3 OUTCOME MEASURES, OUTCOME MODELS AND PATIENT CLASSIFICATION SYSTEMS

3.1 INTRODUCTION

This chapter contains a translation of the conceptual definition of musculoskeletal and neurological rehabilitation into practice. The principal goal is to have tools available to support decisions to the four main questions:

- What? → Individual and Outcome
- How? → Methods
- Who? → Professionals
- Where? → Organisation and Infrastructure

Outcome measures are necessary to explore individuals’ needs and capabilities and are essential to assign an individual to an appropriate rehabilitation programme (What?). By one outcome measure only a limited set of outcomes is measured. To have an integrated view on the patients’ needs, preferences and capabilities a compilation of all possible outcomes into an outcome model such as the International Classification of Functioning, Disability and Health (ICF) is essential.

To structure inflow of individuals (What?) and determine the type and intensity of required interventions (How?), the professionals to be involved (Who?) and the preferred organisation (Where?), a patient classification system is required. Patient classification systems (PCS) should contain groups of individuals, homogeneous related to outcome and required resources. Such a PCS can serve as a patient selection and referral tool, a framework for selection of therapy as well as for a financing system. In existing patient classification systems individuals are homogeneously grouped related to resource consumption (length of stay (LOS)) but they can not serve for patient referral purposes because they lack sufficient information for clinical decision making.

The final outcome of the rehabilitation process is the main quality criterion. Accreditation requirements for professionals and services are necessary in creating the possibility to deliver services of high quality.

This chapter describes internationally used tools or tools that are applied to a large population. Internationally applied tools make it possible to compare the Belgian situation with the situation in other countries by use of common parameters. If relevant, these tools will be proposed for each selected pathology (Spinal Cord Injury, Lower Extremity Amputation, Stroke, Multiple Sclerosis and Total Hip Replacement). Outcome measures can differ for different pathologies. For the purpose of this study though, one PCS for all musculoskeletal and neurological rehabilitation indication is preferable.

3.2 OUTCOME MEASURES

3.2.1 Introduction

Outcome measures inform about individuals’ needs, preferences and capabilities at the start and the end of the rehabilitation process. In daily practice, the results of outcome measures are used to orient health care professionals towards an appropriate type and intensity of therapy. Each outcome measure covers a limited set of outcomes. A compilation of several outcome measures is often required to have enough information for a tailored therapy. Some outcome measures serve in a patient classification system as a relative parameter for allocation of resources (e.g.: Functional Independence Measure (FIM), Barthel Index (BI)).

A search on outcome measures was performed on Pubmed with the algorithm "Outcome Assessment (Health Care)"[MeSH] AND "Rehabilitation"[MeSH] published later than 1999 and delivered 4780 results. A search on Google with the keywords “the use of outcome
measures in rehabilitation” delivered a link to the Pro-Esor study “The use of outcome measures in physical medicine and rehabilitation in Europe”. The aim of the study was to survey the use of outcome measures in rehabilitation within Europe. The survey focused on nine diagnostic groups: hip and knee replacement, low back pain, lower limb amputees, multiple sclerosis, neuromuscular disorders, rheumatoid arthritis, spinal cord lesions, stroke and traumatic brain injury. It identified a relatively small number of dominant outcome assessments for each diagnostic group and some variation in the preference for measures across regions. The five diagnostic groups selected for this project were included although the described methodology can be extended to other pathologies. A comparable study was performed in Australia “Outcome measurement in Australian rehabilitation environment”. For this study the original survey questionnaire of the Pro-Esor study was used. Three of the five diagnostic groups selected for our project were included.

3.2.2 Outcome measures used in rehabilitation

The results of the Pro-Esor Study and the Australian study for the 5 selected pathologies are included (See Appendix to chapter 3). For each pathology the most frequently applied outcome measures are listed based respectively on a survey of 418 rehabilitation centres across Europe and 440 across Australia.

3.2.3 Discussion

An outcome measure supports by preference clinical decision making as well as resource allocation. This outcome measure must be applicable for most diagnostic groups and must be useful to groups of individuals needing comparable resources.

FIM is the only instrument used for outcome measurement in each diagnostic group. Barthel Index is used in nearly each diagnostic group. In literature both outcome measures are considered as competing instruments. Appropriateness and responsiveness of outcome measures such as FIM and BI requires an extensive search of the literature.

FIM and BI are tools measuring level of dependence related to activities of daily living. The results of this measurement can be used to estimate workload. But neither FIM nor Barthel Index measure rehabilitation needs. Nevertheless, they are currently used to classify patients into homogeneous groups related to resource consumption during rehabilitation (LOS).

3.3 OUTCOME MODELS

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

For this project, the concept of an outcome model is used. Several interpretations of this term exist. Within the framework of this project an ‘outcome model’ is considered as a structured compilation of all possible outcomes as a consequence of a health condition.

An outcome model is required to identify individuals with different types of disabilities or to examine the effect of interventions. One common classification system for clinical decision making as well as resource allocation could not be found in literature. The reason might be that clinical relevant outcomes can differ from one health condition to another and thus give rise to many subgroups. Within a payment model, subgroups need to be limited, otherwise the model becomes impractical.

