

# Consumption of physiotherapy and physical and rehabilitation medicine in Belgium

*KCE reports 87C*

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## KCE reports 87C

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## Executive summary

### OBJECTIVE OF THE STUDY

The objective of this study is to analyse the Belgian consumption of rehabilitation, in particular of Physiotherapy (PT) and Physical and Rehabilitation Medicine (PRM).

The first chapter of this report compares the organisation of rehabilitation in Belgium with that in four other countries. This comparison is complementary to previous KCE reports, namely report 40 on physiotherapy and report 57 on musculoskeletal and neurological rehabilitation.

The following chapters analyse the consumption of rehabilitation in Belgium with the help of administrative data provided by the Common Sickness Funds Agency (AMI-IMA). Chapter two assesses the global consumption while chapter three focuses on the rehabilitation following specific surgical interventions.

The use of administrative instead of clinical data brought along important limitations. First, these data contain no information on the medical diagnosis. Therefore, we could not identify nor study non-surgical disorders such as neurological conditions. Second, there is no information on the patient's functional status. Finally, these data do not tell us who made the choice between the different treatment pathways i.e. physician or patient.

### BACKGROUND: REHABILITATION IN BELGIUM

Rehabilitation in Belgium has three different pathways i.e. physiotherapy (PT), Physical and Rehabilitation Medicine (PRM) and conventions for specific diseases. Physiotherapists and PRM specialists mainly work within a fee-for-service system. Nomenclature "M" reimbursement codes are specific for PT whereas PRM specialists use nomenclature "K" codes. It is remarkable, though, that these different codes can sometimes cover the same services.

In principle, one PT session (nomenclature "M") a day is reimbursed. In specific situations and, in particular, in case of serious disorders ("E" list) a second, shorter session the same day can be reimbursed. The amount that is reimbursed falls considerably after a certain number of sessions. This number depends on the disorder that needs treatment: for "standard" diseases, reimbursement is diminished after 18 sessions; for specific acute ("Fa" list) and chronic ("Fb" list) disorders this is 60 sessions; for "serious" disorders ("E" list) there is no reduction in reimbursement.

PRM services (nomenclature "K") are carried out under the supervision of a PRM specialist who has to be present in the building. There are different fees that vary between the least remunerated "K15" services and the best paid "K60" services. The "K20" fee is given per treatment session at which one or more mono-disciplinary techniques are used (maximum 48 sessions). Specific disorders can benefit from multi-disciplinary rehabilitation sessions ("K30" and "K60"). For these, the number of sessions (60 or 120) depends on the underlying disease. After a first series of "K20", "K30" or "K60" sessions, subsequent sessions can only be invoiced with "K15" services, or else the patient can switch to physiotherapy (nomenclature "M").

Finally, there are the conventions, which are rehabilitation agreements for specific serious neurological, pulmonary and musculoskeletal (congenital and acquired) disorders.

The same diseases can be reimbursed through different reimbursement systems. First, patients with standard disorders have the choice between mono-disciplinary PT and mono-disciplinary PRM. Second, there is an overlap between the lists of diseases entitled to multi-disciplinary PRM and those that may benefit from conventions. Finally, several disorders are mentioned both on the lists for physiotherapy ("E" and "F" lists) as on the list for multi-disciplinary PRM treatment.

## METHODS

The first part of the study describes the organisation of rehabilitation in Canada, France, the Netherlands, United Kingdom and Belgium. Local experts validated the data that was gathered from websites of professional associations and grey literature.

The following chapters of the study describe the rehabilitation consumption in Belgium based on claims data provided by the Common Sickness Funds Agency. The second part describes the global rehabilitation consumption over a three-year period (2003-2005). The third part analyses the rehabilitation consumption following specific surgical interventions: differences in consumption are explained by means of regression models. Other disorders that represent an important part in rehabilitation, for example neurological illnesses, could not be studied in this report because they were not identifiable in the available databases.

## ORGANISATION OF REHABILITATION IN OTHER COUNTRIES

At the European level, Physical and Rehabilitation Medicine is defined as an independent medical speciality concerned with the promotion of physical and cognitive functioning, activities (including behaviour) and participation (including quality of life), taking into account personal and environmental factors. It hereby includes the components of the International Classification of Functioning, Disability and Health (ICF). The Netherlands and Canada are the only countries where the definition of PRM is not in line with the ICF.

## ORGANISATION OF THE PRM PROFESSION

Physicians must complete four to five years of residency training in order to become licensed as a PRM specialist. Belgium and France have the highest number of PRM specialists per 1 000 residents, followed by the Netherlands and Canada. The UK is clearly limping behind. In most countries, PRM specialists are salaried and work in rehabilitation facilities. This is also the case in France, although a certain number of specialists there work in a private practice where they are financed on the basis of fee-for-service. Belgium is the only country where the majority of the specialists' activities is remunerated on a fee-for-service basis, in outpatient as well as inpatient settings.

Continuous medical education is mandatory for PRM specialists in every country. European specialists are, in addition, encouraged to become a European Board Certified PRM specialist.

The international comparison provides several examples of quality initiatives. For PRM specialists there are clinical guidelines, practice visits or a registration system for complications. For rehabilitation facilities, frameworks for care, quality certifications and performance indicators were developed.

## MULTI-DISCIPLINARY TREATMENTS

In every country, inpatient and outpatient multi-disciplinary PRM treatment is offered in general hospitals or in specialized rehabilitation centres. The Anglo-Saxon countries also have community-based multi-disciplinary rehabilitation teams.

In the Netherlands, UK and Canada, access to multi-disciplinary PRM care is restricted by a gate-keeping system and patients face waiting lists. But services are 100% free of charge.

French and Belgian patients have free access to PRM services and there are no long waiting times. Reimbursement is limited though; co-payments are charged in both countries and, in Belgium, the number of reimbursed PRM sessions is limited.

## MONO-DISCIPLINARY TREATMENTS

Patients in need of musculoskeletal rehabilitation are often treated with mono-disciplinary PRM care.

In the Netherlands, UK and Canada, these patients are often referred to the private practice of a physiotherapist because of the waiting times in the multi-disciplinary facilities. These private rehabilitation services are not covered by the public system: patients pay with out-of-pocket payments or through their private health insurance. The number of sessions covered varies according to the insurance plan. Access is much easier to a private practice than to a multi-disciplinary centre because it is not restricted by any gate-keeping system.

In France and Belgium, PRM specialists can treat patients in need of musculoskeletal rehabilitation in their own private practice or clinic instead of referring them to a physiotherapist. This implies that patients can choose between PRM specialists and physiotherapists since both offer physiotherapy.

## GLOBAL CONSUMPTION AND EXPENSES FOR REHABILITATION IN THE SAMPLE OF THE COMMON SICKNESS FUNDS AGENCY

The sample (1/40) of the Common Sickness Funds Agency is representative of the Belgian population and consisted in this study of a group of 273 596 individuals studied over a three-year period (2003-2005).

One patient out of four (26.1%) had rehabilitation during these three years: 23.9% had physiotherapy and 5.9% PRM. Each year, 13.5% of the sample had one or another form of rehabilitation treatment. This percentage slightly increased from 13.0% in 2003 to 13.7% in 2005. In terms of number of patients, however, the balance between PRM and PT remained stable over the study period. One patient out of ten (1.35% of the sample) received both PRM and PT. Conventions with PT were insignificant in the rehabilitation consumption.

Rehabilitation consumption increases with age, in particular above 60 years. Women consume more often rehabilitation than men. The same accounts for beneficiaries of increased intervention, especially children and adolescents, although this effect is rather small.

The average annual number of PT sessions for the different disease lists are the following: 100 sessions for serious diseases ("E" list), 31 sessions for Fa-listed conditions, 54 sessions for Fb-listed conditions and 14 sessions for standard diseases.

The average number of PRM sessions is 20.6 for multi-disciplinary long sessions (120 minutes) and 13.6 for shorter multi-disciplinary sessions (60 minutes). Patients with mono-disciplinary "K20" sessions have an average of 9.7 sessions a year.

In 2005, the average annual expenditure per patient with rehabilitation is similar for physiotherapy and PRM, i.e. €295 and €292 respectively.

## EPISODES OF CARE IN THE SAMPLE

We analysed 113 305 episodes of care, the latter being defined as the succession of rehabilitation treatments without any significant (> 30 days) interruption. Two thirds of the patients received one care episode only during the study period. PRM was involved in 15.9%, and PT in 90.8% of the episodes. Nearly three out of four episodes involved PT sessions for standard diseases.

Most care episodes (88.3%) consisted of only one type of rehabilitation, either PT or PRM, entirely performed in outpatient or during hospitalisation. The analysis of these homogeneous episodes shows low median values for the number of sessions: 90% of patients did not exceed the number of sessions for which the nomenclature provides maximum reimbursement.

The proportion of multi-disciplinary PRM treatments and of PT for serious disorders (E, Fa and Fb-listed conditions) increased with age. The geographical distribution showed a preference for PRM or for PT in some districts in comparison with the national average. To some extent, a certain substitution effect was noticeable between both rehabilitation pathways.

When the episode of care began as an outpatient treatment, PT was the most common first rehabilitation (92%). Most episodes (94.5%) had only one sequence of treatment. However, for care episodes with more than one sequence of treatment, PRM came second in the sequence, in 20% of cases.

When the episode of care began during hospitalisation, PT was the first treatment in 70% of the episodes. The most frequent succession of treatments was PT followed by the same treatment in outpatient (10.3% of episodes). PRM was the first rehabilitation in 29.6% of the episodes that began during hospitalisation, mainly followed at home by PT (5.2% of the episodes).

The 2004 reform of PRM nomenclature did have an impact on the rehabilitation consumption. The number of episodes with 60 minutes PRM sessions ("K30") decreased, while those with 120 minutes sessions ("K60") increased. On the other hand, the consumption of PRM services paid by fee-for-service (in stead of per session) decreased drastically.

## REHABILITATION AFTER SPECIFIC SURGICAL OPERATIONS

The surgical interventions that were studied were mainly orthopaedic of nature. Nevertheless, the study also included mastectomies and interventions for the treatment of urinary incontinence. The analysis started with clustering these interventions in groups with homogeneous severity. All but two interventions were performed during classic hospitalisation. On the whole, 28.9% of the episodes did not have any recorded rehabilitation. Ten percent of the interventions was excluded because of a complex or outlier profile. In the end, 60.6% of the interventions were included in the analysis.

### DESCRIPTION OF THE EPISODES AFTER INTERVENTIONS

Most frequently, PT is the first rehabilitation treatment and it usually starts during hospitalisation. PT is even the only rehabilitation for four out of five patients who were operated for incontinence, distal fractures, meniscus problems and carpal tunnel syndrome (the latter two in one day).

Multi-disciplinary PRM is often the first treatment for patients who had major interventions e.g. knee and hip arthroplasty (1 out of 3 patients), hip fracture (1 out of 5) and spinal arthrodesis (13%). It is often combined with PT. A longer hospital stay is associated with a multi-disciplinary treatment, in particular when this treatment takes place during hospitalisation only.

Mono-disciplinary PRM sessions are less frequent. They are the first treatment for 1 out of 5 inpatients, and the only treatment for more than 10% of patients with specific interventions.

### NUMBER OF SERVICES, LENGTH OF THE EPISODE, BUDGET

For a given intervention, the number of services varied according to the type of rehabilitation. The number of acts was usually highest for episodes with a combination of different types of rehabilitation, followed by episodes with PT only, and subsequently by episodes with multi-disciplinary PRM only. Mono-disciplinary PRM treatments had only a small number of services.

For a same intervention, many PRM treatments stopped after hospitalisation (9 out of 10 mono-disciplinary and 7 out of 10 multi-disciplinary PRM treatments). PT treatments had more chance to continue after hospitalisation.



In relation to the length of treatment, two profiles could be distinguished: many patients stopped the rehabilitation after a few days; another group of surgical interventions, on the other hand, had long episodes where PT and PRM were combined.

The costs varied according to the intervention and the variability within the same interventions was huge. The costs were highest for multi-disciplinary treatments combined with PT; the median costs for this combination were twice as high as for PT alone.

## FACTORS ASSOCIATED WITH REHABILITATION CONSUMPTION

Two important factors are associated with the number of services within an episode: the fact that the treatment was stopped after hospitalisation and the type of rehabilitation. Age, socio-economic status and rehabilitation prior to the surgical intervention also play a role.

The statistical model that tries to explain the choice for the first treatment indicates the hospital itself as most important explanatory factor. None of the available hospital characteristics could sufficiently explain this choice, e.g. private or public status, size of the hospital etc. Half of the hospitals (with a PRM department) systematically begin with PRM (mono- or multi-disciplinary) for at least 80% of patients who underwent a surgical intervention. Moreover, 6 out of 48 eligible hospitals systematically began with multi-disciplinary PRM for more than 80% of their patients. The patient characteristics had significantly less importance.

The identity of the hospital was also the most important explanatory factor for the choice of PRM as first treatment in an outpatient setting.

## DISCUSSION AND CONCLUSIONS

Rehabilitation care is organised in an unusual manner in Belgium (and France). First, there is the coexistence of PRM and PT because one can choose between both rehabilitation pathways. Second, the same PRM specialist who prescribes the treatment is also paid for providing it, although the work could actually be done by a physiotherapist who works under his responsibility.

The use of administrative data entailed important limitations. The first limitation is the fact that only rehabilitation after specific surgical interventions was analysed. This implied that other conditions such as neurological ones could not be studied although they represent an important part of patients in need of (multi-disciplinary) rehabilitation. Secondly, there was the absence of information on the severity of the disorder and on the patient's functional status. The importance of the functional status had been pointed out by previous KCE reports.

However, thanks to this study we were able to establish that factors other than the medical diagnosis and the functional status interfere with the choice of the rehabilitation pathway. First, the reimbursement rules of the Belgian nomenclature play a definite role in the choice of type and length of the rehabilitation. Second, the choice for certain types of rehabilitation seems to be determined by local habits of certain hospitals, rather than by objective characteristics such as hospital size, availability of rehabilitation beds, etc. Third, the patient's choice is also influenced by the offer of care: the outpatient setting has mostly PT treatments.

Finally, some findings call into question the correspondence between the need of the patient and his rehabilitation treatment. The fact that more than half of the patients who underwent surgery for urinary incontinence, fracture of the collar bone or certain interventions on the hand, had no rehabilitation whatsoever, is questionable. On the other hand, many PRM treatments were stopped at the end of the hospitalisation whilst PT treatments were more likely to continue after discharge from hospital.

