital's rehabilitation unit. Here he received a routine evaluation, additional care and follow-up rehabilitation. Mr. Wun remained in the unit for one month of intensive therapy and rehabilitation that included a number of interventions to treat and/or prevent secondary conditions, swallowing training, instalment of a new tracheostomy tube, regular suctioning of secretion in the air passage and treating his "ineffective cough", bladder management, self-care, and mobility training. Having made some minor improvements, Mr. Wun returned home. Four weeks later an unsuccessful attempt was made to close the wound left by the tracheostomy tube that was not healing on its own.

Sixteen months after his injury, Mr. Wun **was re-admitted to the rehabilitation unit of the local hospital to further address his tracheostomy incision, ongoing spasticity and bladder problems, and his continued dependency on others for self-care and mobility.**



## Assessment



To enable appropriate planning of Mr. Wun's second period of rehabilitation, the rehabilitation team had to gain an accurate picture of his functioning.

Gaining a comprehensive picture of functioning is achieved during the assessment phase of the Rehab-Cycle®. In assessing Mr. Wun's functioning the rehabilitation team not only looked at his body functions and related ability to execute activities of daily living e.g. self-care, the multi-disciplinary rehabilitation team also considered Mr. Wun's participation in daily life and in the community, as well as possible contextual factors that facilitated or posed a barrier to improving Mr. Wun's functioning. The assessment results were documented using the **ICF Assessment Sheet**, a comprehensive overview of Mr. Wun's functioning state according to the ICF components of body functions and structures, activities and participation, and environmental and personal factors. See *"Table 1: ICF Assessment Sheet"* on page 28 at the end of this booklet. In addition to summarising the rehabilitation team's assessment results, it also documented information from the perspective of Mr. Wun, including statements he made about his functioning. In general, **Mr. Wun's statements**

**seemed to be consistent with the rehabilitation team's assessment of his functioning.**

Mr. Wun's assessment revealed a list of problems, predominately in body functions and structures, that led to a range of ongoing or potential secondary complications:

- Reduced breathing capacity, impaired cough and reduced movement of lung secretions (with increased risk of pneumonia) due to paralysis of respiratory muscles
- Exposed tracheostomy fistula from the acute phase
- Dysphagia i.e. swallowing difficulties due to the tracheostomy fistula
- Increased risk of both aspiration (fluids entering the lungs) and pneumonia due to the dysphagia
- Ongoing spasticity that resulted in pain, fatigue and sleep problems as well as increased risk of pressure ulcers and infections
- Impaired urination and defecation functions
- Impaired joint mobility and muscle power

Many of these body function problems exacerbated Mr. Wun's mobility difficulties i.e. in transferring, moving around in the wheelchair, and changing basic body positions as well as in self-care e.g. washing himself and toileting.

*"I need assistance to get into and out of the wheelchair...I can't go to the toilet."*

Mr. Wun

Particularly difficult for Mr. Wun to deal with are the limitations related to food and eating, since

he loved cooking and eating. While dysphagia continued to severely limit his ability to swallow food and eat, Mr. Wun's use of a U-cuff, an assistive device worn on the hand to hold items such a fork or spoon, helped to compensate for the paralysis in his hands.

The U-cuff was not the only environmental factor that were seen as facilitators. Other environmental factors that served as supports for Mr. Wun in daily life included his mother and housekeepers, an adapted house, and medication.

*"In the first year after his accident Mr. Wun was completely excluded from community life, because the lack of accessibility in the community prevented him from leaving the confines of his home and property."*

Mr. Wun also experienced some environmental factors as barriers to optimal functioning and to being fully integrated in the community. **Among the most significant is the lack of accessibility in the community.** This impacted not only his mobility, but also his ability to maintain friendships, work and participate in community life. For example, in the first year after his accident

Mr. Wun was completely excluded from community life, because the lack of accessibility in the community prevented him from leaving the confines of his home and property. While the use of the internet and telephone allowed him some degree of connectivity with people outside of his home, this was less than ideal.