ICF is an ‘outcome model’. The project team as well as the expert panel agreed on the use of this model because it is a member of the WHO Family of international classifications and it is internationally considered as the most complete set of possible outcomes as a consequence of a health condition. The WHO worked previously with the International Classification of Impairments, disabilities and handicaps (ICIDH) (= the model preceding ICF), a model proposed by Saad Nagi from the Institute of Medicine and the National Advisory Board on Medical Rehabilitation Research model.

http://www.cdc.gov/nchs/about/otheract/icd9/icfhome.htm
For information on the ICF, the website of the WHO \(^5\), the website of the International Classification of Functioning, disability and health \(^6\), and the website of ICF Research Branch, WHO FIC Collaborating Center (DIMDI), Institute for Health and Rehabilitation Sciences, Ludwig-Maximilian University in Munich \(^6\), were consulted. Publications of Prof. Gerold Stucki, MD, MS, director of the ICF Research Branch of the WHO, were searched on Pubmed. Opinions about the use of the ICF were collected by expert contacts. Expert selection was based on references mentioned in publications or on references of contacted experts.

The International Classification of Functioning, Disability and Health is the result of the revision of the ICIDH. ICF is endorsed by the World Health Assembly as a member of the WHO Family of International Classifications in 2001. It is the generally accepted framework to describe functioning in rehabilitation.

The joint use of ICF and the International Classification of Diseases ICD-10, needs to be addressed when applying the ICF to rehabilitation medicine. WHO considers the ICF and the ICD-10 to be distinct but complementary classifications.

ICF is structured around the following broad components (Figure 3.1):

**Figure 3.1: ICF model**

![ICF 2001 Interaction of Concepts](image)

Functioning and disability are viewed as a complex interaction between the health condition of the individual and the contextual factors (environmental and personal). The picture produced by this combination of factors and dimensions is of "the person in his or her world". Within ICF these dimensions are considered as interactive and dynamic rather than linear or static. It allows an assessment of the degree of disability, although it is not a measurement instrument. It rather defines "what to measure". ICF can contribute to the integration of the results of different outcome measures.

ICF must be compatible with these measures. Items of assessment instruments used in rehabilitation should be linked to ICF domains. ICF linking rules \(^9\) are being developed to link technical and clinical measures, health-status measures and interventions to ICF. It will be essential to know how scores from a specific assessment instrument can be mapped to the scores used in the ICF. ICF scores represent ‘performance’ in real life or ‘capacity’ (with or without assistance), typically in a rehabilitation test situation. However, the most widely used instruments in acute and sub-acute rehabilitation, including FIM, measure

\(^5\) [http://www.who.int/classifications/icf/en/](http://www.who.int/classifications/icf/en/)
\(^6\) [http://www3.who.int/icf/icftemplate.cfm](http://www3.who.int/icf/icftemplate.cfm)
\(^6\) [http://www.icf-research-branch.org/aboutus/history.htm](http://www.icf-research-branch.org/aboutus/history.htm)
assistance. It will be a challenge to link the grading of assistance related to performance and capacity.

Core sets per pathology will improve applicability because ICF covers hundreds of different outcomes. It is not possible to score every individual related to all outcomes. Condition specific core-sets can be defined as a selection of ICF domains including the least number of domains but as many as required to be sufficiently comprehensive to cover the prototypical spectrum of limitations in functioning and health encountered in a specific condition. Scientifically based condition-specific core-sets are currently being developed in a collaborative project of the University of Munich with the Classification, Assessment, Surveys and Terminology Group (CAS) of WHO. Core-sets are yet validated for several health conditions such as rheumatoid arthritis, osteoarthritis, stroke, chronic pain and osteoporosis.

ICF success depends on its compatibility with measures used in rehabilitation and on the improvement of its applicability. It is expected to see the development of ICF, based on versions of currently used measurements, and on the development of ICF core sets. By several experts, it has been claimed that ICF may also be used for the development of prospective payment systems. While current systems such as the FRGs are based on the FIM, future concepts may prefer to base their predictive models on more comprehensive and condition or context-oriented ICF-based sets of domains. \(^{14, 18}\)

### 3.3.2 Conclusion

ICF can be used as a conceptual framework although the operational application of ICF is still experimental. In terms of clinical utility and long-term consistency of ICF, it makes sense to select relevant parameters from ICF respecting the requirements for developing a scientific classification, then to examine the coverage of these parameters provided in existing instruments. Once the clinical records are back-coded, resource use can be linked to the resulting ICF profiles.

### 3.4 ‘ASSESSMENT’ INSTRUMENTS

Several outcome measures, patient classification systems and an outcome model are described in this chapter. Besides these, two ‘assessment’ instruments were identified. ‘Assessment’ instruments are outcome measures which include a classification of individuals. One is the Minimal Data Set for Post-Acute Care, detected during the search for patient classification systems as discussed in the next chapter. The other instrument is “Pathos-Aggir-Socios”\(^ {24}\), developed during a previous study ordered by the Belgian government. These instruments, combine information on outcome with information on clinical status, treatment, management and resource consumption.

#### 3.4.1 Minimal Data Set - Post Acute Care (MDS-PAC)

The first instrument is the Minimum Data Set – Post Acute Care (MDS-PAC)\(^ {97}\). In 1999-2000, the Centres for Medicare and Medicaid Services (CMS), formerly the Health Care Financing Administration, developed the MDS-PAC, an original and very detailed assessment instrument for all post-acute care settings. The MDS-PAC is not (yet) used in practice.