## RECOMMENDATIONS

On the basis of the organisation of PRM in different countries and the data on rehabilitation consumption in Belgium (mainly after orthopaedic interventions), the KCE states the following recommendations:

- There is no justification whatsoever for the distinction between K- and M-nomenclature for the rehabilitation of uncomplicated cases following surgical interventions. The systematic choice for K-nomenclature in many hospitals, for reasons other than medical, has to be put to an end.
- An adapted nomenclature should allow the appropriate remuneration of PRM specialists for following intellectual activities: the medical diagnosis, the drawing up of the rehabilitation treatment, the orientation of the patient to a mono-disciplinary or multi-disciplinary treatment according to severity and objectives of the treatment, the follow-up and coordination of the care provided by allied health professionals such as occupational or physiotherapists (whereby the PRM specialists are not allowed to invoice this care themselves).
- This study does not allow us to propose similar recommendations for the rehabilitation of other, non-surgical interventions, such as neurological disorders.
- It is desirable that the choice of rehabilitation care should only be based on the medical diagnosis, the functional status and the patient's environmental situation (ICF) rather than on local habits or optimal utilization of the nomenclature. At present, however, there is no uniformly collected information on the functional status of rehabilitation patients.

## Scientific summary

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## GLOSSARY

Term	English	Other languages
BIM	Patients with low income who benefit from a higher reimbursement by statutory health insurance.	Bénéficiaire de l'intervention majorée Rechthebbende verhoogde tegemoetkoming
CME	Continuous Medical Education	
Convention	Rehabilitation agreement between specific institutions (health care provider) and RIZIV-INAMI.	Convention de rééducation Revalidatie overeenkomst
District	Administrative area : Belgium counts 43 districts	Arrondissement
GDP	Gross Domestic Product	Produit Intérieur Brut (PIB) Bruto Binnenlands Produkt (BBP)
GP	General Practitioner	Médecin Généraliste Huisarts
ICF	International Classification of Functioning, Disability and Health	
IMA-AIM	Common Sickness Funds Agency	Agence Intermutualiste Intermutualistisch Agentschap
Inpatient care	Care given during a hospitalisation. A one day intervention is considered as outpatient care.	Patient hospitalisé Gehospitaliseerde patiënt
GMC	General Medical Council	
KCE	Belgian Health Care Knowledge Centre	Centre fédéral d'expertise des soins de santé Federaal Kenniscentrum voor de Gezondheidszorg
MAF	System set up in 2001 in order to limit the personal health care expense of the patient and to assure the care accessibility for persons with a low income.	Maximum à Facturer Maximumfactuur
Medical Health Centre	Primary care group practice paid by a system of capitation based payment. Some centres offer physiotherapy, included in the capitation fee.	Maison médicale au forfait Wijkgezondheidscentrum
MRS	Nursing home where mainly older people can live and be taken care of (more nursing staff than in MRPA is available).	Maisons de repos et de soins (MRS) Rust- en verzorgingstehuis (RVT)
MRPA	Nursing home where people older than 60 years can live and be taken care of.	Maisons de repos et de soins pour personnes âgées (MRPA) Rust- en verzorgingstehuis voor ouderen (ROB)
NHS	National Health Service	
Outpatient care	Care given out of "classic" hospitalisation, including care to an ambulatory patient in a hospital setting and day care hospitalisation.	Ambulatoire Ambulant
PRM	Physical and Rehabilitation Medicine	Médecine Physique et de Réadaptation (MPR) Fysische Geneeskunde en Revalidatie
PT	Physiotherapy (in Europe), Physical therapy (in USA)	Kinésithérapie (French term in Belgium) Kinesitherapie (Dutch term in Belgium)

Rehabilitation convention with PT	<p>Rehabilitation agreement when a physiotherapist is involved in the rehabilitation therapy.</p> <p>This category contains the following disease- related agreements: chronic pain, cardiac patients, cerebral palsy, cerebral paralysis, paediatric respiratory disorders, chronic fatigue, chronic respiratory disorders, locomotor-neuro (centre 950), motor rehabilitation, neuromuscular disorders, spina bifida.</p>	
Rehabilitation convention without PT	<p>Rehabilitation agreement without any or with very few physiotherapists involved, who are not the main health professionals implicated. In these rehabilitation agreements, physiotherapists may act in the capacity of counsellors or occupational therapists. Therefore they would not administer one or other form of rehabilitation therapy. This category contains the following kind of disease related convention: MPS (medico-psycho-social) centre, alcoholism-drug dependence, child-parents relation disorder, diabetes, hearing and speech disorder, hearing loss, epilepsy, foot interdisciplinary advice, monogenetic disorder of metabolism, cystic fibrosis, unwanted pregnancy, optic, orthoptic treatment, oxygen therapy, palliative day care centre, professional rehabilitation, psychological handicap, psychosocial disorder, psychotic, rehabilitation convention, infant at risk for sudden death, transport for handicapped people, ventilation assistance, visual handicap and authorisations by the medical college of sickness funds.</p>	
RIZIV-INAMI	National Institute for Health and Disability Insurance	Institut National d'Assurance Maladie-Invalidité Rijksinstituut voor Ziekte- en Invaliditeitsverzekering
SHI	Statutory Health Insurance	
Social security status	Status for level of reimbursement by compulsory health insurance, depending on the level of income	Statut social: bénéfice ou non de l'intervention majorée pour le remboursement des soins de santé Sociaal statuut: recht of niet op verhoogde tegemoetkoming voor de terugbetaling van gezondheidszorgen
VRA	Dutch Association of PRM physicians	Nederlandse Vereniging van Revalidatieartsen

# I INTRODUCTION

## I.1 OBJECTIVES OF THE PROJECT

### I.1.1 Initial objectives

The initial project form - as attached to the call for tenders for external sub-contracting of the study - mentioned three research questions:

- an international comparison of the organisation of rehabilitation systems;
- an analysis of the specificity and usefulness of PRM versus physiotherapy in rehabilitation;
- a proposition of recommendations to optimize the utilization of the nomenclatures for PRM and physiotherapy in Belgium.

The main idea was to provide a clinical insight in the differences between the rehabilitation pathways. This objective implied a recording of the patient's functional impairment and disease severity, the objectives of the rehabilitation plan according to the living and working conditions of the patient as well as the actual rehabilitation services provided during the treatment.

There was only one candidate who answered the call i.e. the Common Sickness Funds Agency (AIM/IMA). They proposed an analysis of the consumption of the different rehabilitation pathways on the basis of their administrative claims data.

The use of administrative data entailed important limitations. Firstly, this database does not have any information on the medical diagnosis. Therefore, neurological conditions could not be identified and analysed in this study. This was a major limitation since these disorders represent an important part of patients in need of (multi-disciplinary) rehabilitation. Secondly, there was no information about the severity of the disorder and the patient's functional status. The importance of the functional status had, however, been pointed out by previous KCE reports.<sup>1,2</sup>

Nevertheless, the main stakeholder in this report i.e. the National Institute for Health and Disability Insurance (RIZIV-INAMI) insisted on the continuance of the study in spite of these limitations. Therefore, the KCE decided to change the initial research protocol by deleting the second initial objective about the specificity of the different rehabilitation pathways. This objective was replaced by a descriptive analysis of these pathways based on administrative data.

Despite of its limitations, this study entailed some interesting findings that lead indirectly to the formulation of important reflections on the organisation of rehabilitation care in Belgium.

### I.1.2 Final objectives

Patient rehabilitation in Belgium may follow 3 pathways: physiotherapy (PT), Physical and Rehabilitation Medicine (PRM) and conventions which cover specific neurological, pulmonary and musculoskeletal impairments. This project focuses on the two first pathways i.e. the consumption of physiotherapy and Physical and Rehabilitation Medicine. Rehabilitation within the framework of conventions forms the object of the KCE report by Kiekens et al.<sup>1,2</sup> Nevertheless, Chapter 3 provides some information on rehabilitation within the framework of conventions in order to assess their utilization in the general population.

**This study analyses the consumption of Physical and Rehabilitation Medicine (K-nomenclature) compared to the consumption of physiotherapy (M-nomenclature) using claims data from the statutory health insurance.**

**The first part** of the report is the study of the Belgian rehabilitation system and the comparison with four other national systems. This analysis supplements the studies already performed by the KCE for outpatient physiotherapy and for musculoskeletal and neurological rehabilitation.<sup>1,3</sup>



The framework of analysis is similar to that utilised in the project related to physiotherapy: care organisation, human resources and task allocation, financing and conditions of reimbursement, quality, regulation and control.

**The second part** describes the general rehabilitation consumption. This descriptive analysis was carried out based on a representative population sampling (statutory health insurance) drawn up by the Common Sickness Funds Agency (IMA-AIM). The sampling amounted to 1/40 of the population covered by compulsory health insurance. The 2003, 2004 and 2005 data were utilised in order to compare two consumption periods i.e. before versus after the reform of Physical and Rehabilitation Medicine (August 2004).

This descriptive analysis, based on individual data from the IMA sampling, was compared with the exhaustive but aggregated data available to the National Institute for Health and Disability Insurance (RIZIV-INAMI) in order to define the limitations of the IMA sampling. This study analyses the rehabilitation consumption (outpatient and hospital treatment) and the care invoiced within the framework of rehabilitation conventions. Two main lines are considered i.e. rehabilitation consumption by the patient and care episode.

**A third part** consists of the rehabilitation consumption specific for surgical operations. This last part deals with the main research question, looking for the potential explanatory factors behind the observed differences in rehabilitation care consumption.

The statistical, descriptive and explanatory analyses of rehabilitation consumption were conducted for a limited number of targeted surgical operations. These involved the operations most frequently followed by physiotherapy or Physical and Rehabilitation Medicine. Most of these operations were performed during hospitalisation. They did not systematically require a multi-disciplinary approach. Rehabilitation conventions (between health institutions and the RIZIV-INAMI) were seldom an option.

**Finally**, the last chapter provides a **conclusion and discussion** about the consumption of physiotherapy and Physical and Rehabilitation Medicine in Belgium. Based on these results, **recommendations** are made in the executive summary.

## 1.2 DESCRIPTION OF KIND OF REHABILITATION

Three types of rehabilitation care are covered by the Belgian compulsory health insurance:

- care by physiotherapists (M-nomenclature),
- care by physicians specialised in Physical and Rehabilitation Medicine (K-nomenclature),
- rehabilitation conventions between health care institutions and the National Institute for Health and Disability Insurance (RIZIV-INAMI).

### 1.2.1 Nomenclature system

The services covered by the statutory health insurance (SHI) are described in the nationally established fee schedule (the “nomenclature”), including more than 8 000 services. For each service, the invoice code, key letter, relative value, tariff, and reimbursement rate are specified. The tariff is calculated by multiplying the key letter (which is assigned a certain monetary value) by the relative value. Rehabilitation activities reimbursed by the SHI are listed in article 22 and 23 of the nomenclature. The corresponding invoice codes for PRM services are labelled with the key letter “K” which is the reason why they are called the **K-nomenclature**.<sup>4,6</sup> Physiotherapy services, on the other hand, are invoiced with codes from the **M-nomenclature**.<sup>7,8</sup>

The utilisation of these nomenclatures is governed by different rules.

- Disorders

There is no list of covered complaints within the framework of compulsory insurance. Nevertheless, certain diseases can benefit from a higher number of better reimbursed sessions after prior notification to the medical advisor from the sickness fund. These disorders are listed as follows:

- First, there are the so-called F-lists for physiotherapy; Fa-list for acute disorders and Fb-list for chronic disorders.
- Serious disorders listed in the E-list, on the other hand, are subject to prior approval by the medical advisor from the sickness fund and can benefit of higher reimbursement, without limitation in the number of sessions for physiotherapy.<sup>7,9</sup>
- For Physical and Rehabilitation Medicine, there is a list of conditions eligible for multi-disciplinary PRM treatment.<sup>4</sup>
- Finally, the rehabilitation conventions concluded between institutions and the RIZIV-INAMI are only accessible to patients suffering from specific conditions.
- Care giver
  - Physiotherapists use the M-nomenclature. K-Nomenclature codes are attested to by PRM specialists. Nevertheless, PRM care itself can be given by a physiotherapist under the PRM specialist's supervision.
- Prescription
  - The physiotherapist must receive a prescription from a physician in order to provide the treatment.
  - For multi-disciplinary Physical and Rehabilitation Medicine, an examination upon admission to treatment determines the plan of treatment best suited to the patient.
- Number of sessions
  - The number of sessions of physiotherapy is not limited. There are, however, upper limits i.e. 18 sessions for standard diseases and 60 sessions for list F diseases. Above these thresholds, the reimbursement decreases for additional sessions (and patient's co-payments increase). The number of sessions is limited to one per day. In specific situations and for serious diseases (E-list), a second but shorter session on the same day can be reimbursed.
  - In relation to Physical and Rehabilitation Medicine, there are several fees: the lowest fee is for "K15" services while the highest is for "K60" services. The "K20" fee is provided per session in which one or more mono-disciplinary techniques are used. Forty-eight sessions is the maximum number that is reimbursed. For specific conditions, multi-disciplinary rehabilitation in an approved centre of Physical and Rehabilitation Medicine ("K30" and "K60") is allowed. The maximum number of multi-disciplinary sessions (from 60 to 120) is based on the nature of the complaint. After these sessions ("K20" or multi-disciplinary treatment "K30" and "K60"), the patient benefits from a lower "K15" reimbursement, or may change to a treatment consisting of physiotherapy. The multi-disciplinary "K45" treatment is not discussed in this report because it was only introduced in December 2007.
- Duration of the sessions
  - The reimbursement for physiotherapy is based on the duration of the session and on the location of the service. In contrast, Physical and Rehabilitation Medicine treatments do not respond to any criterion of duration except the multi-disciplinary rehabilitation sessions in specific accredited centres of Physical and Rehabilitation Medicine. In 2004, a limitative list of disorders for multi-disciplinary treatments was introduced.<sup>4</sup>

The nature of the rehabilitation care performed under the cover of these nomenclatures, K and M, is unknown. For physiotherapy, Thonnard et al. showed the varied profile of activities of a sampling of physiotherapists in Belgium as well as of the numerous techniques utilised.<sup>3</sup>

### 1.2.2 Convention system

Conventions are rehabilitation agreements between the National Institute for Health and Disability Insurance (RIZIV-INAMI) and the health care provider (institutions).

Rehabilitation within the framework of conventions between institutions and the RIZIV-INAMI is limited to specific rehabilitation centres. Conventions cover patients presenting specific disorders including neurological, pulmonary and musculoskeletal (congenital and acquired) impairments. In this system, the patient is entitled 60 or 120 sessions of rehabilitation during 60 or 120 minutes.

### 1.2.3 Overlap between convention and Physical and Rehabilitation Medicine rehabilitation

Many conditions that benefit from multi-disciplinary Physical and Rehabilitation Medicine are similar to those that benefit from the conventions i.e. mainly neurological, muscular and orthopaedic diseases. The duration of the session and the number of sessions allowed vary according to the disorder (60 or 120 sessions).