*"[My friends and I] still talk over the internet and by phone, but I can't go out with them anymore. This is annoying sometimes. My friends are in Bangkok, and they come only twice a year."*

Mr. Wun

The environmental barriers in the community, especially inaccessible modes of transportation, in addition to his mobility problems also restricted his ability to work outside of the home. He was, however, able to work from home using his computer to do translations for his former employer.

to get around, thus a facilitative environmental factor, it also posed a barrier for Mr. Wun, since it was old and heavy. This was a unique situation in which the environmental factor was both a facilitator and a barrier at the same time.

Overcoming the environmental barriers in the community was difficult, partly due to Mr. Wun's wheelchair. While the wheelchair enabled Mr. Wun

Despite continued problems in functioning and barriers to fully participating in social and community life, Mr. Wun seemed to accept his situation. This was among several personal factors that supported Mr. Wun in finding ways to live as fully

as possible in light of his spinal cord injury. In addition to being able to cope with his situation, he was unconcerned about how others perceived him. Furthermore, the fact that he earned an engineering degree from an Australian university assumedly facilitated the arrangements he made with his former employer regarding the translation work.

With a more comprehensive picture of Mr. Wun's functioning and the different factors that could support or hinder his rehabilitation, Mr. Wun and the rehabilitation team proceeded to the next step in the Rehab-Cycle® assessment phase i.e. goal-setting and determination of intervention targets.

## Goal-setting/Determination of Intervention Targets

With the assessment results in mind, the second part of the Rehab-Cycle® assessment phase involved identifying the goals and targets to achieve with rehabilitation interventions.

The goals and intervention targets for Mr. Wun's rehabilitation were determined by his rehabilitation team with consideration of Mr. Wun's expressed goals and wishes. His rehabilitation team was made up of a physician, nurse, and physical and occupational therapists. Based on the results of the assessment conducted by the rehabilitation team and the statements made by Mr. Wun about his functioning and what he would like to achieve in this Rehab-Cycle®, a global goal, a service-program goal, and three cycle goals were set.

The rehabilitation team defined as a long-term **global goal** the 'prevention of secondary complications'. As a **service-program goal** i.e. the goal to achieve at the end of Mr. Wun's one-month Rehab-Cycle® the rehabilitation team decided to strive for 'increased independence in daily living'. As smaller steps to help meet the service-program goal, the following **cycle goals** were also set:

1. Increased independence in mobility
2. Increased independence in self-care
3. Healing of wound due to tracheostomy

With the exception of cycle goal 1, the rehabilitation team did not set other goals that were directly

related to environmental accessibility, despite being a major issue in Mr. Wun's life. Unfortunately, the possibility of providing interventions to improve environmental accessibility in Mr. Wun's community was limited, especially considering that this particular Rehab-Cycle® was planned to last only one month. Consequently, the interventions provided focused on body functions and activities of daily living.

All of Mr. Wun's goals were documented on the **ICF Categorical Profile**, a visual depiction (as a bar graph) of a person's functioning status at the time of assessment showing the ICF qualifier values for selected ICF categories considered relevant to the person's case. See "Table 2: ICF Categorical Profile" on page 30 at the end of this booklet.

Setting the global, service-program and cycle goals was essential for the subsequent selection of the intervention targets. **Intervention targets** are the ICF categories in the ICF Categorical Profile that correspond to any of the goals set and are intended to be addressed with specific interventions.

## Assignment and Intervention



In the Rehab-Cycle® intervention phase, a range of interventions were undertaken to address the goals set for each of Mr. Wun's intervention targets i.e. the ICF category for which a goal was set and for which interventions were planned.

For each intervention target appropriate interventions were identified and assigned to one or more members of Mr. Wun's multidisciplinary rehabilitation team.