MDS-PAC is a comprehensive data collection tool, with over 400 items, including socio-demographic information, pre-admission history, advance directives, cognitive and communication patterns, mood and behaviour patterns, functional status, bladder/bowel management, diagnoses, medical complexities, pain status, oral/nutritional status, procedures/services, functional prognosis, and resources for discharge.

It has been assessed extensively and includes a functional status assessment as informative as FIM, because it uses similar items, and it shows similar validity and inter-observer reliability. In addition, MDS-PAC provides information on treatment, management, and clinical status. However, the implementation of MDS-PAC, both as an assessment and a reimbursement tool, was halted in 2002 and CMS instead proposed the Inpatient Rehabilitation Facilities – Patient Assessment Instrument (IRFs-PAI), which includes FIM as
a measure of patient functional status and is a variation on the FIM-FRG. Implementation of the instrument was halted because it consists of over 400 data elements, many of which simply did not apply to the care and management of many patients.

With MDS-PAC it seemed possible to estimate actual rehabilitation costs and define reliable regression models to predict costs based on individual patient characteristics. An Italian team defined comprehensive measures of clinical status and detailed measures of resource consumption by use of MDS-PAC but they concluded that a direct comparison with the long-established FIM-FRGs is needed.

3.4.2 Pathos-Aggir-Socios

Pathos-Aggir-Socios was adapted in Belgium by Prof. M.-C. Closon and Dr. L. Habimana (Centre Interdisciplinaire en Economie de la Santé, UCL). It combines three instruments originally applied in geriatric settings: Pathos, Socios, Aggir.

Pathos-Aggir-Socios estimates the workload related to the care for the rehabilitation population. It maps the population of different rehabilitation facilities, based on the perception of the health providers. It cannot be used for the planning of a rehabilitation programme at the level of an individual or for an estimation of required resources ex ante.

No studies report on the Pathos-Aggir-Socios used in a rehabilitation setting or in comparison to other outcome measures but it might be interesting to look at the data gathered during this Belgian project. Currently, this instrument is being studied in Switzerland.

3.4.3 Conclusion

Both mentioned assessment instruments, MDS-PAC and Pathos-Aggir-Socios, have important disadvantages to be used as tools to support clinical decision-making and resource allocation. MDS-PAC concerns a too extensive set of items to score (+/- 400). Pathos-Aggir-Socios makes it possible to estimate workload related to rehabilitation services but does not contain criteria to predict required financial resources.

3.5 Patient Classification Systems

Patient selection and referral is by preference done with a Patient Classification System (PCS) including all predictive criteria for outcome and resource utilisation.

Publications related to the use of a PCS were searched. Patient Classification System is not included in the MeSH taxonomy. Instead, the keyword ‘triage’ was used, that is defined as the sorting out and classification of patients or casualties to determine priority of need and proper place of treatment. "Triage"[MeSH] AND "Rehabilitation"[MeSH] resulted in 30 publications. None of them were considered as relevant.

Searching Google with the keywords Patient Classification System and rehabilitation, resulted in publications of MG Stineman about case-mix of patients for rehabilitation and of K Eagar about the comparison of existing Patient Classification Systems and the development of a new PCS. The consultation of another study including a comparison of Patient Classification Systems was found based on a search in the grey literature (Google). During expert contact it seemed that investigations are being performed in the U.S. to develop a Uniform Patient Assessment for Post-Acute Care. For all mentioned PCS Pubmed was searched using the name of the PCS to find reports describing the principles of these systems.

3.5.1 Inpatient or Outpatient Rehabilitation?

Some classifications have been developed specifically for rehabilitation medicine, while others have a broader perspective and contain rehabilitation as only one branch or one class. Often a distinction is made between inpatient and outpatient classification systems. As a consequence, it is necessary to decide if an individual is a candidate for

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inpatient or outpatient rehabilitation before classifying this individual. Criteria for inpatient rehabilitation have also an organisational impact.

Pubmed was searched by (Inpatients (MeSH) AND Patient selection (MeSH) AND Rehabilitation (MeSH)) (N=2), by (Inpatients (MeSH) AND Criteria (All Fields) AND Rehabilitation (MeSH)) (N=47), by (Medical Rehab (Free text) AND Criteria (Free Text) AND (Admission OR Hospitalisation)) (N=4), by (Rehabilitation (Free text) AND Criteria AND (Admission OR Hospitalisation)) (N=1765), by ("Rehabilitation"[MeSH] AND "standards"[Subheading] AND "Patient Admission"[MeSH]) (N=45). No relevant papers were detected.

The absence of scientific papers about inpatient rehabilitation criteria suggests a large variability in the selection and use of these criteria. This presumption is confirmed for stroke rehabilitation in a recent European project.101 This study showed significant differences in case-mix at intake in four European stroke rehabilitation units.

By lack of scientific papers reporting inpatient rehabilitation admission criteria, the researchers explored Google using the keywords “Inpatient rehabilitation admission criteria”. Only the first ten results were withheld as no additional information seemed to be found by scanning more results. Comparing countries, no remarkable differences in admission criteria were detected.