Until recently, Physical and Rehabilitation Medicine and conventions could be used sequentially. Since August 2006, the convention 950 (for locomotor rehabilitation) rules out the addition of K-nomenclature with convention reimbursement during the first 60/120 sessions. In addition, a "convention 950" centre that gives care to a patient who already got some multi-disciplinary PRM sessions has to subtract these sessions from the total of 60 or 120 sessions.

### 1.2.4 Overlap between physiotherapy and Physical and Rehabilitation Medicine

- Patients with standard disorders (e.g. sprained ankle, low back pain) can be referred to the physiotherapist by any physician. The physiotherapy sessions performed after a first set of 18 sessions benefit from a lower reimbursement than in Physical and Rehabilitation Medicine. On the other hand, the patient has also free access to the specialist in Physical and Rehabilitation Medicine, with a maximum of 48 PRM sessions reimbursed. Therefore, patients might have an incentive to favour this pathway of care.
- There is a considerable overlap between the E and F physiotherapy lists, and the lists of disorders that can benefit from a multi-disciplinary PRM treatment.
  - Once patients have reached the maximum number of reimbursed multi-disciplinary PRM treatments, they might want to switch to physiotherapy where the number of reimbursed sessions and their co-payment become more favourable in comparison with the K-nomenclature system.
  - On the contrary, when a patient has reached the threshold for physiotherapy, the co-payment for PRM sessions K15 and K20 becomes less expensive than physiotherapy.

## 2 INTERNATIONAL COMPARISON OF PHYSICAL AND REHABILITATION MEDICINE

### 2.1 RATIONALE AND SCOPE

#### 2.1.1 Rationale

An **analysis of outpatient and inpatient physical and rehabilitation services in several countries** was carried out in order to complete the international comparison of outpatient physiotherapy services performed by Thonnard et al. in 2006.<sup>3,10</sup> Altogether, these analyses will allow Belgian health care deliverers and policymakers to have an informed discussion about the organisation of physiotherapy and physical and rehabilitation medicine (PRM) in the field of rehabilitation, in Belgium.

#### 2.1.2 Scope

##### ***Selected countries***

The comparative analysis comprehended five countries:

- Belgium
- The Netherlands
- France
- United Kingdom
- Canada

Portugal and Germany, which were included in the comparison by Thonnard et al., were not studied because of time constraints.<sup>3,10</sup>

##### ***Topics of interest***

First, each country analysis started with a brief overview of the health care system and its financing scheme: total and public expenditures on health; total health employment; number of practicing physicians; type of coverage system.

Second, the following aspects of physical and rehabilitation medicine were analyzed:

- Definition of PRM
- Profession of PRM specialist: statistics; training; requirements to get and to stay in the profession; employment status; activities; role of professional association.
- General organisation of PRM: services provided; accessibility; patient's freedom of choice in relation with caregiver setting; patient coverage and reimbursement system; decision on nature and duration of treatment; access to PRM and overlap between PRM and physiotherapy.
- Quality initiatives in PRM: for PRM specialists; in rehabilitation centres.

### 2.2 METHODOLOGY

Grey literature was searched, e.g. websites of government departments and agencies, academic and research institutes, professional groups, health insurers et cetera. The most interesting sources of information are listed at the end of each country.

Secondly, we contacted several organisations or authorities in order to retrieve additional information on the organisation of PRM in the different countries. A list of key informants is provided at the end of each country.

The search for information was performed by three KCE reviewers.

The next chapter summarizes our review for the five selected countries. The detailed results are described in the first part of this report's supplement.

## 2.3 RESULTS

### 2.3.1 General characteristics of health care systems

Table I illustrates that all countries spend between 8 and 11% of their gross domestic product on health, of which a substantial part is financed with public funds. There are, however, less practicing physicians per 1 000 population in the United Kingdom and Canada, which are both NHS-type (National Health System) countries where the health system is financed through general taxation. Belgium, the Netherlands and France, on the other hand, are SHI-type (Statutory Health Insurance) countries where sickness funds act as an intermediate between government and public.<sup>3</sup>

**Table I : General characteristics of health care systems**

	BE	NL	FR	UK	CA
Total expenditures on health in 2006: % of GDP	10.3%	9.2% (in 2005)	11.1%	8.3%	9.8%
Public expenditures on health in 2006: % of total expenditures on health	72.3%	62.5% (in 2003)	79.8%	87.1%	70.4%
Total health employment in 2006: % of total employment	no data	6.2% (in 2003)	8.0%	7.3%	8.1%
Number of practicing physicians per 1000 population in 2006	4.0	3.7	3.4	2.4	2.2
Type of coverage system	SHI	SHI	SHI	NHS	NHS

GDP = Gross Domestic Product; SHI = Statutory Health Insurance; NHS = National Health System

### Key points

General characteristics of health care systems

**All countries spend between 8 and 11% of their gross domestic product on health.**

**There are less practicing physicians per 1 000 population in the United Kingdom and Canada, which are both NHS-type countries where the health system is financed through general taxation.**

**Belgium, the Netherlands and France, on the other hand, are countries where sickness funds act as an intermediate between government and public.**

### 2.3.2 Definition of PRM

The **European definition** of PRM, in the White Book on PRM in Europe, is as follows: "PRM is an independent medical speciality concerned with the promotion of physical and cognitive functioning, activities (including behaviour) and participation (including quality of life) taking into account personal and environmental factors. It is thus responsible for the prevention, diagnosis, treatments and rehabilitation management of people with disabling medical conditions and co-morbidity across all ages".<sup>11</sup>

This definition includes the components of the **International Classification of Functioning, Disability and Health (ICF)**. The ICF is the WHO's framework for measuring health and disability at both individual and population levels, that was endorsed in 2001. This classification is pioneering because it acknowledges that every human being can experience a decrement in health and thereby experience some degree of disability. In addition, the ICF takes into account the social aspects of disability and does not see disability only as 'medical' or 'biological' dysfunction.

By including environmental factors, the ICF allows to record the impact of the environment on the person's functioning.<sup>12, 13</sup>

**The Netherlands and Canada** are the only two countries where the **definition of PRM is not in line with the ICF**.

Several countries employ **alternative appellations for PRM** i.e. rehabilitation medicine (in the Netherlands and the UK) or physiatry (in Canada). Consequently, a PRM specialist is called a rehabilitation physician (in the Netherlands), a rehabilitation medicine consultant (in the UK) or a physiatrist (in Canada).

### Key points

Definition of PRM

**At the European level, PRM is defined as an independent medical speciality concerned with the promotion of physical and cognitive functioning, activities (including behaviour) and participation (including quality of life) taking into account personal and environmental factors. It hereby includes the components of the International Classification of Functioning, Disability and Health (ICF).**

**The Netherlands and Canada are the only countries where the definition of PRM is not in line with the ICF.**

**Several countries use alternative appellations for PRM such as rehabilitation medicine or physiatry.**

### 2.3.3 Profession of PRM specialist

#### 2.3.3.1 Number of PRM specialists

Table 2 shows that Belgium and France have the highest numbers of PRM specialists as demonstrated by the derived number of PRM specialists per 1 000 residents and the (inverse value of) number of residents per PRM specialist. The UK seems to have the smallest number of PRM specialists.

These statistics should be interpreted with care, however, since they do not take into account trainees or other specialists involved with PRM.

**Table 2 : Number of PRM specialists**

	<b>BE</b> 2005	<b>NL</b> 2007	<b>FR</b> 2006	<b>UK</b> 2005	<b>CA</b> 2007
Nbr of PRM specialists	417	300	1 792	152	373
Nbr PRM specialists/1000 residents	0.040	0.018	0.028	0.003	0.011
Nbr residents/PRM specialist	25 050	54 527	35 265	398 601	88 384

#### **Requirements for practicing PRM**

As shown in Table 3, physicians must complete four to five years of residency training in order to become licensed as a PRM specialist.

They must all participate in programs of continuous medical education (CME). In Belgium and France, CME is a condition for accreditation in the context of the statutory health insurance. In the other countries, CME is compulsory for renewal of the PRM specialist's license to practice.

**Table 3 : Requirements for practicing PRM**

	<b>BE</b>	<b>NL</b>	<b>FR</b>	<b>UK</b>	<b>CA</b>
Years of schooling in PRM	5	4	4	4	5
CME compulsory for renewal license		Every 5 y		Every 5 y	Every 5 y
CME compulsory for accreditation	Every year		Every 5 y		

CME = continuous medical education

### 2.3.3.2 *Employment status*

In most countries, PRM specialists are salaried and work in rehabilitation facilities. This is also the case in France (and some parts of Canada), although a certain number of specialists there work in a private practice where they are financed on the basis of fee-for-service. Belgium is the only country where the majority of the specialists' activities is remunerated on a fee-for-service basis, in outpatient as well as inpatient settings.

#### **Key points**

Profession of PRM specialist

**Belgium (0.040) and France (0.028) have the highest number of PRM specialists per 1 000 residents, followed by the Netherlands (0.018) and Canada (0.011). The UK seems to limp behind with only 0.003 PRM specialists per 1 000 residents.**

**Physicians must complete four to five years (Belgium and Canada) of residency training in order to become licensed as a PRM specialist.**

**They must all participate in programs of continuous medical education which is a condition for accreditation or for renewal of the license to practice.**

**In most countries, PRM specialists are salaried and work in rehabilitation facilities. This is also the case in France although a certain number of specialists there work in a private practice where they are financed on the basis of fee-for-service. Belgium is the only country where the majority of the specialists' activities is remunerated on a fee-for-service basis, in outpatient as well as inpatient settings.**

### 2.3.4 General organisation of PRM

#### 2.3.4.1 *Provision of multi-disciplinary PRM services*

In every country we studied, the majority of **PRM specialists are part of a multi-disciplinary team** of physiotherapists, occupational therapists, speech therapists, psychologists, dieticians, nurses, social workers, orthotists and prosthetists. They are responsible for the treatment plan, the follow-up and the evaluation of the treatment. This multi-disciplinary treatment is offered on an **outpatient or inpatient** basis in **general hospitals, university hospitals or specialized rehabilitation centres**, which offer specialized rehabilitation services to individuals with a motor, visual, hearing or speech and language impairment.

In some parts of the UK and Canada, there are also **community-based** multi-disciplinary rehabilitation teams to smooth the reintegration to home and community.

#### 2.3.4.2 *Provision of specific PRM services for musculoskeletal rehabilitation*

In the **Netherlands, UK and Canada**, patients in need of musculoskeletal rehabilitation are mostly referred to the **private practice of a physiotherapist, an occupational or speech therapist**. These services could, in theory, be provided by the same facilities that offer multi-disciplinary PRM services (i.e. general hospitals and specialized rehabilitation centres) and without any co-payment. However, long waiting times force patients to go to private clinics that offer mono-disciplinary services at the expense of the patient or his private insurance.

The situation is completely different in **France and Belgium** where patients have free access to PRM services (no gate keeping), where the number of PRM specialists is considerably higher than in the other countries and where there are no waiting lists for outpatient PRM care. For these reasons, PRM specialists tend to treat patients in their own private practice or clinic in stead of referring them to a physiotherapist. This leads to an **overlap between PRM specialists and physiotherapists** both offering outpatient physiotherapy.

### 2.3.4.3 Accessibility and reimbursement of PRM services

#### THE NETHERLANDS, UK AND CANADA

- Patients must have a referral from a physician to get an appointment from a PRM specialist. This way, access to outpatient PRM care is restricted by the **gate-keeping** system. For inpatient as well as and outpatient multi-disciplinary PRM services, patients are confronted with **waiting lists** and can not really choose where they receive their treatment.

On the other hand, multi-disciplinary PRM services are **100% free of charge** for patients and there is no limit on the number of sessions covered.

- Private rehabilitation services such as physiotherapy, occupational therapy or speech therapy provided by allied health professions in their private practice, are typically **not covered** by the public system. Although there are some exceptions for those who are socio-economically deprived, in general, patients pay for these services with out-of-pocket payments or through private health insurance. The number of sessions covered varies according to the insurance plan. The **access** to such a private practice is **easier** than the circuit described for multi-disciplinary PRM treatments, because it is not restricted by any gate-keeping system.

#### BELGIUM AND FRANCE

- As mentioned before, French and Belgian patients have free access to PRM services (**no gate keeping**).
  - In relation to outpatient PRM services, there is no problem of waiting lists and patients can freely choose their caregiver. There are, however, limits to the reimbursement; co-payments are charged in both countries, and, in Belgium, the number of reimbursed PRM sessions is limited.
  - In Belgium, there are also co-payments for inpatient PRM care, and a restriction on the number of reimbursed inpatient sessions.
- On the other hand, patients need a **referral prescription** from a physician if they want access to reimbursed outpatient physiotherapy that is provided by a physiotherapist. Both countries apply patient co-payments for physiotherapy, and, in Belgium, the number of treatment sessions is limited. In relation to the overlap between physiotherapists and PRM specialists, Belgian patients might, in theory, have an incentive to favour the PRM pathway of care because of better reimbursement conditions. The patient could, however, be faced with an additional obstacle when the PRM specialists demands to examine the patient himself, in addition to the referral prescription.



## Key points

General organisation of PRM

In every country, inpatient and outpatient **multi-disciplinary** PRM treatment is offered in general hospitals or specialized rehabilitation centres. In the UK and Canada, there are also community-based multi-disciplinary rehabilitation teams.

- In the Netherlands, UK and Canada, access to multi-disciplinary PRM care is restricted by a gate-keeping system and patients face waiting lists. But, services are 100% free of charge and there is no limit on the number of sessions covered.
- French and Belgian patients have free access to PRM services and do not have to wait long. Reimbursement, however, is limited; co-payments are charged in both countries, and, in Belgium, the number of reimbursed PRM sessions is limited.

Patients in need of musculoskeletal rehabilitation are often treated with **mono-disciplinary** PRM care.

- In the Netherlands, UK and Canada, these patients are often referred to the private practice of a physio-, occupational or speech therapist because of the waiting times in the multi-disciplinary facilities. These private rehabilitation services are typically not covered by the public system and patients pay for them with out-of-pocket payments or through private health insurance. The number of sessions covered varies according to the insurance plan. Access to such a private practice is easier though than to multi-disciplinary PRM because it is not restricted by any gate-keeping system.
- In France and Belgium, PRM specialists tend to treat patients in need of musculoskeletal rehabilitation in their own private practice or clinic instead of referring them to a physiotherapist. This leads to an overlap between PRM specialists and physiotherapists both offering outpatient physiotherapy.

### 2.3.5 Quality initiatives in PRM

#### 2.3.5.1 Quality measures for PRM specialists

In every country, PRM specialists must participate in programs of **continuous medical education** (CME). CME is a condition for accreditation (Belgium, France) or for renewal of the PRM specialist's license to practice (Netherlands, UK and Canada). In Canada, the public can even consult a public register that includes information on every specialist's status of CME.