The physical (PT) and occupational (OT) therapists shared the responsibility for addressing mobility-related intervention targets. **While some intervention targets were addressed solely by the PT or solely by the OT, some intervention targets were tackled by both the PT and OT.** For example, the PT conducted muscle endurance training to improve b455 Exercise tolerance functions and b740 Muscle endurance functions, and the OT used therapeutic games and provided Mr. Wun and his mother with training on using assistive devices to improve d440 Fine hand use and d445 Hand and arm use. Both the PT and OT provided strengthening exercises of the upper

extremity to ameliorate b730 Muscle power functions.

**Likewise, the physician and the nurse also shared the responsibility for specific intervention targets** such as b620 Urination functions. While the physician was ultimately responsible for the medication, the nurse took prime responsibility for catheterisation and instructing Mr. Wun and his mother/caregiver on bladder management. These interventions were intended to prevent secondary complications rather than to improve urinary functions.

To address b820 Repair functions of the skin, both the physician and the nurse also performed appropriate wound care to foster optimal healing of the tracheostomy incision. Continued inadequate healing of the tracheostomy incision contributed

to Mr. Wun's swallowing difficulties. While it was hoped that the percutaneous endoscopic gastrostomy (PEG) tube that compensated for Mr. Wun's dysphagia (impairment in swallowing) could be removed, it had to remain as long as the dysphagia persisted. Thus, the nurse, together with the OT, conducted consultation sessions and provided training to Mr. Wun and his mother on using the assistive devices and optimising strategies for eating, drinking and swallowing.

The assignment of the intervention targets to the individual members of Mr. Wun's rehabilitation team and the interventions planned were documented on the **ICF Intervention Table**. See *"Table 3: ICF Intervention Table"* on page 32 at

*the end of this booklet.* This table also displays the first value, i.e. the ICF qualifier that was given for the intervention target as a baseline rating at the initial assessment, the goal value i.e. the ICF qualifier value that was set as the goal to achieve with interventions for each target, and the final value i.e. the ICF qualifier rating given at the re-assessment of Mr. Wun's functioning after intervention.

The ICF Intervention Table can facilitate rehabilitation management, specifically in planning and implementing the appropriate interventions for each intervention target. Having such an overview can help avoid gaps and redundancy in service provision.

*"The ICF Intervention Table can facilitate rehabilitation management...such an overview can help avoid gaps and redundancy in service provision."*

Toward the end of Mr. Wun's one-month Rehab-Cycle® the rehabilitation team again assessed Mr. Wun's status in the intervention targets that were addressed during the intervention phase. This

final assessment of Mr. Wun's functioning took place during the evaluation phase of the Rehab-Cycle®.

## Evaluation



Although the re-assessment of Mr. Wun's functioning status at the end of the Rehab-Cycle® revealed only modest improvements, the goals related to the prevention of secondary complications and to mobility were achieved.

The rehabilitation team considered cycle goal 1 (increased independence in mobility) as achieved. Cycle goal 1 was reached despite not meeting the ICF qualifier values set as goals for b710 Mobility of joint functions, d410 Changing basic body

positions and b420 Transferring oneself, since Mr. Wun's functioning in these mobility-related targets were maintained, and the goals for the other mobility-related intervention targets were achieved.

*"Maintaining a sitting position improved due to the movement reaction training."*

*Mr. Wun's Physical Therapist (PT)*

*"...he can perform compensation techniques for holding objects like...a glass or mobile phone...He is able to write using a hand-stick and U-cuff...although he has limitations in mobility and transportation, he continues to work on the computer. This means he has an income."*

*Mr. Wun's Occupational Therapist (OT)*

Unfortunately, the problem of sub-optimal healing of the tracheostomy incision remained at the end of this Rehab-Cycle®. After consulting with an ear-nose-throat physician, it was decided that surgical closure of the tracheostoma was necessary to alleviate the problem.

Other body function issues like urination functions remained completely impaired. Nevertheless no further complications, like urinary tract infections or bowel impactions, arose. This in itself was positive, since preventing secondary complications was the main target of the rehabilitation interventions.

With regard to Mr. Wun's spasticity, the medication treatment with Baclofen and Diazepam was modified, and the spasticity decreased.