A synthesis of all inpatient rehabilitation admission criteria (See attachment) is made:

- Have inability or decreased ability in at least two areas diagnosed by a physician and listed below:
  - complete activities of daily living;
  - move self from place to place;
  - manage elimination needs;
  - communicate or understand information;
  - cognitively process information, memory, and reasoning;
- Be medically stable;
- Need for continued close medical supervision by a physician with specialized training or experience in rehabilitation. The intensity may not be as great as acute care but 24 hour availability of a physician with special training or experience in the field of rehabilitation is required;
- Need for twenty-four hour rehabilitation nursing;
- Need for an intensive programme with multiple services (physical therapy, occupational therapy, speech pathology);
- Be capable of participating cognitively and behaviourally in a programme;
- Be able to physically tolerate programme activity including three hours of therapy per day;
- Have a discharge plan.

Via Google a report of the GTA Rehab Network about ‘Inpatient Rehab Referral Guidelines’ was also found. The GTA Rehab Network is made up of publicly-funded hospital and community-based organisations from across the Greater Toronto Area (GTA) that are involved in the planning and provision of rehabilitation services. This report contains a quick reference guide for inpatient rehabilitation referrals. The development of the Inpatient Rehab Referral Guidelines has resulted in the standardization of best practice for the inpatient rehabilitation referral process to improve patient flow through the system.

All admission criteria were formulated for rehabilitation patients in general and no specific criteria for musculoskeletal and/or neurological rehabilitation patients were found. However, in a few papers the need for more specific criteria was discussed, specially concerning orthopaedic patients.

In a report of the Centres for Medicare and Medicaid Services (CMS) the application of the 75 percent rule was discussed. To develop the list in the 75 percent rule in 1983,
Centres for Medicare and Medicaid Services (CMS) relied on information from the American Academy of Physical Medicine and Rehabilitation, the American Congress of Rehabilitation Medicine, the National Association of Rehabilitation Facilities, and the American Hospital Association (See also attachment). A control of the admissions in Inpatient Rehabilitation Facilities in 2003 showed that fewer than half of all Inpatient Rehabilitation Facilities Medicare patients in the fiscal year 2003 were admitted for conditions on the list in the 75 percent rule. Nearly half of the patients admitted for conditions not on the list were admitted for orthopaedic conditions. Experts, including those of the Institute of Medicine, generally agreed that condition alone is insufficient for identifying appropriate types of patients for inpatient rehabilitation, since within any condition only a subgroup of patients require the level of services of an Inpatient Rehabilitation Facility, and contended that functional status should also be considered. Further, the experts agreed on the fact that two basic requirements must be met if inpatient hospital stays for rehabilitation services are to be covered: (1) the services must be reasonable and necessary, and (2) it must be reasonable and necessary to furnish the care on an inpatient hospital basis, rather than in a less intensive facility, such as a Skilled Nursing Facility (SNF), or on an outpatient basis." 20

All these conditions are subject for a discussion with experts. An agreement on more specific criteria must be formulated. For example if ‘being medically stable’ is one of the conditions than ‘medically stable’ must be judged using objective indicators.

### 3.5.2 Inpatient classifications

#### 3.5.2.1 Functional Independence Measure - Functional Related Groups (FIM-FRG) 15, 98

**Origin:** Patients were classified into FRGs (Functional Related Groups) following their development in 1993 by Harada 102. These were refined twice by M Stineman: first in 1994 with the Functional Independence Measure Functional Related Groups (FIM-FRG) 21 and further in 1997 22. In the U.S. the FIM-FRGs are known as Cost Management Groups (CMGs).

**Outcome measure:** Classes are formed based on the Rehabilitation Impairment Code, the motor and cognitive subscales of the FIM at admission and patient age. This data are collected by the Centres for Medicare and Medicaid by use of the Inpatient Rehabilitation Facility – Patient Assessment Instrument (IRF-PAI).

**Implementation:** By the Centres for Medicare and Medicaid (CMS) Cost Management Groups (CMGs) are compounded for Prospective Payment by use of the Inpatient Rehabilitation Facility – Patient Assessment Instrument (IRF-PAI). This is also in Canada the current national standard.

#### 3.5.2.2 Resource Utilisation Groups (RUG-III) 103

**Origin:** The RUG-III model was developed for nursing home patients and groups these patients into one of eight hierarchies on the basis of patient conditions and services required. The RUG-III classification system has eight major classification groups: 1) Rehabilitation Plus Extensive Services, 2) Rehabilitation, 3) Extensive Services, 4) Special Care, 5) Clinically Complex, 6) Impaired Cognition, 7) Behaviour Problems, 8) Reduced Physical Function. The eight groups are further divided into 44 RUG-III-groups by the intensity of the resident’s activities of daily living (ADL) needs, and in the Clinically Complex category, by the presence of depression.