In addition, European PRM specialists are encouraged to become a **European Board Certified PRM specialist** which is granted by the European Board of Physical and Rehabilitation Medicine. Board certification is optional and does not give an academic qualification but it means that the candidate has reached the European standards of competence in PRM. It can be obtained by examination (for young specialists) or by equivalence.

The Netherlands, France and the UK developed **clinical guidelines** that recommend a certain treatment to the PRM specialist.

Finally, the **Dutch** Association of PRM physicians ('Nederlandse Vereniging van Revalidatieartsen', VRA) organises **practice visits** ('visitaties') in all PRM practices and has set up a system for **registering complications** ('complicatieregistratie').

### 2.3.5.2 *Quality measures for rehabilitation facilities*

**PRM training centres** can also apply for **Board Certification** by the European Board of Physical and Rehabilitation Medicine. Although their exact number was not retrievable, several Belgian rehabilitation centres are told to have obtained this certification.

In the Netherlands, rehabilitation facilities were given **frameworks for care** that indicate what is necessary to provide the treatment specified in the clinical guidelines. In the UK, the NHS published National Service Frameworks that are long term strategies for improving specific areas of care and that help service providers to take practical steps to improve rehabilitation services. In France, there are the so-called regulations “soins de suite et de réadaptation” (SSR) that form the framework for middle-long term rehabilitation services and that aim at social reintegration.

Dutch rehabilitation facilities are evaluated on the basis of quality criteria and can obtain a **quality certification**. In France, the rules of accreditation apply also to rehabilitation centres and became more quality oriented.

Finally, in the Netherlands, there are **performance indicators** for the rehabilitation centres. They cover 26 aspects of the care in relation to structure, process and outcome. In the Canadian province of Ontario, data of the Ontarian rehabilitation facilities are processed to produce balanced score cards which report on hospital performance. In addition, methodologies were developed to identify “high performing” hospitals. These hospital-specific performance scores can even be made public.

#### **Key points**

Quality initiatives in PRM

**Continuous medical education is obligatory in every country. In addition, European PRM specialists are encouraged to obtain the European Board certification. Rehabilitation centres can also apply for Board Certification.**

**The international comparison learned that several countries developed clinical guidelines for PRM specialists. The Dutch organise practice visits in all PRM practices and developed a system for registering complications.**

**Rehabilitation facilities were given frameworks for care in the Netherlands, the UK and France. In addition, Dutch and French rehabilitation centres can obtain a quality certification or accreditation. Finally, the Netherlands and Canada issued performance indicators for the rehabilitation centres.**

### 3 DESCRIPTION OF THE GENERAL CONSUMPTION OF REHABILITATION CARE BY THE STATUTORY HEALTH INSURANCE

#### 3.1 METHODOLOGY

The only data sets used to analyse the volume of rehabilitation in Belgium were those provided by the Common Sickness Funds Agency (IMA-AIM). This agency provides **claims data** on the services covered by the compulsory health insurance, labelled with nomenclature codes and delivered in both ambulatory care settings and hospitals.

##### 3.1.1 Flaws of claims data

It has to be acknowledged, however, that claims data like those provided by the Common Sickness Funds Agency have **several flaws**:

- Claims data do not register the reason for which a patient is treated or examined; there is **no registration of diagnosis**, co-morbidities or complications. Such a registration is, on the other hand, provided in the clinical minimum data set for hospitalised patients. Nevertheless, deadlines of this study did not allow the use of the latter since these data are only available and validated at least 3 year after occurrence.
- The provided data base did not contain information on the out-of-pocket payments (OOP) of patients in 2004 en 2005. It was decided **not to study the cost for the patient** and limit the analyses to the insurance cost.
- The **insurance cost only includes the fees for the physician and therapist** performing the rehabilitation.

##### 3.1.2 IMA sample

This descriptive analysis is based on a representative insured population sampling equal to 1/40 of the population covered by compulsory health insurance. The sampling consisted of a group of 273 596 individuals over a 3-year period (2003-2005). The data allow comparing two consumption periods, respectively before and after the reform of Physical and Rehabilitation Medicine (1st August 2004). This reform consisted of the introduction of a limitative list of disorders that were eligible for multi-disciplinary PRM.<sup>4</sup>

The sampling process ensured the representativity by age and sex and allowed for longitudinal patient follow-up. The researchers disposed of a socio-demographic description for each individual, including the geographical data that corresponded to the residence of the patient.

The consultations in PRM that are not covered by the nomenclature K were not analysed since they did not address a specific form of therapeutic intervention.

##### 3.1.3 Representativity

This descriptive analysis, based on individual data from the IMA sampling, was compared with the exhaustive but aggregated data available to the RIZIV-INAMI. For the 2003-2005 period, these data permit a comparison of consumption per social category or district where the insured is domiciled. The table below shows that, globally, the three types of rehabilitation (i.e. physiotherapy, Physical and Rehabilitation Medicine and rehabilitation convention) were satisfactorily represented in the IMA sample: they all represent about 1/40 (2.50%) of the health insurance expenses for the whole population. The reader should be aware that these statistics are per accountancy year in stead of year of performance which explains why the share of the IMA sample in the total RIZIV-INAMI expenses is less for the accountancy year 2003. Theses expenses, however, are not exhaustive (see explanations in appendix 6 of this report's supplement), and should not be compared with other tables in this report or used for other purposes.

**Table 4 : IMA Sample: amount in € and portion of expenses in the IMA sample out of the total of RIZIV-INAMI expenses, per accountancy year and type of rehabilitation**

		Accountancy Year		
		2003	2004	2005
PRM	Expenses for sample (€)	2027856	2801847	3908608
	% of total expenses of RIZIV-INAMI	1.92%	2.46%	3.09%
PT	Expenses for sample (€)	7422640	9517289	9717246
	% of total expenses of RIZIV-INAMI	2.09%	2.45%	2.43%
Convention with PT	Expenses for sample (€)	584040	896984	946726
	% of total expenses of RIZIV-INAMI	1.89%	2.48%	2.43%
Other convention	Expenses for sample (€)	5566091	6871636	7087485
	% of total expenses of RIZIV-INAMI	2.01%	2.50%	2.53%
Medical health centre	Expenses for sample (€)	72383	86914	106088
	% of total expenses of RIZIV-INAMI	1.67%	1.82%	1.97%

The representativity of the sampling by type of intervention or type of disease is assured for the most common types of intervention only (i.e. those for which expenditure is most frequent).

On a more detailed level, the sampling does not always show the expected proportion of national expenses. This is not surprising since the sampling is based on a selection of individuals by age and sex, without control of the other parameters. Only rehabilitation affecting a large number of persons (e.g. physiotherapy) could claim representativity over criteria other than those used to perform the sampling.

- Expenses for physiotherapy and Physical and Rehabilitation Medicine were over or under-represented in most of the districts (distribution according to place of residence of the patient).
- The expenses for the least frequent social statuses were also over or under-represented.
- The expenses distributed by nomenclature code were not proportional to the size of the sampling.

### 3.1.4 Analysis

The descriptive analysis of rehabilitation consumption, i.e. rehabilitation covered by nomenclature codes K and M, as well as rehabilitation within the framework of conventions between health care centres and RIZIV-INAMI <sup>a</sup> follows two main lines:

- rehabilitation consumption by the patient;
- care episode.

<sup>a</sup> Acts per type-group of conventions, targeting, more particularly, those with an intrinsic link with the care given by physiotherapists or PRM specialists.

### 3.1.5 Classifications

#### 3.1.5.1 *Classification of care consumption in Physical and Rehabilitation Medicine and physiotherapy*

The acts of Physical and Rehabilitation Medicine are classified by the type of intervention. The acts of physiotherapy are classified by the kind of disease.

These classifications are conditioned by the respective configurations of "the nomenclature", insofar as nomenclature is in effect between 2003 and 2005.

1. The classification for Physical and Rehabilitation Medicine is:
  - standard sessions K20 or K15, according to the number of sessions already completed (e.g., K15 sessions starting with the 19th session);
  - mono-disciplinary sessions K30;
  - multi-disciplinary sessions lasting 60 minutes (K30), multi-disciplinary sessions lasting 120 minutes (K60);
  - multi-disciplinary sessions for back treatment, lasting 120 minutes,
  - rehabilitation associated with post multi-disciplinary rehabilitation (this can only be invoiced after the completion of multi-disciplinary physical medical treatment for certain health conditions),
  - some services may be invoiced on the spot but the cumulative fee is limited by day (manipulation, thermotherapy, traction, waves, etc).
2. The classification for physiotherapy is:
  - standard disease,
  - session for acute specific diseases (Fa-list),
  - session for chronic specific diseases (Fb-list),
  - session for serious disease (E-list)<sup>b</sup>,
  - perinatal condition session.
3. All the sessions related to that kind of disease are grouped under these terms:
  - wherever the treatment is provided;
  - whatever the duration (overall total duration of 60 minutes is only allowed for Cerebral Palsy, when patient is younger than 21);
  - whether or not the treatment exceeds the number of maximally reimbursed treatment sessions for standard diseases (18 sessions) and Fa- and Fb-listed conditions (60 sessions);
  - whether or not it involves a first or second treatment on the same day for E-listed conditions and standard diseases, in certain circumstances.

There is one exception on the principle of regrouping according to condition: we refer explicitly to a "second session due to certain hospital procedures" when a second session is invoiced on the same day as another session related to standard disease. This is only possible if:

- the patient was hospitalised in intensive care or intensive neonatal care or in a service for frail new-born;
- the patient was hospitalised and received reanimation care or specific onerous orthopaedic surgery. In this case, 14 second sessions may be invoiced within the 30 days following these interventions.

<sup>b</sup> Appendix 1, 2 and 3 provide a description of these diseases E and F. The standard diseases are defined by default.

### 3.1.5.2 *Classification of rehabilitation conventions*

Rehabilitation conventions between health care institutions and RIZIV-INAMI are classified in two categories.

- rehabilitation conventions with physiotherapy involve a physiotherapist in the rehabilitation treatment. This category refers to the following problems: chronic pain, cardiac patients, cerebral palsy, cerebral paralysis, paediatric respiratory disorders, chronic fatigue, chronic respiratory disorders, locomotor-neuro (centre 950), motor rehabilitation, neuromuscular disorders, spina bifida. A detailed list of included therapeutic code can be found in Appendix 4.
- rehabilitation conventions without physiotherapy are conventions without any physiotherapist involved or when the physiotherapists are not the main rehabilitation professionals. Physiotherapists act as counsellors or occupational therapists. This category contains the following diseases: intervention in medico-psycho-social centre, alcohol-drug dependence, chronic pain, child-parents relation disorder, diabetes, hearing and speech disorder, hearing loss, epilepsy, foot interdisciplinary advice, monogenetic disorder of metabolism, cystic fibrosis, unwanted pregnancy, optic, orthoptic treatment, oxygen therapy, palliative day care centre, professional rehabilitation, psychological handicap, psychosocial disorder, psychotic, rehabilitation convention, infants at risk for sudden death, transport of handicapped patients, ventilation assistance, visual handicap and authorisations by the medical college of sickness funds. A detailed list of included therapeutic codes is in Appendix 5.

### 3.1.5.3 *Classification of rehabilitation consumption: inpatient and outpatient treatment*

Another classification takes into account the treatment setting: patient is hospitalised (inpatient) or not (outpatient).

One day hospitalisations are considered as outpatient. In the same way, a patient who is treated at the hospital but who does not stay overnight is an outpatient.

## 3.2 **ANALYSIS OF CONSUMPTION BASED ON IMA SAMPLE**

This chapter provides an inventory of the consumption of rehabilitation:

- a description of the characteristics of the consumers;
- a “reconstitution” of the care episodes;
- a description of the most common rehabilitation pathways.

The study period relates to the years 2003-2005. The year mentioned refers to the actual date the service took place, and not to the date it was invoiced. The unit of observation is the patient who benefits from a rehabilitation treatment (i.e. compulsory insurance expenditure for rehabilitation different from zero).

Initially, we briefly analyse the rehabilitation consumption and expenses including the therapeutic interventions and clinical examinations, the evaluation reports of physiotherapists or specialists in Physical and Rehabilitation Medicine, as well as the diagnostic procedures.

This chapter also presents the budgets allocated to the medical health centres that work within a capitation system. Medical health centres are first line practices involving GPs and sometimes also other health practitioners (e.g. physiotherapists, nurses).

The details are provided in Appendix 7.

### 3.2.1 Global consumption per patient given the kind of rehabilitation

#### 3.2.1.1 *Statutory health insurance expenditure per consumer*

The expenditure distributions reflect the annual rehabilitation consumption of the consumers who benefited from a type of rehabilitation.<sup>c</sup> The averages therefore represent average expenditure per rehabilitation consumer, instead of average expenditure per insured person as published in the statutory insurance reports.

The consumption distributions in terms of numbers of services are also mentioned, although they amalgamate interventions of different kinds: diagnostic or therapeutic actions, therapeutic sessions and lump sum coverage within the framework of rehabilitation conventions. It should be noticed that PT sessions, even of the same duration, have different fees according to their setting: fees are lower when PT sessions take place in a nursing home for elderly or disabled.

The main points are the followings:

- The average expenditure per patient is similar for physiotherapy and Physical and Rehabilitation Medicine, i.e. €295 and €292 in 2005 respectively.
- For 50% of the physiotherapy consumers, the RIZIV-INAMI spent less than €125 (median) in 2005. For 10% of the patients, the expenditure exceeded €1 147 (Table 5).
- For 50% of the consumers of Physical and Rehabilitation Medicine, the RIZIV-INAMI spent less than €94 (median) in 2005. For 10% of the patients, the expenditure exceeded €1 308. These expenditures included both treatment and diagnostic tests (Table 3).
- For 50% of rehabilitation consumers with physiotherapy, the RIZIV-INAMI spent less than €535 (median) in 2005. For 10% of the patients, expenditure exceeded €3 405 (Table 7).
- The data from the medical health centres that work within a capitation system do not reflect the physiotherapy consumption. They give the number of monthly lump sums invoiced, taking account of the number of patients registered with the medical centre and the total amount of lump sums allocated to the medical health centres pro rata these registrations (Table 9).

For details see Appendix 7.

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<sup>c</sup> For information on consumption per care episode see further.