The results of the re-assessment/re-evaluation were documented on the **ICF Evaluation Display**, a visual depiction of the change between Mr. Wun's functioning status (as represented by the intervention targets) before and after intervention, showing whether the goal value set for each intervention target was reached. See "Table 4: ICF Evaluation Display" on page 34 at the end

*of this booklet.* It is important to note that the change shown on the ICF Evaluation Display only indicates that there has been a change, but not whether the change resulted from the interventions provided.

In spite of Mr. Wun's increased independence in mobility, the efforts made by him and his rehabilitation team during this Rehab-Cycle® was only able to minimally compensate for the environmental barriers that Mr. Wun faced in his community.

*"Despite his improvements in mobility, Mr. Wun will continue to have problems with accessibility in his community due to the existing environmental barriers. Unfortunately, we can't do much about this – even an expensive electric wheelchair is not going to overcome them."*

*Mr. Wun's PT*



## Discussion



Accessibility is a broad term encompassing many elements, including physical, socio-cultural and technological aspects. This case study of Mr. Wun highlighted how difficult it is to overcome environmental inaccessibility, despite rehabilitation efforts to increase a person's independence in mobility.

In Mr. Wun's case, the two periods of rehabilitation in a local hospital as well as the measures taken at home, i.e. architectural adaptations to home and property, use of the computer to maintain contact with friends and others in the community and to work doing translations, were unable to substantially compensate for the environmental inaccessibility Mr. Wun experienced in the community. Poor road and sidewalk conditions, physical barriers, wheelchair-inaccessible

public transportation are some of the common external environmental factors that presented barriers for him. In fact, the issue of environmental accessibility in the community, although vital for Mr. Wun's community integration, was minimally addressed in the 17 months following his spinal cord injury (SCI). Addressing the issue of environmental accessibility in the community was beyond the scope of rehabilitation, and required public policy changes.

### Public Policy That May Have Made a Difference for Mr. Wun

Even though national legislation that meets the mandates outlined in the United Nations Convention on the Rights for Persons with Disabilities (or "the Convention")<sup>1</sup> already existed in Thailand at the time this case study of Mr. Wun was conducted, accessing the world beyond his home

was still largely out of reach. The legislation, the Persons with Disability Empowerment Act of 2007, was new at the time. Since then, several national action plans have been adopted, most recently the 4th National Plan on the Empowerment of Persons with Disabilities (2012-2016).<sup>3,4,5,6</sup> Policy

changes have also taken place; however translating these policies into concrete improvements seems to be "easier said than done".<sup>4</sup>

*"Policy changes have also taken place; however translating these policies into concrete improvements seems to be 'easier said than done'"*

The adoption of laws and policies to ensure "accessibility to physical, social, economic and cultural environments"<sup>1</sup>, demonstrates Thailand's political will in supporting the rights of persons with disability. While laws and policies offer an important starting point, effective strategies and the necessary resources for translation into improved accessibility for persons with SCI and other disabilities is still greatly needed. Considering existing guidelines and best practices is

also essential. An example of existing guidelines for improving access is provided in box 3 (on page 24).

In summary, while rehabilitation can optimise the functioning of a person with SCI in terms of the body functions and structures, extend the range of activities the person can do, provide the person with assistive devices and corresponding training, or even adapt the person's home, if the efforts to improve the person's lived experience does not extend to also fostering environmental accessibility in the community, the person's full participation and integration in the community is compromised. Mr. Wun's case clearly illustrates this.

Mr. Wun's case also highlights the potential of the Convention<sup>1</sup> and international standards like the International Classification of Functioning, Disability and Health (ICF)<sup>15</sup> for tackling the environmental accessibility challenges that are faced by persons with SCI and other disabilities all over the world.

### Box 3 | An Example of Guidelines for Improving Access – Walkways and Wheelchairs

#### A. Walkways<sup>16</sup>

The following guidelines are an example (in verbatim) of standards published by the European Conference of Ministers of Transport in 2006 to ensure pavements and pathways are accessible for pedestrians and wheelchair users.