**Outcome measures:** Minimum Data Set Assessment Instrument (MDS).

**Implementation:** Prospective payment to nursing homes within CMS.

#### 3.5.2.3 Australian National Sub-acute and Non-acute Patient classification15, 104

**Origin:** In 1995 the Centre for Health Service Development at the University of Wollongong was commissioned by the Commonwealth to develop a national classification of sub-acute and non-acute care, including rehabilitation. The resultant classification – the Australian National Sub-Acute and Non-Acute Patient (AN-SNAP) classification - was
released in 1997. The AN-SNAP system, based on analysis of over 30,000 episodes of care, defines four case types of subacute care (palliative care, rehabilitation, psychogeriatric care, and geriatric evaluation and management) and one case type of non-acute care (maintenance care), and classifies both overnight and ambulatory care.

Outcome measure: Concerning rehabilitation the classification is built on impairment groupings, functional status as measured by FIM (Functional Independence Measure) or by Barthel Index as an alternative, and age.

Implementation: The AN-SNAP classification is implemented in NSW, South Australia, Queensland and the Northern Territory for a mixed payment model (an episode component and a per diem component). Victoria and Western Australia are taking different approaches whilst no classifications are in use in Tasmania or the ACT. (1999)

3.5.2.4  Casemix Rehabilitation and Funding Tree (CRAFT)  

Origin: July 1999, Victorian Department of Human Services implemented CRAFT (Case-mix Rehabilitation and Funding Tree).

Outcome measure: This model groups patients based on impairment category and according to their functional status as measured by the Barthel Index.

Implementation: This model classifies patient episodes of care in designated rehabilitation units and is being progressively introduced for funding purposes. The Victorian Rehabilitation Classification and Funding System (VicRehab) funding model (Victoria, Australia) is based on the Case-mix Rehabilitation and Funding Tree (CRAFT) classification.

3.5.2.5  Diagnostic Related Groups (DRG)  

Origin: The system was created by Robert Barclay Fetter and John Devereaux Thompson at Yale University with the material support of the former Health Care Financing Administration (HCFA), now called the Centres for Medicare and Medicaid Services (CMS), a federal agency with the United States Department of Health and Human Services.

Outcome measure: DRGs are assigned by a "grouper" programme based on ICD diagnoses, procedures, age, sex, and the presence of complications or comorbidities.

Implementation: Many variations of the DRGs exist. All of them are used for Prospective Payment (Medicare, Belgian Hospital Financing System).

In 1983, DRGs were implemented in all acute care, non-specialty hospitals throughout the United States. They were implemented to contain the costs for the Medicare Programme. Instead of hospital reimbursement being based on retrospective charges (after the delivery of care), the reimbursement system changed to a DRG fixed payment or "prospective payment" system, meaning hospitals are compensated for a patient's care based on the qualifying DRG.

3.5.2.6  Diagnose Behandel Combinaties (DBC)  

(See also study of rehabilitation in The Netherlands in chapter 8)

Origin: The DBCs are developed in the Netherlands as a variation and ‘enrichment’ of the DRGs.

Outcome measure: The DBCs group all activities and interventions in a hospital performed by a medical specialist on demand of a patient with a certain diagnosis. All steps in the patient's care process are mentioned.

Implementation: Currently DBCs are used in acute hospital care. From January 1st 2007, DBCs will be gradually introduced for the funding of rehabilitation settings.
Programme de Médicalisation du Système d'Information – Soins de Suite et de Réadaptation

Origin: PMSI-SSI has been developed in France in 1998. It not only includes post-acute rehabilitation, but also geriatric care, palliative care, alcohol abuse, and rehabilitation for children. Psychiatric care and long-term (“chronic”) care are excluded. It is based on medical diagnosis combined with an assessment of functional impairment and a description of resource utilisation (time attributed to physiotherapy, speech therapy…). Evaluation of the patient has to be completed once every week (instead of once per care episode). The system has been criticised on three points: the large inclusion criteria which weakens its ability to predict costs per category, the large time investment (to be completed once every week); the fact that resource utilisation (and not only patient characteristics) is taken into account to develop case-mix groups.

Outcome measure: Diagnosis, a measure for dependence and a measure for the utilisation of resources.

Implementation: Funding of rehabilitation in France.

TAR-FIM

Origin: TAR-FIM was developed by a team in Switzerland specific for neurological rehabilitation.

Outcome measure: Diagnosis, a measure for dependence and a measure for the consumption of resources.

Implementation: TAR-FIM was subject of an experiment. It is not clear if it was implemented.

Outpatient classifications

Home Health Resource Groups

Origin: The implementation of the prospective payment system for home health care in October 2000 in the USA.

Outcome measures: Outcome and Assessment Information Set (OASIS). OASIS is developed by the Centre for Health Services Research at the University of Colorado in the late 1980s and early to mid 1990s. The Oasis items were designed to measure, assess, and encourage improvement in care outcomes over time using Outcome-Based Quality Improvement processes.

Implementation: With the implementation of the prospective payment system for home health care in October 2000, information collected via OASIS was used for case-mix adjustment in establishing Medicare reimbursement. Overall, OASIS is used for outcome monitoring, payment, and as a core but not comprehensive clinical assessment.

Ambulatory Visit Groups

Origin: Ambulatory Visit Groups (AVGs) were developed in the 1980’s by the Health Systems research group at Yale University (USA).