**Table 5 : Physiotherapy (report, examination, diagnostic and treatment): consumption per patient<sup>d</sup>**

Year	N Obs	Variable	Sum	Mean	Lower 95% CL for Mean	Upper 95% CL for Mean	Median	Upper Qrtile	90th Pctl	95th Pctl
2003	31543	ACTS	839284	26.61	26.12	27.09	9	24	65	116
		EXPENSES	8945430.54	283.59	278.35	288.84	109.89	257.4	692.93	1134.9
2004	32487	ACTS	859878	26.47	26	26.94	9	24	64	112
		EXPENSES	9545473.27	293.82	288.51	299.14	116.34	267.96	729.83	1151.4
2005	33471	ACTS	866203	25.88	25.43	26.33	10	24	62	109
		EXPENSES	9859685.59	294.57	289.38	299.77	124.08	270.03	726.11	1147.2

N Obs = number of patients- Unit of observation is the patient

**Table 6 : Physical and Rehabilitation Medicine (examination, diagnostic and treatment): consumption per patient**

Year	N Obs	Variable	Sum	Mean	Lower 95% CL for Mean	Upper 95% CL for Mean	Median	Upper Qrtile	90th Pctl	95th Pctl
2003	10075	ACTS	102901	10.21	9.83	10.59	3	10	26	44
		EXPENSES	2545765.84	252.68	241.72	263.64	88.84	188.99	543.2	1085.8
2004	10446	ACTS	103975	9.95	9.61	10.3	3	10	26	43
		EXPENSES	2819750.3	269.94	259.06	280.82	90.19	201.9	601.38	1223
2005	10362	ACTS	98656	9.52	9.22	9.82	3	10	26	41
		EXPENSES	3029020.92	292.32	280.56	304.08	93.07	240.54	645.88	1307.7

N Obs = number of patients- Unit of observation is the patient

<sup>d</sup> Table 5 is not comparable with Table 4 as far as Table 5 gives expenses per year when rehabilitation was performed.



**Table 7 : Rehabilitation convention with physiotherapy: consumption per patient**

Year	N Obs	Variable	Sum	Mean	Lower 95% CL for Mean	Upper 95% CL for Mean	Median	Upper Qrtile	90th Pctl	95th Pctl
2003	513	ACTS	11660	22.73	19.52	25.94	9	26	54	105
		EXPENSES	802484.15	1564.3	1244.77	1883.83	418.6	1205.54	3976.4	7245.3
2004	565	ACTS	12791	22.64	19.72	25.56	10	27	56	92
		EXPENSES	859066.55	1520.47	1211.21	1829.73	427.57	1055.57	3632.8	6525
2005	578	ACTS	12352	21.37	18.46	24.29	9	27	49	85
		EXPENSES	943950.11	1633.13	1312.89	1953.37	534.65	1252	3404.8	8385.5

**Table 8 : Other rehabilitation convention: consumption per patient**

Year	N Obs	Variable	Sum	Mean	Lower 95% CL for Mean	Upper 95% CL for Mean	Median	Upper Qrtile	90th Pctl	95th Pctl
2003	4996	ACTS	238753	47.79	38.78	56.8	10	27	64	188
		EXPENSES	5887055.82	1178.35	1074.54	1282.17	375.69	1240.68	2107.4	3925.4
2004	3952	ACTS	265846	67.27	50.61	83.92	2	12	105	350
		EXPENSES	6095173.71	1542.3	1414.66	1669.94	640.2	1351.32	3055.1	5664.2
2005	4130	ACTS	313659	75.95	57.01	94.88	2	12	120	362
		EXPENSES	6262615.18	1516.37	1399.67	1633.07	708.62	1354.32	3077	5415.6

**Table 9 : Medical health centre with capitation system including physiotherapy**

Year	N Obs	Variable	Sum	Mean	Lower 95% CL for Mean	Upper 95% CL for Mean	Median	Upper Qrtile	90th Pctl	95th Pctl
2003	1803	Nbr subscriptions	18237	10.11	9.98	10.25	12	12	12	12
		EXPENSES	75721.23	42	40.3	43.7	24.07	61.12	84.32	135.97
2004	2012	Nbr subscriptions	20075	9.98	9.85	10.11	11	12	12	12
		EXPENSES	87173.74	43.33	41.53	45.13	23.49	70.96	83.6	162.85
2005	2455	Nbr subscriptions	24567	10.01	9.9	10.12	11	12	12	12
		EXPENSES	105828.15	43.11	41.46	44.76	23.31	71.81	81.95	171.28

N Obs= number of patients - Unit of observation is the patient

### 3.2.2 Diagnostic or evaluation examination reports

The PRM and physiotherapy nomenclatures include codes for examination reports under precise conditions. These diagnostic consultations are out of the scope of this report which addresses therapeutic interventions. The inclusion of these acts could distort the analysis, since they represent a considerable portion of the activity of PRM specialists. These services are detailed in Appendix 8 but are not included in the following chapters.

### 3.2.3 Consumption of rehabilitation treatment

The following chapters relate to the rehabilitation treatment. Rehabilitation within the framework of conventions that does not explicitly involve a physiotherapist is not taken into account. Registration with a medical health centre (first line practice with capitation payment) is not included either.

#### 3.2.3.1 *Different kinds of rehabilitation for the period 2003-2005*

Each year, approximately 13.5% of the sample population has rehabilitation (Table 10).

Table 11 illustrates that one patient out of four (26.16%) benefited from rehabilitation at least once during this 3-year period. In 3 years, 3.09% of the sample population underwent recurrent, chronic or non-chronic rehabilitation.

One patient out of ten (11.71%) in 2003 and 12.42% in 2005 had physiotherapy.

Physical and Rehabilitation Medicine was consumed by 2.51% of the insured in 2003 and 2.59% in 2004.

Each year, 0.20% to 0.22% of the insured benefited from rehabilitation conventions including physiotherapy.

In 2005, 1.35% of the sample population had physiotherapy and Physical and Rehabilitation Medicine. A combination of several kinds of rehabilitation therefore exists for the same patient: it is far from marginal compared to the sample population receiving Physical and Rehabilitation Medicine.

These data do not support the assumption that patients received more frequently Physical and Rehabilitation Medicine (versus physiotherapy) in 2005 compared with 2003 and 2004 (see Table 10).

**Table 10 : Number and proportion of patients with at least one rehabilitation treatment session per year**

	Kind of rehabilitation	Patients who had at least one treatment	Sample population	% of sample population
2003	PRM	6590	262298	2.51%
	Physiotherapy	30712		11.71%
	Physiotherapy + PRM	3302		1.26%
	Convention + PT	514		0.20%
	Total	34156		13.02%
2004	PRM	6775	261741	2.59%
	Physiotherapy	31783		12.14%
	Physiotherapy + PRM	3342		1.28%
	Convention + PT	566		0.22%
	Total	35932		13.52%
2005	PRM	6782	263817	2.57%
	Physiotherapy	32770		12.42%
	Physiotherapy + PRM	3554		1.35%
	Convention + PT	575		0.22%
	Total	36179		13.71%

Table 11 shows the number of patients with rehabilitation treatment at least once between 2003 and 2005, either over the course of a single year or repeatedly each year. This table does not, therefore, consist of a mere adding-up of the data from the 3 years presented separately in Table 10.

**Table 11 : Number and proportion of patients with at least one rehabilitation treatment session during the period 2003-2005**

	Kind of rehabilitation	Patients who had at least one treatment	Sample population	% of sample population
Period 2003-2005	PRM	16182		5.91%
	Physiotherapy	65378		23.90%
	Convention with PT	1389		0.51%
	Total rehabilitation for 1 year	45793		16.74%
	Total rehabilitation for 2 years	17332		6.33%
	Total rehabilitation for 3 years	8457		3.09%
	Total rehabilitation at least 1 year	71582	273596	26.16%

### 3.2.3.2 *Inpatient and outpatient rehabilitation (2003-2005)*

Over the 3-year period, more than one out of ten patients (10.49%) received physiotherapy during hospitalisation. More than one in four (27.58%) had at least once physiotherapy in outpatient. See Table 12.

During the same period, 5.42% of the sample were hospitalised and treated by Physical and Rehabilitation Medicine. Nearly 8 % of the sample had this rehabilitation as an outpatient treatment.

Rehabilitation with conventions including physiotherapy involved barely 0.24% of the sample population without hospitalisation and 0.42% with hospitalisation. Rehabilitation conventions without physiotherapy were more frequent i.e. among 6.75% of the sample population as an outpatient treatment.

**Table 12 : Inpatient and outpatient rehabilitation (period 2003-2005)**

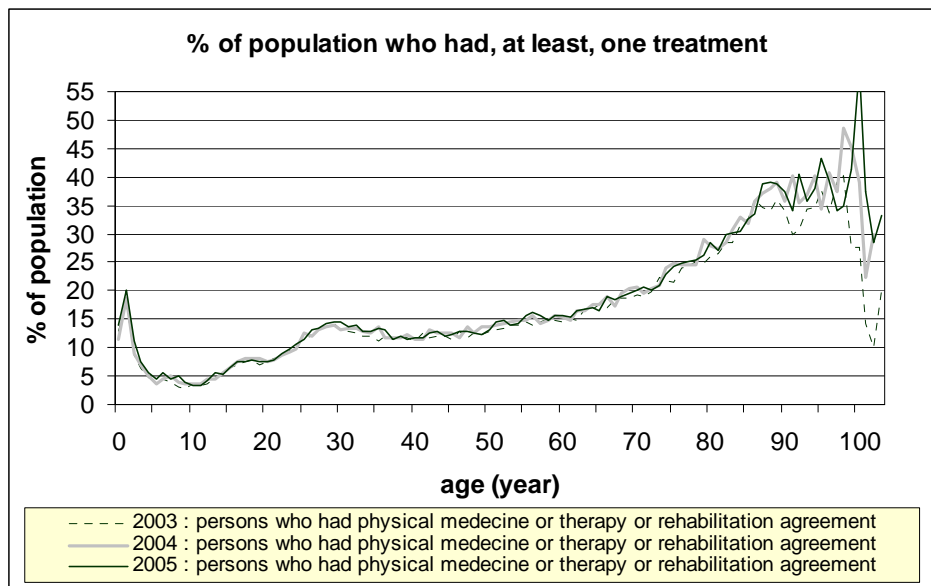
Type of rehabilitation	In- or outpatient treatment	Proportion of sample population
Physical and Rehabilitation Medicine	Inpatient	5.42%
	outpatient	7.93%
Physiotherapy	Inpatient	10.49%
	outpatient	27.58%
Convention with PT	Inpatient	0.42%
	outpatient	0.24%
Convention without PT	Inpatient	0.18%
	outpatient	6.75%

### 3.2.3.3 *Rehabilitation consumption: analysis by age and gender*

Rehabilitation consumption increases in the oldest age groups (Figure 1 - details in Appendix 9) for the three kinds of rehabilitation. Over the age of 60, the rehabilitation concerns 20% to 35% of the sample population.

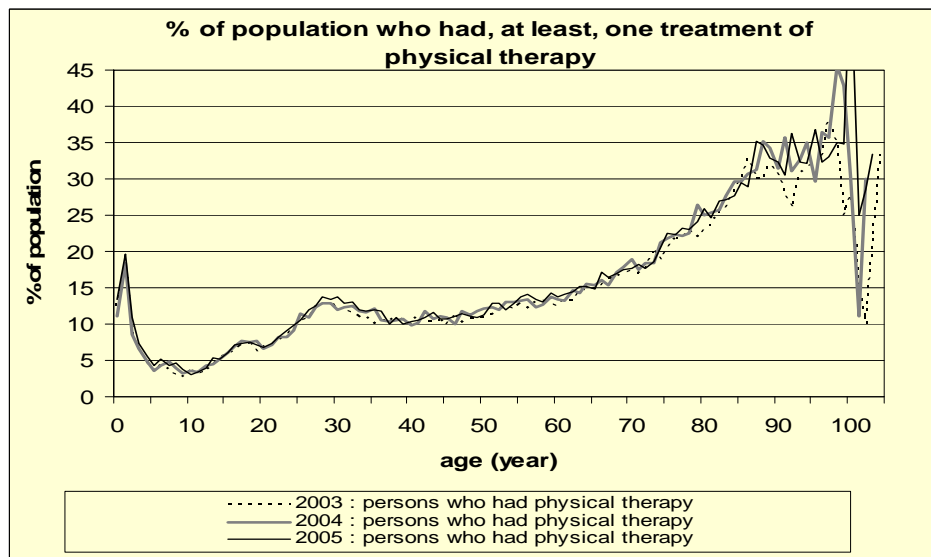
Regardless of age, physiotherapy is predominant.

**Figure 1 : Global rehabilitation consumption by age**



The specific consumption of physiotherapy increases according to age (Figure 2). A peak in consumption is also observed for infants aged less than 1 year. The next peak (between 25 and 35 years) is linked to pregnancy. This peak disappears (see Figure 3) when suppressing the physiotherapy linked to perinatal conditions.

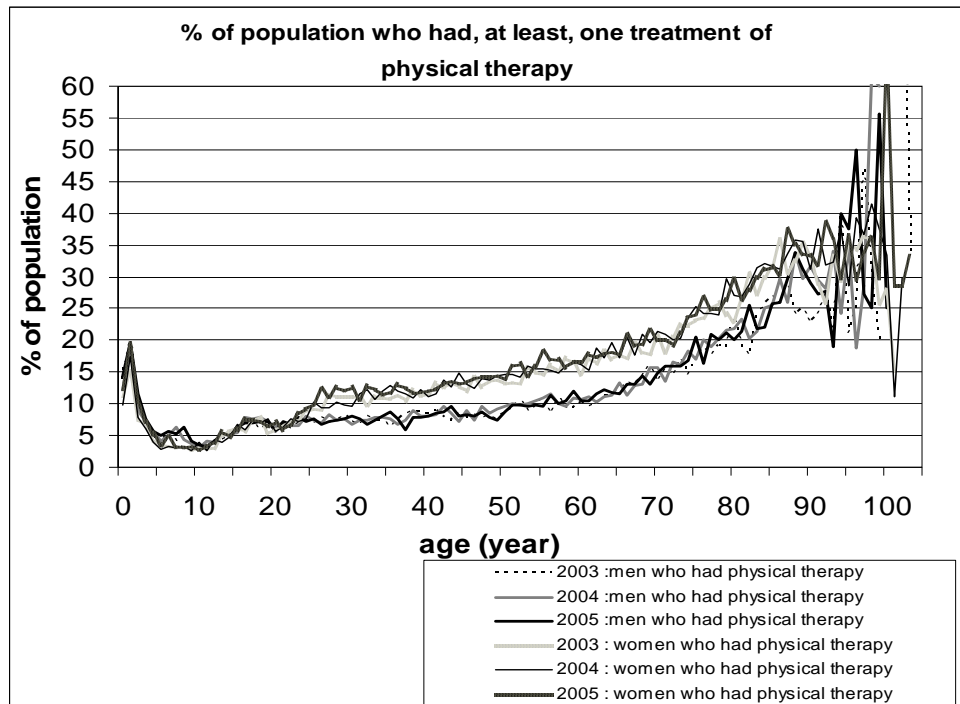
**Figure 2 : Physiotherapy consumption by age**



Over the age of 25, regardless of age, physiotherapy is more frequent among women ( $\pm 5\%$  more) than among men (Figure 3). These differences remain identical after the exclusion of perinatal physiotherapy.

Between 25 and 69 years, the percentage of women consumers is 1.58 times higher on average than that of men.