- A minimum obstacle free footway at least 1500 mm wide - preferably 2000 mm.
- Widths should be greater at bus stops (minimum 3000 mm) and in front of shops (3500 mm or more).
- If possible gradients should be not more than 5% (1 in 20) to cater for self-propelled wheelchairs: this should be used as a design limit in new development. The Swedish Association of Local Authorities 2 noted that a gradient of 2.5% (1 in 40) can be managed by the majority of people, but gradients steeper than this begin to cause difficulties for some manual wheelchair users.
- Where gradients are unavoidably steeper than this, level areas (preferably 1500 to 1800 mm long) should be incorporated at intervals of 10 m.
- Crossfalls, which are needed to make sure rain water drains away quickly, should be between 1.5 and 2.5% (1 in 40). Anything steeper than 2.5% makes it difficult for a wheelchair user to steer in a straight line.
- Where there is a drop or steep slope at the rear side of a footway (or both sides of a footpath) a 100 mm edging upstand should be provided as a safeguard for wheelchair users and as a tapping rail for long cane users.
- Surfaces should be non-slip, well maintained and any joints between paving slabs should be closed and flush to avoid catching the small wheels of a wheelchair.
- Covers and gratings should be non-slip and flush with the pavement surface.
- Nothing should overhang the footway (signs, tree branches, etc.) to a height of less than 2100 mm (preferably 2500 mm).
- Where it is not possible to avoid having obstacles in the pavement, such as lamp-posts, traffic signs, etc. they should have a contrasting band of colour 140 mm to 160 mm wide with the lower edge 1500 to 1700 mm above ground level. Trees in the footway should have a distinctive surface around them (for example grating or pebbled) to warn blind people.
- Seating should be provided at regular intervals of around 100 m.
- In parts of Europe, particularly in the north and Scandinavia, keeping footways clear of snow and ice is very important.

#### B. Wheelchairs<sup>17,18</sup>

For most persons living with SCI, the wheelchair is an indispensable device for increasing mobility. A wheelchair can do much to increase accessibility, independence, participation and social integration. The Convention obligates countries who have ratified it to "take effective measures to ensure personal mobility with the greatest possible independence for persons with disabilities."<sup>1</sup> In other words, persons with disabilities have the right to mobility aiding devices including wheelchairs. Wheelchairs must be appropriate, meaning they:

- Meet the user's needs and environmental conditions
- Provide a proper fit and postural support
- Are safe and durable
- Are available
- Are affordable and can be maintained in the country

In many cases persons with disabilities in low-income countries cannot afford wheelchairs or the ideal type of wheelchair, and funding sources must be mobilised through government funding, donors and wheelchair funds. In addition, inaccessible environment, lack of training and rehabilitation, and poor choice of wheelchair pose a barrier to mobility. It is therefore important that policies for providing wheelchairs address issues of design, production, supply, service delivery, training and financing.



## Annex

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- *Table 1: ICF Assessment Sheet*
- *Table 2: ICF Categorical Profile*
- *Table 3: ICF Intervention Table*
- *Table 4: ICF Evaluation Display*
- *Literature*
- *Questions*