“Ambulatory care has particular problems in the construction of appropriate case-mix measures, and day-case surgery provides an opportunity to test two existing measures, one inpatient (Diagnosis Related Groups) and one ambulatory (Ambulatory Visit Groups). These grouping systems were applied to the same data to compare the case-mix patterns that they produce. The findings show that Ambulatory Visit Groups appear to have advantages over the Diagnosis Related Groups with respect to their underlying assumptions and labelling of the groups; in particular, they assign greater weight to procedures. However, Diagnosis Related Groups are more developed, easier to use, more familiar and allow direct comparisons with inpatient care. Nevertheless, a proper evaluation of these issues requires further data collection and analysis, together with a fundamental examination of the uses of ambulatory case-mix.”
Outcome measures: AVG is a visit-based grouping methodology with 570 groups, which each categorizes visits with similar types and amounts of resource use.

Implementation: unknown

3.5.3.3 Ambulatory Patient Groups

Origin: APG were developed by researchers at 3M Health Information Systems, Inc. (USA).

Outcome measures: Visits are grouped into 297 categories based on significant procedures, medical, and ancillary services provided.

Implementation: In the U.S., APG are the basis for Medicare’s ambulatory prospective payment system.

3.5.3.4 Ambulatory Care Groups

Origin: Adjusted Clinical Group (ACG) is a population/patient case-mix adjustment system developed by researchers at Johns Hopkins University School of Hygiene and Public Health in Baltimore, Maryland, U.S.

Outcome measure: ACG measures health status by grouping diagnoses into clinically cogent groups. The goal of ACG is to assign each individual a single, mutually exclusive ACG value, which is a relative measure of the individual’s expected or actual consumption of health services. The primary conceptual basis is the expected persistence or recurrence of the condition over time. Other considerations included (in decreasing order of priority): Likelihood that the patient would have a return visit for the condition; Likelihood of a specialty consultation or referral; Expected need and cost of diagnostic and therapeutic procedures associated with the condition; Likelihood of an associated hospitalization; Likelihood of associated disability; and likelihood of associated decreased life expectancy.

Implementation: Only in experimental setting.

3.5.3.5 Duke Casemix System

Origin: Dumix was developed in the U.K. to cater for the wide variety amongst patients encountered in geriatric medicine. Rehabilitation is part of the system.

Outcome measure: Dumix combines age, gender, patient-reported perceived and physical health status, and provider-reported or auditor-reported severity of illness to classify patients by their risk of high future utilization.

Implementation: Only in experimental setting.

3.5.3.6 Australian National Sub-acute and Non-acute Patient classification

See Inpatient classifications

3.5.3.7 Other

Admission Casemix System for the Eldery (ACME), Australian Ambulatory Classification (AAC), Victorian Ambulatory Classification and Funding System, Efficient model.

3.5.4 Discussion

Only general information is available concerning the patient classification systems, the underlying rules are never published in detail. Anyway, no Belgian data set is available to test the applicability of the system to the Belgian situation.

A common feature of all mentioned inpatient classification systems, is that all of them use the results of a measurement of activities of daily living (FIM or Barthel Index) as main criterion for classifying patients and that all of them are used for financing of rehabilitation. The mentioned outpatient classification systems all use different criteria for grouping individuals and not systematically measure for activities of daily living.
For a further assessment of the advantages and disadvantages of the listed patient classification systems, the results of other research teams were summarised.

Concerning PCS for inpatient rehabilitation, the team at the University of Wollongong (see 3.5.2, Australian National Sub-acute and Non-acute Patient classification) concluded that the more variables were used to classify patients, the better the predictive value of the required resources. Of the compared PCS, FIM-FRG and AN-SNAP scored best. Selection of the "best" classification involves a trade-off between simplicity and accuracy and whether the classification is already in use elsewhere, in order to benchmark. Concerning PCS for outpatient rehabilitation, this team concluded the preferred option was highly dependent on the model selected for the classification of inpatient care to facilitate transfers and follow up of individuals. 15

A report was found including a comparison of Patient Classification Systems using predefined selection criteria without testing these instruments with a data set (Rapport rédigé par les membres du CoPil sur la base d’un travail de recherche de M.Nicolas Jeanprêtre, 2002, 104). For this comparison, no distinction was made between in- and outpatient classification systems. MDS-PAC, AN-SNAP, PMSI-SSR, TAR-FIM and RUG-III were compared and AN-SNAP was selected model as the best patient classification system. The main comment on this system was that it does not include prognostic indicators for the medical evolution.

The preference for one or another patient classification system depends on the application possibilities. Ideally, a Patient Classification System supports patient referral to the most appropriate rehabilitation programme which is determining the required resources. The PCS currently used to support resource allocation show the important restriction that not the real rehabilitation needs are covered but rather the care needs by using the FIM and Barthel Index. The International Classification of Functioning, disability and health is not yet tested on validity related to patient referral and/or resource allocation, and as such is not ready to use yet. However, scientific work on this subject is going on, including research on how to convert the existing PCS to the future ICF-based PCS. Another problem is that for most PCS, it will be a challenge to tune an inpatient to an outpatient classification.

### 3.6 FRAMEWORK FOR SELECTION OF THERAPY

#### 3.6.1 Introduction

In the definition of rehabilitation two conditions for therapy are:

- Interventions must be evidence based;
- Interventions must have a proven added value to achieve the defined goals.

Criteria to evaluate therapy concerning evidence, proven added value and quality are essential.