**Figure 3 : Consumption of physiotherapy (excluding perinatal care) by age and gender**



The proportion of persons with a PRM treatment also increases with age (Figure 4). This increase starts at the age of 25 but does not diminish after 35 years as was observed for physiotherapy.

**Figure 4 : Consumption of Physical and Rehabilitation Medicine by age**

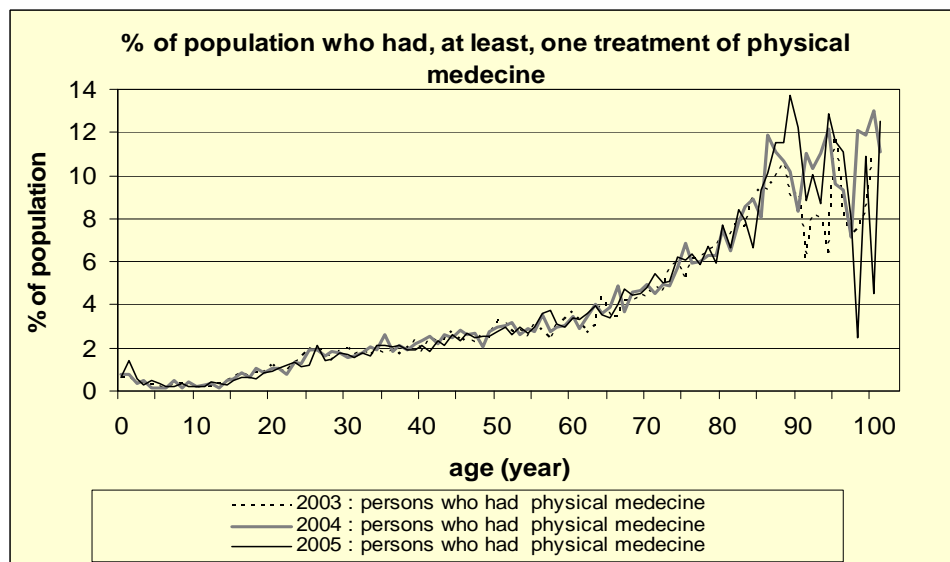
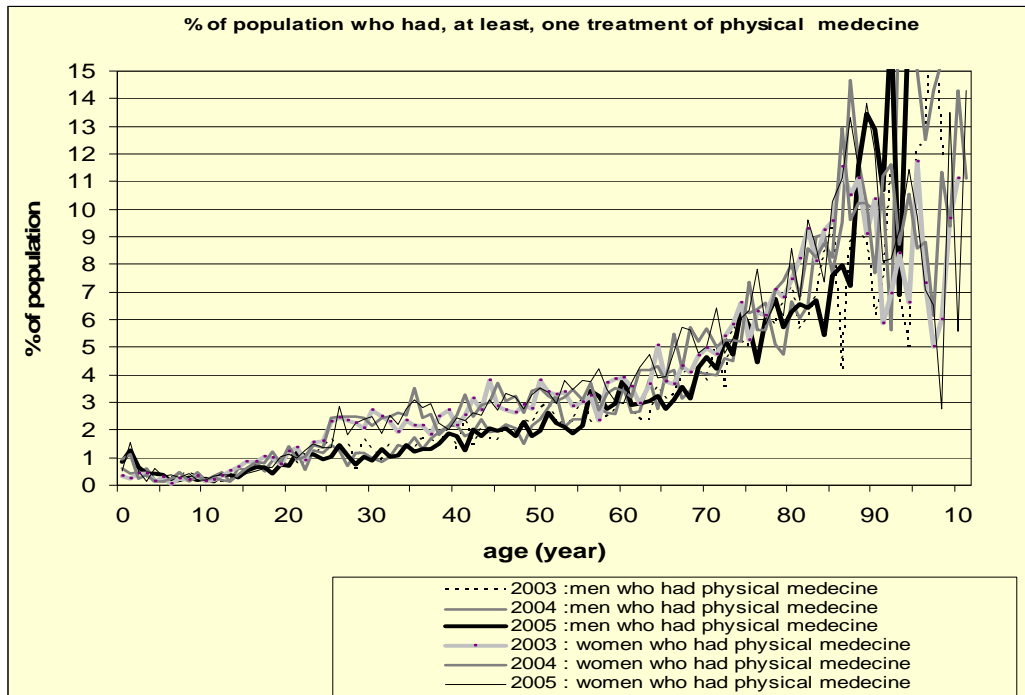


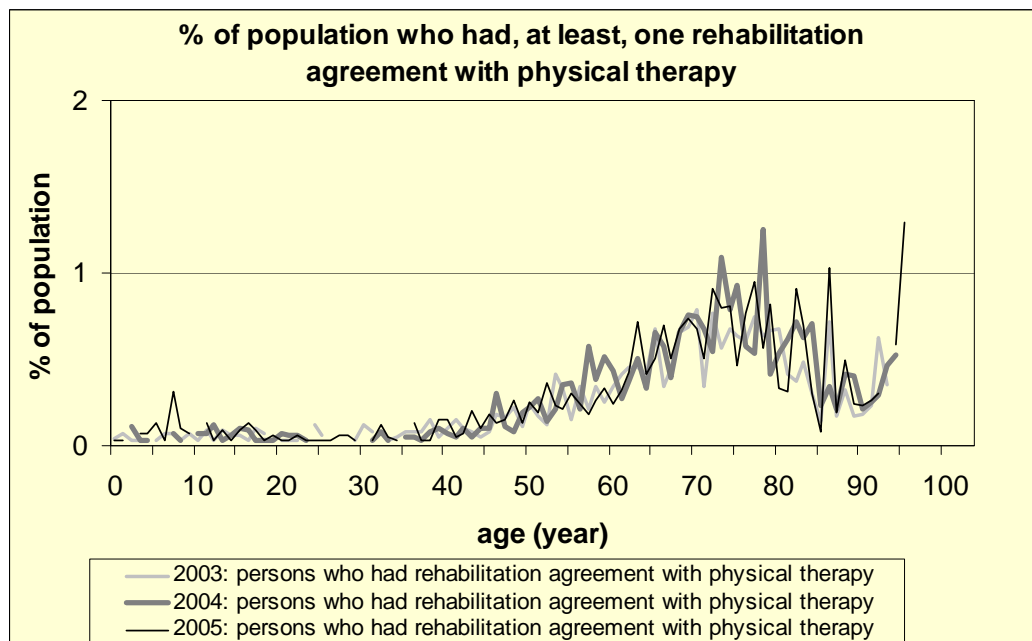
Figure 5 shows a difference between men and women as regards the consumption of Physical and Rehabilitation Medicine between 25 and 50 years. On average, between the ages of 25 and 49, the percentage of women consumers is 1.82 times higher than that of men (details in Appendix 9).

**Figure 5 : Rehabilitation by specialist in Physical and Rehabilitation Medicine by age and sex**



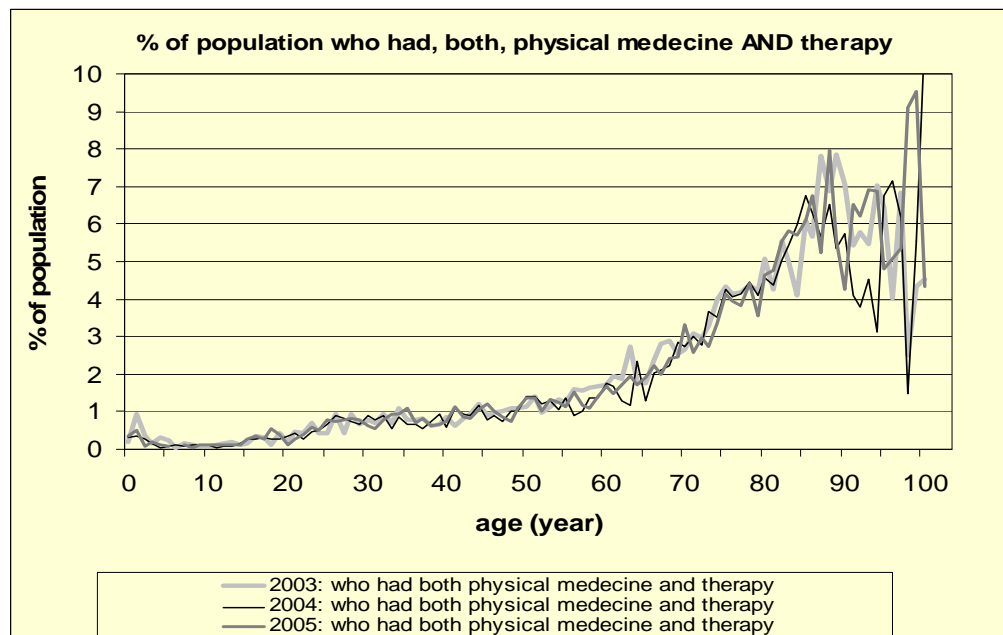
The proportion of persons with rehabilitation conventions is low, but increases dramatically over the age of 65 (Figure 6).

**Figure 6 : Prevalence of rehabilitation with convention including physiotherapy component by age**



The proportion of persons with both physiotherapy and PRM during the same year increases with age, starting at 15 years (Figure 7). The increase is progressive but the trend accelerates over age 65. To confirm these comments, see details Appendix 9.

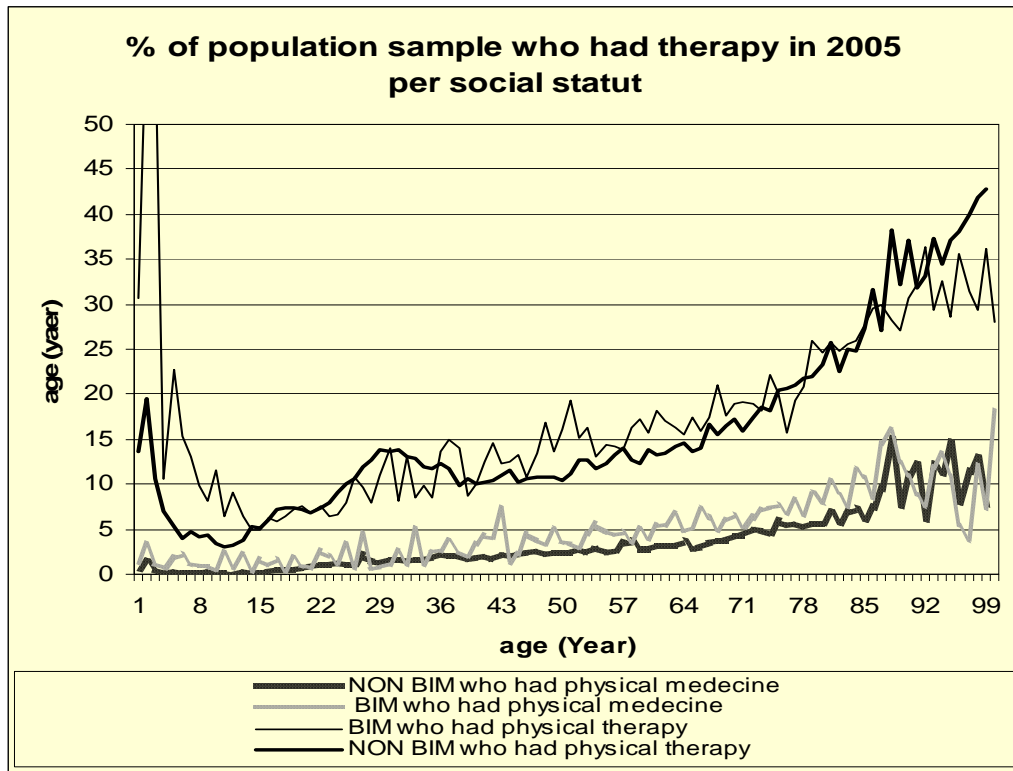
**Figure 7** Prevalence of rehabilitation with a combination of physiotherapy and Physical and Rehabilitation Medicine during the same year: evolution by age



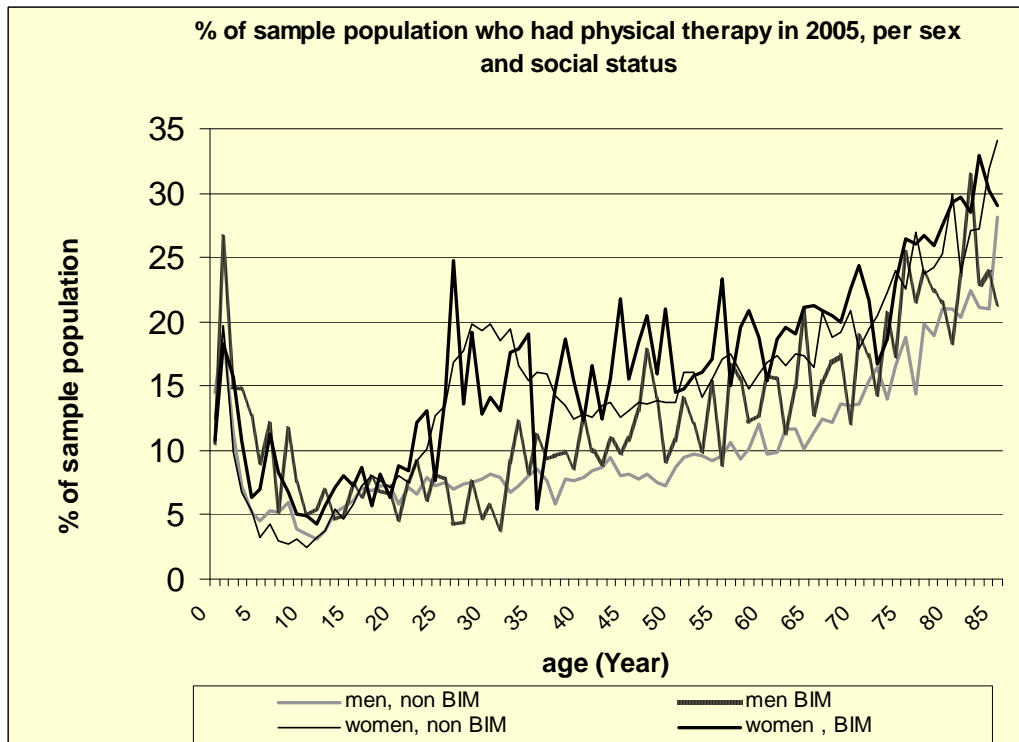
#### 3.2.3.4 Rehabilitation with physiotherapy or with PRM according to social security status

The difference between the consumption of physiotherapy and the consumption of Physical and Rehabilitation Medicine is statistically significant ( $p$  value ( $\text{Chi}^2$ )  $< 0.01$ ) between BIM (beneficiary of increased intervention) and non-BIM (non-beneficiary of increased intervention). It nevertheless appears of lesser importance than the difference between genders shown by Figure 8 and Figure 9 below (see details in Appendix 9). The difference between BIM and non-BIM is particularly marked during childhood and adolescence. For details, see Appendix 9.