Table 1: ICF Assessment Sheet

ICF Assessment Sheet			
<p><b>Health Professional Perspective</b></p>	<p><b>Body Functions &amp; Structures</b></p> <ul style="list-style-type: none"> <li>- Decreased respiratory muscle functions with secretion in both lungs – moderately impaired</li> <li>- Depth of respiration – moderately impaired</li> <li>- Coughing – moderately impaired</li> <li>- Swallowing solid food – severely impaired</li> <li>- Defecation functions – completely impaired</li> <li>- Urination functions – completely impaired</li> <li>- Mobility of joint functions in ankles – mildly impaired</li> <li>- Muscle power functions – severely impaired</li> <li>- Muscle tone functions with increased spasticity mainly in hip flexors and plantar flexors – severely impaired</li> <li>- Muscle endurance functions – moderately impaired</li> <li>- Delayed repair functions of the skin at the tracheostomy area – moderately impaired</li> </ul>	<p><b>Activities &amp; Participation</b></p>	<ul style="list-style-type: none"> <li>- It's hard to sit up on my own</li> <li>- I need assistance to get into and out of the wheelchair</li> <li>- I can move around in the wheelchair a short distance</li> <li>- I need an assistive device for typing</li> <li>- I am able to brush my teeth and put lotion on my face</li> <li>- I can't go to the toilet</li> <li>- I am able to take off pants but can't put on a shirt</li> <li>- I can't eat nor drink normally</li> <li>- I can't go out – I have to stay at home 24 hours a day; this is sometimes annoying</li> <li>- I communicate with others by talking over the phone or on the internet</li> <li>- My friends visit me about twice a year</li> <li>- I like watching cooking programmes</li> <li>- I can't work in the fields, but I started working at home doing translations with use of the computer</li> </ul>
<p><b>Patient Perspective</b></p>	<ul style="list-style-type: none"> <li>- I have problems with sleeping because of the spasticity</li> <li>- My emotions are a problem, but I take it as it is</li> <li>- I can feel just parts of my arms but nothing in my legs</li> <li>- My legs don't work</li> <li>- Parts of my arms and fingers don't work</li> <li>- I have spasticity in my legs and my whole body</li> <li>- I have breathing problems when I have a lot of secretion</li> <li>- Coughing is difficult due to the hole from the tracheostomy</li> <li>- I have an appetite, but I have problems with swallowing</li> <li>- My bladder does not work</li> <li>- I can't sense when I need to go to the toilet</li> <li>- I have sensitive skin</li> </ul>		
			<ul style="list-style-type: none"> <li>- Severe limitations in changing body positions; only able to change position from side to side</li> <li>- Severe limitations in hand and arm use despite using U-cuff</li> <li>- Severe limitations in moving around using the wheelchair – only for less than 50 meters and only on a flat surface</li> <li>- Severe limitations in washing himself</li> <li>- Severe limitations in caring for his body parts</li> <li>- Complete limitations in toileting</li> <li>- Severe limitations in dressing</li> <li>- Severe limitations in eating and drinking</li> <li>- Moderate restrictions with regards to employment</li> <li>- Complete restrictions with regards to community life</li> </ul>
			<p><b>Personal Factors</b></p> <ul style="list-style-type: none"> <li>- Male, 24 years old</li> <li>- Lives with his mother</li> <li>- Studied engineering in Australia</li> <li>- Thinking about studying law</li> <li>- Doesn't care how other people look at him</li> <li>- Is very relaxed</li> <li>- Accepts his situation</li> </ul>
			<p><b>Environmental Factors</b></p> <ul style="list-style-type: none"> <li>- Medication</li> <li>- Assistive devices: U-cuff for hand and arm use, percutaneous endoscopic gastrostomy (PEG) tube to compensate for swallowing problems, sustained maximal inspiration device (SMI) for breathing</li> <li>- Very heavy manual wheelchair</li> <li>- Living in wheelchair-adapted house</li> <li>- Public surroundings not suitable for persons with disability</li> <li>- Support provided by mother and two housekeepers</li> </ul>

Table 2: ICF Categorical Profile

ICF Categorical Profile											
Assessment											
ICF categories	ICF Qualifier					Goal Relation	Goal value				
	0	1	2	3	4						
Global Goal: Prevention of secondary complications							0				
Service-Program Goal: Increased independence in daily living							2				
Cycle goal 1: Increased independence in mobility							2				
Cycle goal 2: Increased independence in self-care							2				
Cycle goal 3: Healing of wound due to tracheostomy							0				
ICF categories	ICF Qualifier					Goal Relation	Goal value				
	problem										
	0	1	2	3	4						
b4402							2				
b450						G	2				
b455						G	2				
b5105						1	1				
b620						2	2				
b710						G	4				
b730						1	0				
b735						1	2				
b740						1	1				
b755						1	2				
b810						G	0				
b820						3	0				
s810						3	0				
d410						1	2				
d415						1	2				
d420						1	3				
d440						1,2	2				
d445						1,2	2				
d465						1	2				
d510						2	3				
d520						2	2				
d550						2	2				
d560						2	2				
	facilitator					barrier					
	4+	3+	2+	1+	0	1	2	3	4		
e1151										1,2	3+
e310										SP2	4+
e340										SP2	4+
pf										G	4+