First, the focus is on criteria for the selection of interventions to compound a rehabilitation programme. Numerous factors influence the individuals’ decision-making when planning care across the continuum. Patient, environment and disease related factors are critical. Taking these factors into account is essential in selecting appropriate intervention strategies in any disease stage. 15

In chapter 8 models for quality assessment will be discussed. Current clinical practice in Belgium will be compared to clinical pathways developed in different countries (chapter 6 and 7).

The complexity and interaction of the criteria which determine a therapy plan for an individual, requires a framework permitting a health professional to have a detailed view on the individuals’ situation. This is in contrast with the framework used for resource planning, which has to be easy manageable for financial analysts and policy-makers.
3.6.2 International Classification of Functioning, Disability and Health

The ICF model earlier mentioned, is probably the best candidate to serve as a framework for therapy planning. Studies reporting the application of ICF for therapy planning, were searched. One study of the application of ICF was performed for a well described pathology \(^{116}\). No papers are available, which report the application of these models for the whole set of pathologies requiring rehabilitation. An attempt was made through the development of linking rules to link the outcomes of ICF to useful interventions \(^9\). These linking rules are only a first step in the use of ICF as a connecting framework between interventions and outcome measures. A lot of study work is necessary to apply these or comparable rules in clinical practice.

3.6.3 The 3-hour rule

The US also struggles with the problem of therapy planning. The Centres for Medicare and Medicaid Services (CMS’s) solved the problem by implementing a simple “3 hour rule”. Strictly speaking the 3 hour rule is not a rule at all. The 3 hour rule is not specified in any regulation, and, therefore, it does not have the force of law. Nevertheless, CMS’s viewpoint, that the “general threshold for establishing the need for inpatient hospital rehabilitation services is that the patient must require and receive at least 3 hours a day of physical and/or occupational therapy” has achieved such general acceptance that it has become a virtually unquestioned part of the rehabilitation services culture in the US. CMS’s guidance on the 3 hour rule notes that the daily component of the rule may be answered by therapy services 5 days a week. Also, while most patients will answer the 3 hour rule through physical or occupational therapy, CMS recognizes that other therapies, such as speech therapy or prosthetic-orthotic services, may be required, within the 3 hours. Furthermore, if the patient has a secondary diagnosis or medical complication that rules out 3 hours of therapy a day, inpatient hospital care may nevertheless be the only reasonable means by which even a low-intensity rehabilitation programme can be safely carried out. However, in such cases, CMS requires justification of the existence and extent of complicating conditions affecting the carrying out of a rehabilitation programme.

3.6.4 Discussion

At long term ICF might be a good framework for therapy planning but not enough evidence is available yet to implement this now. This opinion is shared by some experts contacted (see attachments).

3.7 ACCREDITATION OF PROFESSIONALS AND SERVICES

3.7.1 Commission on Accreditation of Rehabilitation Facilities (CARF)

Because in scientific literature no information on the development and use of accreditation systems was found, grey literature was searched. The study of rehabilitation in The Netherlands, Germany, France, Sweden in a next chapter and the US will also focus on the use of quality systems in the concerned countries.

The CARF-system was identified as an internationally used accreditation system (Commission on Accreditation of Rehabilitation Facilities) \(^\circ\). CARF was formed in 1966 in the US by two national organisations - the Association of Rehabilitation Centres (ARC) and the National Association of Sheltered Workshops and Homebound Programmes (NASWHP) - that had been developing standards for their respective memberships for about a decade. In September 1966, the two organisations agreed to pool their interests in setting standards, and they formed the Commission on Accreditation of Rehabilitation Facilities, now known as CARF. In the years since its formation, CARF has steadily grown in size and stature.

\(^\circ\) http://www.carf.org/
The CARF family of organizations currently accredits more than 4,800 providers at more than 17,000 locations in the United States, Canada, Western Europe, and South America. More than 6.3 million persons of all ages are served annually by CARF-accredited providers.

After an organisation applies for accreditation of its services or programmes, CARF sends professionals in the field to conduct an on-site survey to determine the degree to which the organisation meets the standards. CARF surveyors also consult with staff members and offer suggestions for improving the quality of services.

CARF-accredited programmes and services have demonstrated that they substantially meet internationally recognized standards. CARF accreditation means that you can be confident that an organization has made a commitment to continually enhance the quality of its services and programmes, and its focus is on consumer satisfaction.

3.7.2 Accreditation systems in Belgium

In Belgium there are requirements for rehabilitation services, requirements for services related to a hospital stay during rehabilitation and accreditation criteria for physicians.

Requirements for rehabilitation services are included in the description of financing principles and differ per type of payment system (K30/K60, convention 9.50, convention 7.71). Requirements are related to team composition, opening hours, equipment and buildings. These requirements are discussed in detail in chapter 5.

Requirements for services related to a hospital stay are also conditions to be paid (B1 and B2: see chapter 5). Requirements include data registration concerning the activities related to social services and discharge management, participation to projects which contribute to the improvement of social services and discharge management, specific numbers of required full time equivalents (FTE) and some infrastructural issues.

Accreditation criteria for physicians influence the price of the honoraria and include a minimum participation to further training courses.

All these requirements and criteria are related to structure or process but no outcome measurement is performed.