**Figure 8 : Proportion of population sample who had at least one treatment, by social status, kind of treatment and age**



**Figure 9 : Proportion of sample population who had at least one physiotherapy treatment per social characteristic, kind of treatment and gender**



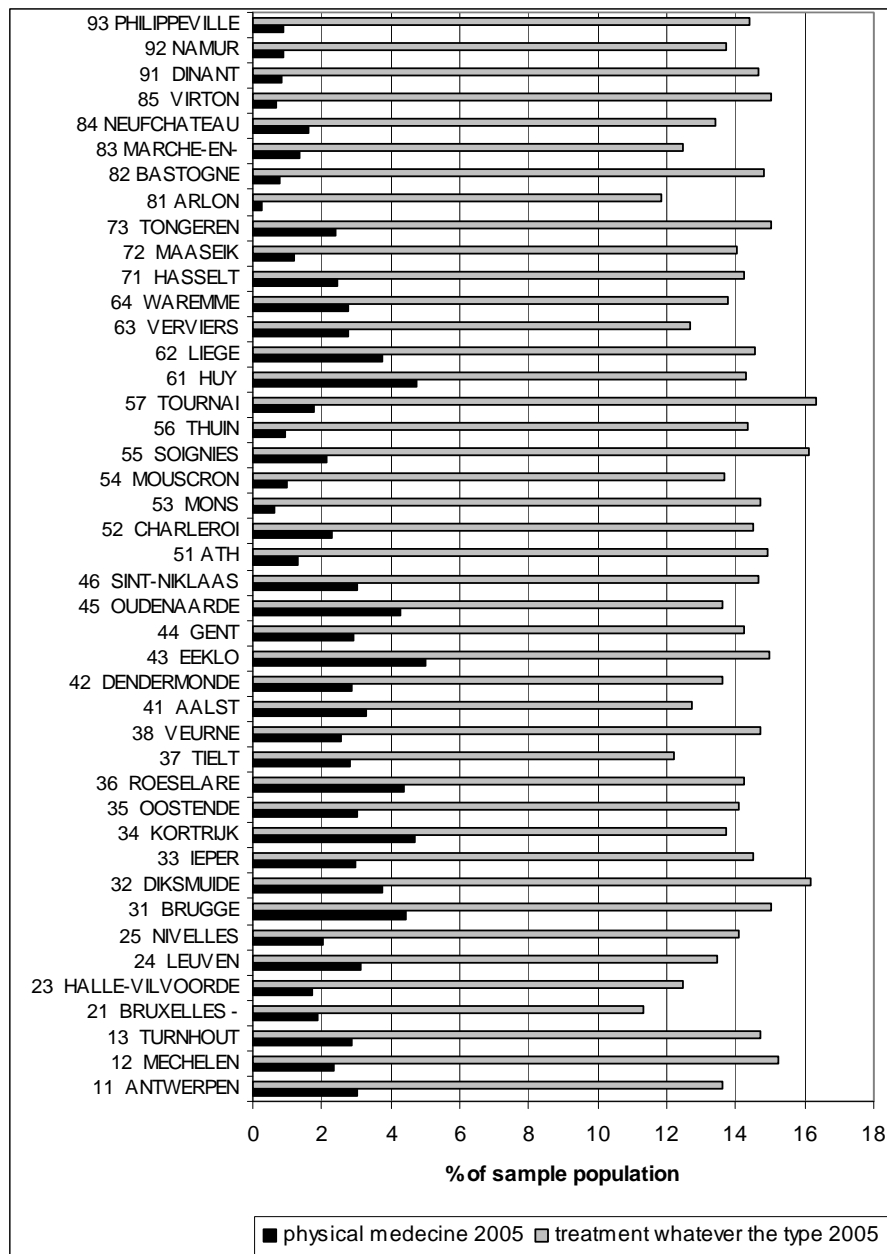


### 3.2.3.5 Rehabilitation consumption by district

The differences between districts (Figure 10) are statistically significant: p value ( $\chi^2$ ) < 0.0001 except for rehabilitation with physiotherapy (p value ( $\chi^2$ ) = 0.0106 in 2004 and 0.0148 in 2003). These differences are proportionally less marked for physiotherapy than for PRM.

It should nevertheless be recalled that the representativity of the population within each district varies (sampling is done after controlling for age and gender). The rehabilitation consumption has not been weighted by the authors to control differences in prevalence of patients per age, gender or social status in each district. Such factors, as seen on the previous page, could partially explain the differences observed between the districts. The consumption of physiotherapy calculated by age, class and gender is detailed for each district in Appendix 9, as well as the importance of the sample population per district.

**Figure 10 : Percentage of sample population per district who had at least one rehabilitation treatment (whatever the kind) and percentage of sample population per district who had specifically PRM in 2005**



### 3.2.4 Expenses for rehabilitation treatment

#### 3.2.4.1 *Physical and Rehabilitation Medicine versus physiotherapy*

The average and median expenditure for physiotherapy and Physical and Rehabilitation Medicine are nearly identical. When comparing the upper quartile of the patients of each discipline who consume the most, patients with physiotherapy consume more than the upper quartile for Physical and Rehabilitation Medicine. Physiotherapy is clearly addressed towards chronic patients.

The detailed data are presented in Appendix 10.

#### 3.2.4.2 *Inpatient and outpatient treatment*

For hospitalised patients (inpatients), the annual average expenditure under compulsory insurance for Physical and Rehabilitation Medicine treatment in 2005 was clearly higher than for physiotherapy treatment: Physical and Rehabilitation Medicine costs on average €424 per inpatient versus €137 for physiotherapy treatment per inpatient.

The difference is smaller for outpatients' expenditure: physiotherapy treatment costs to the compulsory insurance on average €315 compared to €439 for PRM treatment.

Physical medicine Interventions paid on a fee for service basis, rather than per session, are marginal.

Rehabilitation within the framework of conventions costs an average of €946 for inpatients and €2 435 for outpatients. The IMA sample contains few patients treated by rehabilitation convention with physiotherapy. The most frequent conventions are conventions for cardiac patients and for locomotor neurological patients (referred to as centre 950).

### 3.2.5 Number of therapeutic services or rehabilitation sessions per consumer

#### 3.2.5.1 *Physiotherapy*

- Patients suffering from E-listed conditions received 100 sessions on average per year, but 10% of these patients received more than 226 physiotherapy sessions. The median is 82 sessions per year.
- For the Fa-listed<sup>e</sup> conditions, the annual average was 31 physiotherapy sessions. 10% of patients consumed more than 60 sessions annually and half consumed less than 26 sessions annually.
- For the Fb-listed conditions, the annual average was 54 physiotherapy sessions. 10% of patients consumed more than 120 sessions annually and half consumed less than 40 sessions annually.
- For the standard diseases, the annual average was 14 physiotherapy sessions. 10% of the patients consumed more than 25 sessions annually. 50% of the patients consumed less than 9 sessions.
- Second sessions on the same day were less frequent. Only 10% of the patients consumed more than 24 second sessions. The average was 8.4 sessions on an annual basis.
- Perinatal sessions counted for 5 sessions or less on an annual basis for 50% of the consumers.

<sup>e</sup> Here, the number of sessions is an annual average that doesn't take account that rehabilitation episodes may not be finished at the end of the calendar year. For the Fa-listed conditions, the 60 sessions for which reimbursement is at its maximum are counted during one year since the first session. On the contrary for Fb-listed conditions, the 60 sessions for which reimbursement is at its maximum are counted per calendar year whenever begins the rehabilitation. For more details on number of sessions per episode, that takes into account these different methods between Fa and Fb listed conditions, see chapter 5 "Consumption for homogeneous episodes".

### 3.2.5.2 *Physical and Rehabilitation Medicine*

- Patients treated by multi-disciplinary sessions of 120 minutes received annually an average of 20.66 sessions. 10% of these patients received more than 51 sessions. Half of the patients consumed less than 12 sessions over one year.
- Patients treated by 60 minutes multi-disciplinary sessions received an average of 13.63 sessions. 10% of patients consumed more than 35 sessions annually, and half consumed less than 9 sessions annually.
- Mono-disciplinary K30 sessions were not very common: only 69 patients out of 6 782 were given this treatment in 2005. Half of the patients had nine sessions or more while ten percent of them had at least 16 sessions.
- The invoicing in K20 amounted to an average of 9.70 sessions per patient. 50% of the patients received less than 8 sessions.

### 3.2.5.3 *Rehabilitation convention with Physical and Rehabilitation Medicine*

- Patients treated within the framework of rehabilitation convention with physiotherapy were rare in the sampling, except for cardiac rehabilitation (340 patients in 2005) and loco-motor-neurological centres (centre 950) (80 patients in 2005).

See details in Appendix 10.

There is a great probability that a treatment will not be finished at the end of the year, especially for chronic problems. The Appendix 11 depicts the distribution over a 3-year period. In outpatient care, long-term treatment is more frequent in physiotherapy than in Physical and Rehabilitation Medicine.

Appendix 12 provides data on consumption per patient, by age, class and gender. The following chapters analyse more precisely these demographic characteristics by rehabilitation episodes.

## **Key points**

Annual consumption of rehabilitation

**Rehabilitation is very common among residents of Belgium: every year, some 13.5% of the patients in the IMA sample required some form of rehabilitation care.**

**Over the entire 3-year period, one out of every four patients required some form of rehabilitation care. During the 3 years period, 3.09% of the sample received rehabilitation care on a recurrent basis, either continuous (chronic care) or repeated with interruptions.**

**12.42% of the sample had physiotherapy in 2005.**

**2.57% of sample had Physical and Rehabilitation Medicine in 2005.**

**1.35% of the sample population had both physiotherapy and Physical and Rehabilitation Medicine in 2005. The combination of kinds of rehabilitation is far from marginal within the population receiving Physical and Rehabilitation Medicine.**

**Consumption of rehabilitation care is positively related to age. For the patients older than 24 years, women are more likely to consume rehabilitation than men.**

### 3.3 EPISODES OF REHABILITATION IN IMA SAMPLE

#### 3.3.1 Definitions

Since the available administrative data have no information on the nature of the treatment or on the diagnosis, the construction of a care episode is based on the chronological succession of rehabilitation sessions.

**A care episode** is defined as a set of rehabilitation interventions succeeding each other within a time interval of maximum 30 days between two successive treatment interventions. A care episode was only completed if the time interval between two care sessions was more than 30 days. This interval avoided splitting a treatment session that was briefly interrupted for any reason. The 30-day interval was supposed to include rapid relapses or complications in the same care episode.

**A care sequence** is defined as a succession of treatments of the same nature within the same care episode. Different types of sessions may succeed each other within a care episode. For example, a hospitalised patient has K20 Physical and Rehabilitation Medicine sessions followed by 120 minutes multi-disciplinary sessions. Returning home, the patient continues the treatment with Fa-physiotherapy. When several sessions of an identical nature followed chronologically in the same setting (inpatient versus outpatient), we defined this succession as one care sequence.

Two types of sequences have been defined:

- **Sequence per “kind of rehabilitation”**. This type of sequence aggregated the successive rehabilitation sessions belonging to the same nomenclature (Physical and Rehabilitation Medicine, physiotherapy, rehabilitation convention with physiotherapy) and provided in the same inpatient or outpatient setting. Here, the one day was included among the outpatient sequences. In the previous example, a patient received Physical and Rehabilitation Medicine during hospitalisation and then physiotherapy upon returning home: it was considered as 2 sequences, one "inpatient Physical and Rehabilitation Medicine" sequence, followed by an "outpatient physiotherapy" sequence.
- **Sequence per “kind of disease or kind of treatment”**. This type of sequence aggregated all successive interventions relating to the same disease (in physiotherapy) or to the same type of intervention (in Physical and Rehabilitation Medicine) as well as the same setting (inpatient versus outpatient). In the preceding example, there were 3 sequences: a "K20 inpatient PRM" sequence followed by a "120 minutes inpatient multi-disciplinary PRM" sequence and, finally, a "Fa-type outpatient physiotherapy sequence".

**A care circuit** is henceforth defined as the order of care sequences.

So if different rehabilitation treatments succeed each other within an interval of maximum 30 days, they are part of the same care episode. These episodes or rehabilitation pathways may cover 2 or 3 calendar years.

For detailed tables, see Appendix 13.

#### 3.3.2 Kind of treatment observed in the episode

All treatments formed 113 305 care episodes over the 2003-2005 period.

Two thirds of the patients received a single care episode during the 3-year period.

**Table 13 : Distribution of patients according to the number of episodes per patient during 2003-2005**

	Number of episodes per patient						
	1	2	3	4	5	6	>= 7
Patient distribution	65.2%	21.5%	7.9%	3.2%	1.3%	0.6%	0.4%

Nearly 5% of care episodes were linked to childbirth, 8.70% to chronic conditions (E and Fb-listed conditions) and nearly 10% to acute conditions from the Fa-list.

Nearly ¾ of the care episodes involved a physiotherapy care sequence reimbursed as a “standard disorder”.

Few (1.35%) episodes included rehabilitation within the framework of the convention, essentially for cardiac patients.

Multi-disciplinary Physical and Rehabilitation Medicine was part of the care episode for 4.12% of care episodes. 10.84% of care episodes involved K15 or K20 sessions<sup>f</sup>. Overall, Physical and Rehabilitation Medicine, whatever the form, was present in nearly 16% of care episodes.

**Table 14 : Type of treatment during the episodes: % of episodes with a specific kind of intervention**

<b>Type interventions or diseases observed in the episode</b>	<b>Rehabilitation episodes</b>	
	<b>Number</b>	<b>Percentage</b>
<b>PHYSICAL AND REHABILITATION MEDICINE</b>		
<i>PRM: K15 or K20</i>	18042	15.92
<i>PRM: mono-disciplinary K30</i>	12273	10.83
<i>PRM: multi-disciplinary 60 minutes</i>	93	0.08
<i>PRM: multi-disciplinary 120 minutes</i>	1674	1.48
<i>PRM: multi-disciplinary 120 minutes for back problem</i>	2872	2.53
<i>PRM: paid per service with maximum fee per day<sup>g</sup></i>	228	0.2
<i>PRM: post-multi-disciplinary session</i>	3342	2.95
	141	0.12
<b>PHYSIOTHERAPY</b>	102821	90.75
<i>Physiotherapy: diseases list E</i>	6414	5.66
<i>Physiotherapy: diseases list Fa</i>	11290	9.96
<i>Physiotherapy: diseases list Fb</i>	3434	3.03
<i>Physiotherapy: perinatal</i>	5516	4.87
<i>Physiotherapy: standard diseases</i>	84288	74.39
<b>REHABILITATION CONVENTION WITH PT</b>	1531	1.35
<i>Cardiac patients</i>	1077	70,35
<i>Neuromuscular disorders</i>	26	1,70
<i>Spina bifida</i>	3	0,20
<i>Motor rehabilitation</i>	115	7,51
<i>Locomotor-neurologic (centre 950)</i>	223	14,57
<i>Chronic respiratory disorder</i>	20	1,31
<i>Chronic fatigue</i>	35	2,29
<i>Child respiratory disorder</i>	7	0,46
<i>Cerebral paralysis</i>	16	1,05
<i>Cerebral palsy</i>	17	1,11
<i>Chronic pain</i>	4	0,26

Non-mutually exclusive distribution: sum is > 100% since one and the same care episode may involve different treatments

<sup>f</sup> K15 and K20 are aggregated together.