Table 2: ICF Categorical Profile; ICF Qualifier: rate the extent of problems (0 = no problem to 4 = complete problem) in the components of body functions (b), body structures (s), activities and participation (d) and the extent of positive (+) or negative impact of environmental (e) and personal factors (pf); Goal Relation: 1, 2, 3 refers to Cycle goal 1, 2, 3; SP refers to Service-Program Goal; G refers to the Global Goal; Goal value refers to the ICF-qualifier to achieve after an intervention. Note: This table only displays an excerpt of the ICF Categorical Profile; only the categories that are associated with a goal and for which a goal value has been identified (i.e. intervention targets) are shown.

Table 3: ICF Intervention Table

ICF Intervention Table									
	Intervention target	Intervention	Doc	Nurse	PT	OT	First value	Goal value	Final value
Body functions/structures	b4402	Depth of respiration	Breathing exercise, Sustained maximal inspiration device (SMI)	x			2	2	2
	b450	Additional respiratory functions (Coughing)	Assisted coughing		x		3	2	3
	b455	Exercise tolerance functions	Muscle endurance training		x		2	1	1
	b5105	Swallowing	Swallowing training			x	3	2	3
	b620	Urination functions	Urine analysis, U/C, BUN, Creatinine Urine culture, Cystometry, Medication (Ofloxacin), Plan ID or clean intermittent instruction of patient and caregiver(s) on bladder management	x	x		4	4	4
	b710	Mobility of joint functions	Stretching, Passive movement, Training to use ankle-foot-orthosis Therapeutic standing using tilt table		x	x	1	0	1
	b730	Muscle power functions	Strengthening exercises of upper extremity		x	x	3	2	2
	b735	Muscle tone functions	Medication Stretching, Passive movement	x			3	1	1
	b740	Muscle endurance functions	Muscle endurance training		x		2	1	1
	b755	Involuntary movement reaction functions	Movement reaction training while sitting		x	x	3	2	2
	b810	Protective functions of the skin	Instruction of patient and caregiver(s)	x	x	x	0	0	0
	b820	Repair functions of the skin	Wound dressing	x	x		2	0	2
	s810	Structure of areas of skin	Daily control of the skin		x		2	0	2
	d410	Changing basic body positions	Training on changing body positions (specifically from side to side)		x	x	3	2	3
Activities / Participation	d415	Maintaining a sitting position	Body balance training, Movement reaction training		x	x	3	2	2
	d420	Transferring oneself	Transfer training		x	x	4	3	4
	d440	Fine hand use	Therapeutic games			x	3	2	2
	d445	Hand and arm use	Training to use assistive devices, therapeutic games			x	3	2	2
	d465	Moving around using equipment	Wheelchair training		x		3	2	2
	d510	Washing oneself	Self-care activity training, instruction of family/ caregiver(s)		x		3	3	3
	d520	Caring for body parts	Self-care activity training, instruction of family/ caregiver(s)	x			3	2	3
	d550	Eating	Self-care activity training, Training to use assistive device		x		3	2	2
	d560	Drinking	Self-care activity training, Training to use assistive device		x		3	2	2
	e1151	Assistive products and technology for personal use in daily living	Control of devices for hand use (U-cuff), Model ankle-foot orthosis			x	2+	3+	3+
Environmental factors	e310	Immediate Family	Instruction and consultation	x	x	x	4+	4+	4+
	e340	Personal care providers and personal assistants	Instruction and consultation		x	x	4+	4+	4+
	pf	Knowledge about spinal cord injury	Education about spinal cord injury to prevent complications	x	x	x	2	4+	4+

**Table 3:** ICF Intervention Table; Doc = Physician; PT = Physical Therapist; OT = Occupational Therapist. The first value refers to the rating at the initial assessment; the goal value refers to the rating that should be achieved after the intervention, and the final value refers to the actual rating at the second/final assessment or evaluation. ICF qualifiers were used to determine these ratings (0 = no problem to 4 = complete problem) in the intervention targets. For the intervention targets representing the environmental and personal factors, the plus sign next to the value indicates a facilitator.