3.7.3 Discussion

Accreditation or quality systems for professionals and services will be further discussed in the chapter concerning the international comparison of the five selected countries (chapter 8).

3.8 CONCLUSION

In this chapter, existing outcome measures, outcome models, assessment instruments, patient classification systems, criteria for the selection of therapy and accreditation of professionals and services, were discussed.

Exploring the published literature an ideal interaction between outcome measures, an outcome model and a patient classification system as a framework for the mapping of a rehabilitation programme as well as for resource allocation, was designed.

As proposed in Figure 3.2, outcome measures supply information to an outcome model. In this outcome model data related to diagnosis as well as level of function and environmental factors, should be covered. Starting from this outcome model a patient classification is built. One level in the hierarchy of this patient classification system serves as a framework for resource allocation (rehabilitation budget). Another level serves as a framework for the composition of rehabilitation programmes (rehabilitation services). The rehabilitation programme determines the resource allocation. Resource allocation as well as rehabilitation programmes must be controlled by a quality system.
This model is not applied (yet). Outcome measures, outcome models and patient classification systems exist. But no links are made yet between outcome measures and outcome models, nor links between outcome models and patient classification systems. Outcome measures are as such used in clinical practice. It should be kept in mind that existing patient classification systems group patients related to resource allocation (Length Of Stay), hence they are not satisfying to manage clinical patient referral. They can serve as a relative indicator to distribute the rehabilitation budget over resources independent of care needs and indeed are mostly used for financing purposes. These PCS are usually built upon the results of tools measuring dependence for activities of daily living, like FIM and the Barthel Index, which cover a very limited set of outcomes that are not fully representative for rehabilitation needs. However, because a lot of research is going on to convert the results of the FIM and the Barthel Index to ICF scores \(^{117}\), it might be an option to implement FIM or Barthel Index at short term in Belgium, in order to line up with international tendencies. Also, it would allow to get some although limited-information on the severity of functional impairment of patients treated in Belgian rehabilitation centres. Nowadays this information is not available.

ICF is widely accepted as the most complete instrument to describe functional impairment and rehabilitation needs. It can already be used as a conceptual framework although the application of ICF in clinical practice and for financing purposes only fits long term vision. The current main restrictions of ICF are the huge set of items to score, the lack of clear definitions to distinguish the content of the items mutually and the difficulty to convert the results of measurement tools to ICF scores. ICF core sets and ICF linking rules are already valuable attempts to compensate these restrictions. It can be considered to start a validation project using ICF core sets versus FIM or Barthel Index. Elements common to ICF core sets and FIM or Barthel Index are described in the Appendix to chapter 4.

Another option is to consider a novel research project in which an alternative approach should be developed to the objective of using ICF as the basis for a PCS which supports patient referral as well as resource allocation. In this research project, one should (instead of starting with the selection of existing tools) start with the selection of ICF items related to each of the ICF components (Health condition; Body function and structure; Activities; Participation; Environmental factors and Personal factors), which are supposed to be relevant for patient referral and/or resource allocation in rehabilitation. Next, one should identify measurement tools which cover one or more of these ICF items. Then, a new measurement tool for ICF items which are not covered by one or another existing measurement tool should be developed. Next, start registering the results of the selected measurement tools, and use the linking rules (still under development) to translate the
results of these measures to ICF scores. Finally, analyse the collected data on their utility in a PCS. Groups within this PCS must be homogeneous related to required rehabilitation services and indirectly to required resources. A comparable approach was respected by the Division of Health Care Policy and Research at the University of Colorado at Denver for the development of a Uniform Patient Assessment instrument for Post-Acute Care. Their instrument is intended to cover the population in different rehabilitation settings and must facilitate placement decision-making, enhancement of safety and quality of care transitions through transmission of core information to a receiving provider and provision of baseline information for longitudinal follow up of health and function.

Key points

- The conceptual definition of musculoskeletal and neurological rehabilitation has to be translated into practice to facilitate decisions on the organisation and financing of rehabilitation.

- A patient classification system is required to structure inflow of individuals (What?) and determine the type and intensity of required interventions (How?), the professionals to be involved (Who?) and the preferred organisation (Where?).

- Outcome measures, outcome models and patient classification systems exist. But no links are made between outcome measures and outcome models, or between outcome models and patient classification systems.

- ICF can already be used as a conceptual framework for an outcome model but the application of ICF in clinical practice and for financing purposes only fits long term vision. A lot of research is going on about this subject.

- ICF’s success depends on its compatibility with measures used in rehabilitation and on the improvement of its applicability.

- FIM and Barthel Index are tools measuring the level of dependence related to activities of daily living, but neither FIM nor Barthel Index measure rehabilitation needs. However, in some countries they are used in Patient Classification Systems implemented for resource allocation.

- Most of the existing PCS are specific for inpatient or for outpatient care. An exception is the Australian AN-SNAP, derived from the FIM-FRG-system.

- In order to test existing PCS in Belgium, datasets from Belgian rehabilitation patients are necessary.

- A short term option could be to implement the registration of FIM or Barthel Index in Belgian rehabilitation centres, in order to get some – although limited - information on the severity of functional impairment of rehabilitation patients.

- To line up with international tendencies, it could be considered to start a validation project using ICF core sets versus FIM or Barthel Index.