**Table 4: ICF Evaluation Display**

		ICF Evaluation Display																	
		Assessment						Evaluation											
		ICF Qualifier						ICF Qualifier											
Global Goal: Prevention of secondary complications		0						0						+					
Service-Program Goal: increased independence in daily living		2						2						-					
Cycle goal 1: Increased independence in mobility		2						2						+					
Cycle goal 2: Increased independence in self-care		2						2						-					
Cycle goal 3: Healing of wound due to tracheostomy		0						0						-					
ICF categories		ICF Qualifier						ICF Qualifier						Goal achievement					
		problem						problem											
		0	1	2	3	4	0	1	2	3	4								
b4402	Depth of respiration	G						2						+					
b450	Additional respiratory functions (coughing)	G						2						-					
b455	Exercise tolerance functions	1						1						+					
b5105	Swallowing	2						2						-					
b620	Urination functions	G						4						+					
b710	Mobility of joint functions	1						0						-					
b730	Muscle power functions	1						2						+					
b735	Muscle tone functions	1						1						+					
b740	Muscle endurance functions	1						1						+					
b755	Involuntary movement reaction functions	1						2						+					
b810	Protective functions of the skin	G						0						+					
b820	Repair functions of the skin	3						0						-					
s810	Structures of areas of the skin	3						0						-					
d410	Changing basic body positions	1						2						-					
d415	Maintaining a body position	1						2						+					
d420	Transferring oneself	1						3						-					
d440	Fine hand use	1,2						2						+					
d445	Hand and arm use	1,2						2						+					
d465	Moving around using equipment	1						2						+					
d510	Washing oneself	2						3						+					
d520	Caring for body parts	2						2						-					
d550	Eating	2						2						+					
d560	Drinking	2						2						+					
		facilitator						facilitator											
		4+	3+	2+	1+	0	1	2	3	4	4+	3+	2+	1+	0	1	2	3	4
e1151	Assistive products...for personal use in daily living	1,2						3+						+					
e310	Immediate family	SP2						4+						+					
e340	Personal care providers and personal assistants	SP2						4+						+					
pf	Knowledge about spinal cord injury	G						4+						+					

*Table 4: ICF Evaluation Display; ICF Qualifier: rate the extent of problems (0 = no problem to 4 = complete problem) in the components of body functions (b), body structures (s), activities and participation (d) and the extent of positive (+) or negative impact of environmental (e) and personal factors (pf); Goal Relation: 1, 2, 3 refers to Cycle goal 1, 2, 3, SP refers to Service-Program Goal, G refers to the Global Goal, Goal value refers to the ICF qualifier to achieve after an intervention; Goal achievement: + means achieved, - means not achieved*

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### Questions

- Q1. Which articles in the United Nations (UN) Convention on the Rights for Persons with Disabilities address accessibility? *(Refer to page 9 for the answer.)*
- Q2. Why was environmental accessibility important to Mr. Wun? *(Refer to page 15 for the answer.)*
- Q3. What types of environmental barriers were faced by Mr. Wun? *(Refer to page 13 for the answer.)*
- Q4. Name at least three measures outlined in 'Article 9: Accessibility' of the UN Convention on the Rights of Persons with Disabilities that could apply to Mr. Wun's case. *(Refer to page 9 for the answer.)*
- Q5. What has Thailand done to move toward ensuring environmental accessibility for persons with disabilities? *(Refer to page 22 for the answer.)*



ICF Case Studies Website  
[www.icf-casestudies.org](http://www.icf-casestudies.org)



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