<sup>g</sup> Some services may be invoiced on the spot, but the cumulative fee is limited by day (manipulation, thermotherapy, traction, waves, etc).

### 3.3.3 Inpatient or outpatient treatment during the care episodes, per age group

The portion of episodes involving inpatient care sequences increases with age. For persons over 80, more than half of the care episodes included at least one care sequence during hospitalisation.

The portion of episodes not involving outpatient sequence also increases with age. For patients older than 80 years, at least 30% of the care episodes did not involve any outpatient treatment.

See details in Appendix I3.

### 3.3.4 Kind of treatment observed during the episodes, per age group

The portion of the episodes involving Physical and Rehabilitation Medicine treatment or rehabilitation convention with physiotherapy also increases with patient age, while the frequency of physiotherapy treatment diminishes. For patients over 70 years of age, 20% and more of the care episodes involved Physical and Rehabilitation Medicine treatment. In particular, the proportion of multi-disciplinary Physical and Rehabilitation Medicine and of serious diseases treated by physiotherapy (E, Fb and Fa-lists) also increased with age.

See details in Appendix I3.

### 3.3.5 Kind of rehabilitation observed during the episodes, by district

The importance of Physical and Rehabilitation Medicine treatment in rehabilitation episodes varies according to the district.<sup>h</sup> On average, Physical and Rehabilitation Medicine in **outpatient** is found in 7.39% of care episodes while **inpatient PRM** is found in 8.93% of the episodes. In four districts, the prevalence of Physical and Rehabilitation Medicine for outpatients exceeds 12% of care episodes.

It may be noted that, where episodes have a low proportion of physiotherapy, Physical and Rehabilitation Medicine is often in high proportion and inversely. This observation indicates a relative substitution effect but this phenomenon is not systematic. Moreover, in districts where Physical and Rehabilitation Medicine is more frequent, there is no increase in the proportion of care episodes involving both kinds of rehabilitation (details in Appendix I3).

There is no link between a higher frequency of Physical and Rehabilitation Medicine and a higher number of specialists in Physical and Rehabilitation Medicine: the districts with a high proportion of care episodes with Physical and Rehabilitation Medicine are not exclusively situated in the provinces with a high density of PRM specialists. Two explanations can be given for this surprising finding:

- PRM is mainly delivered in hospitals, during a hospitalisation. In 2005, for example, of 6 782 patients treated with PRM 49% were treated during hospitalisation. The distance between home and the setting where the care is delivered does seem to be a constraint in such circumstances. Hospitals do attract patients living in another province.
- The data are provided for provinces and did not well capture the non-homogeneous spreading of local settings. Further refinement on geographical spreading of the PRM supply (per district at least) is needed to confirm a lack of association between consumption and supply.

### 3.3.6 Kind of treatment observed during the episodes, by gender

Women consumed 61.73% of the episodes of care. There is a difference in the kind of treatment between men and women except for Physical and Rehabilitation Medicine: Physical and Rehabilitation Medicine is found just as frequently in care episodes for men as for women.

See details in Appendix I3.

<sup>h</sup> District = "arrondissement" in French or Dutch.

### 3.3.7 Kind of treatment observed during the episodes, by social status

The differences of kind of treatment between BIM and non-BIM were statistically significant, except for some marginal interventions (mono-disciplinary sessions and rehabilitation after multi-disciplinary sessions). BIM patients received more rehabilitation during hospitalisation: 40% of care episodes involved inpatient rehabilitation as against 21% for non-BIM patients.

See details in Appendix 13.

#### Key points

Analysis of care episodes

**Two thirds of the patients had one single care episode during the 3-year period.**

**Most (87.31%) of the episodes only involved one single rehabilitation treatment (physiotherapy, Physical and Rehabilitation Medicine or rehabilitation convention with physiotherapy).**

**Almost 5% of care episodes were related to childbirth, 8.70% to chronic conditions (identified as E and Fb-listed conditions) and up to 10% to acute Fa-listed conditions.**

**Although not all the potential factors influencing rehabilitation could be explored, we observed differences between gender, age, social status and geographical area.**

**The proportion of episodes with Physical and Rehabilitation Medicine or with physiotherapy differs between districts. Some districts have a much higher percentage of PRM and a lower percentage of physiotherapy than the national average.**

## 3.4 REHABILITATION PATHWAYS IN IMA SAMPLE

The conditions of reimbursement of Physical and Rehabilitation Medicine were adjusted on 01/08/2004. The distribution of care episodes is consequently presented for two distinct periods: the period from 01/01/2003 to 31/07/2004 and the period from 01/08/2004 to 31/12/2005.

The classification of the care episodes depends on the beginning of the care episode. The first period begins after the 31/01/2003. The second one begins later than 31/08/2004. As stated in the methodology (see Appendix 13), patients whose care episodes commenced prior to 01/02/2003 and patients whose care episodes were not completed by 30/11/2005 were excluded from the analysis.

The following paragraphs analyse the care episodes consisting of several sequences of treatments. The definitions of care episode, care sequence and care circuit were listed on page 34.

### 3.4.1 Number of sequences in a care episode

Two types of sequences have been defined:

- By type of rehabilitation (PRM versus PT) and by inpatient/outpatient setting;
- By type of treatment (even within the same type of rehabilitation) and by inpatient/outpatient setting. These sequences are shorter.

#### 3.4.1.1 Sequences defined by type of rehabilitation and inpatient/outpatient setting.

Most episodes (88.54%) involved only one type of rehabilitation (either physiotherapy or Physical and Rehabilitation Medicine or rehabilitation convention) in the same setting (inpatient or outpatient).

One tenth (11.31%) of the episodes consisted of 2 or 3 sequences (different kinds of rehabilitation or a mix inpatient/outpatient). Less than 1% of the episodes involved more than 4 kinds of rehabilitation.

**Table 15 : Distribution of care episodes based on the number of sequences when the sequences are defined by the major categories of rehabilitation and inpatient/outpatient setting**

	Number of sequences	Number of episodes	Percent
	1	83 832	88,54
	2	9139	9,65
	3	1 568	1,66
	4	124	0,13
	5	11	0,01
	6	4	0

#### 3.4.1.2 Sequences defined by type of treatment and inpatient/outpatient setting

Majority (86.29%) of care episodes consisted of one sequence, i.e. one kind of treatment for the same inpatient/outpatient setting. One tenth (10%) of care episodes had two sequences. Fewer than 3.3% of the episodes consisted of 3 care sequences or more. A maximum of 10 care sequences per care episode was observed in the sample. The number of sequences increases with age (details in Appendix 12).

**Table 16 : Distribution of the care episodes based on the number of sequences when the sequences are defined by the nature of the intervention (disease for PT and kind of intervention for PRM)**

Nbr of care sequences	Before 01/08/2004		After 01/08/2004		Total 2003-2005	
	Nbr	%	Nbr	%	Nbr	%
1	44132	85.30%	37565	87.48%	81697	86.29%
2	5646	10.91%	4186	9.75%	9832	10.38%
3	1437	2.78%	951	2.21%	2388	2.52%
4	372	0.72%	193	0.45%	65	0.60%
5	110	0.21%	40	0.09%	150	0.16%
6	28	0.05%	5	0.01%	33	0.03%
7	6	0.01%	1	0.00%	7	0.01%
8	4	0.01%	0	0.00%	4	0.00%
9	1	0.00%	0	0.00%	1	0.00%
10	1	0.00%	0	0.00%	1	0.00%
Total	51737	100%	42941	100%	94678	100%

#### 3.4.2 Circuit given the kind of rehabilitation and inpatient/outpatient setting

This chapter presents the rehabilitation pathways according to the kind of rehabilitation and in- or outpatient setting. We limit the presentation to the most frequent combinations of the first care sequences.

##### 3.4.2.1 Care sequences if the care episode begins during hospitalisation

When the care episode commences during hospitalisation, one single care sequence was observed in 68% of the episodes. Different types of rehabilitation are recorded in 32% of care episodes. The most common combinations were:

- inpatient physiotherapy followed by outpatient physiotherapy (11.7% before 01/08/2004 and 10.3% after the reform);
- inpatient PRM followed by outpatient physiotherapy (6.2% before the reform and 5.2% after the reform);
- inpatient physiotherapy followed by outpatient PRM (3.4% before 01/08/2004 and 3.2% after the reform);
- inpatient PRM followed by inpatient physiotherapy: 3% before 01/08/2004 and 3.7% after the reform.

The differences in distribution between the 2 periods were small but statistically significant (P value (Chi<sup>2</sup>) < 0.0001).



Rehabilitation conventions with physiotherapy were only present on a first intention basis in 2.3% of the episodes and rarely followed by other types of rehabilitation (see Appendix 13).

See details in Appendix 12.

### 3.4.2.2 *Care sequences if the care episode begins in an outpatient setting*

For care episodes that began in an outpatient setting, one single care sequence was observed in 94.5% of the cases. For a majority (92%) of the episodes, physiotherapy was the first treatment.

Successions of different types of rehabilitation existed for barely 5.5% of care episodes. The most common successions were:

- outpatient Physiotherapy followed by inpatient physiotherapy (2.3% before 01/08/2004 and 2.0% after the reform);
- outpatient PRM followed by outpatient physiotherapy (1.1% before 01/08/2004 and 1.0% after the reform).

The frequency of Physical and Rehabilitation Medicine as first intention treatment in an outpatient setting decreased slightly between the two periods: 8.1% of care episodes before 01/08/2004 versus 7.2% after the reform.

Details in Appendix 13.

**Physical and Rehabilitation Medicine was the first inpatient treatment for 29.6% of care episodes.**

**Physical and Rehabilitation Medicine as first intention treatment in an outpatient setting decreased slightly between both periods: from 8.1% of care episodes before 01/08/2004 versus 7.2% after the reform.**

**When the care episode started during hospitalisation, the most common successions were inpatient physiotherapy followed by outpatient physiotherapy, and inpatient Physical and Rehabilitation Medicine followed by outpatient physiotherapy.**

**When the care episode started in an outpatient setting, 94.5% of the episodes involved one single sequence. This was 68% when the episode started during hospitalisation.**

### 3.4.3 Circuit according to the kind of treatment and inpatient/outpatient setting

The situation is more complex when taking into account different sequences of care within the same type of rehabilitation. We restrict the description to the most frequent combination of treatments.

#### 3.4.3.1 *First intention treatment*

Physiotherapy for standard diseases is the first treatment both in an outpatient (77%) as inpatient (57%) setting.

For hospitalised patients, K15-K20 PRM sessions were observed as first treatment in 22.6% of care episodes. Perinatal PT treatment was the first care for 11% of care episodes.

In an outpatient setting, K15-K20 PRM sessions were the first treatment in 4.2% of care episodes. Physiotherapy was more frequent as first treatment i.e. in 91.9% of care episodes (including 77% episodes treated for standard diseases).

#### 3.4.3.2 *Was there a change before and after the PRM reform in terms of first treatment?*

For hospitalised patients, the number of episodes involving 60 minutes multi-disciplinary sessions (K30) decreased to the benefit of 120 minutes multi-disciplinary sessions (K60). There was a decrease in physiotherapy provided to hospitalised patients (treatment for standard diseases).

The changes between the two periods were statistically significant (Chi<sup>2</sup> test, p<0.0001). These observations are similar to those of the RIZIV-INAMI in its trend audit reports.<sup>14</sup>

In an outpatient setting, PRM services invoiced on a fee-for-service basis (paid per service, with a maximum fee per day) were proportionally less frequent during the second period (i.e. after August 2004). The 60 minutes multi-disciplinary sessions (K30) declined as first treatment, as did physiotherapy for E-listed conditions. By contrast, there was an increase in physiotherapy for Fb-listed conditions. The change in distribution of the first intention treatments between both periods was statistically significant (Chi<sup>2</sup> test, p<0.0001).

See details in Appendix 13.

**In relation to hospitalized patients, the reform in Physical and Rehabilitation Medicine in August 2004 had an impact on the type of first intention treatment: the number of episodes involving 60 minutes multi-disciplinary PRM sessions (K30) decreased to the benefit of 120 minutes multi-disciplinary PRM treatments (K60). Moreover, the physiotherapy provided to hospitalised patients also declined between both periods.**

#### 3.4.3.3 *Second intention treatment*

In 55% of mixed episodes that started during hospitalisation, the second treatment continued on an outpatient basis. The most frequent treatment was a treatment for Fa-listed conditions (26.8% of total mixed episodes). If the treatment was continued in hospital, it involved 120 minutes multi-disciplinary PRM treatment (K60) in 9% of cases, followed by 4.5% of 60 minutes multi-disciplinary PRM treatment (K30). In total, inpatient PRM accounts for 25.5% of the episodes commencing during hospitalisation.

In 38% of mixed episodes that started in outpatient, the treatment was continued during hospitalisation, mostly perinatal physiotherapy (10.7% of episodes) or physiotherapy for standard diseases (16.5% of the mixed episodes). When the second treatment was continued in outpatient, the second treatment consisted of PRM (19.8% of mixed episodes). In 9.4% of mixed episodes, this second treatment was outpatient PRM, mainly K15-K20 or therapeutic fee-for-service<sup>i</sup> (see tables in Appendix 13).

**Physical and Rehabilitation Medicine is quite frequent (20%) as second intention treatment in outpatient, when the episode itself started on an outpatient basis.**

#### 3.4.3.4 *Rehabilitation pathways: combination of the two first treatments*

- For hospitalised patients, when the treatment started with PRM:
  - in 45% of care episodes, the treatment consisted of K15-K20 PRM alone;
  - in 11.5% of care episodes, the treatment consisted of K15-K20 PRM followed by inpatient PT for standard diseases;
  - in 6.2% of care episodes, the treatment consisted of K15-K20 PRM followed by outpatient PT for Fa-listed conditions.
- In outpatient, when the treatment started with PRM:
  - in 43.4% of care episodes, the treatment consisted of K15-K20 PRM alone;
  - in 22.2% of care episodes, the treatment was invoiced on a fee-for-service basis, not followed by other care episodes;
  - in 6.7% of care episodes, the treatment consisted of services invoiced on a fee-for-service basis, followed by PT for standard diseases.
- For hospitalised patients, when the treatment started with physiotherapy:
  - in 58% of care episodes, the treatment consisted only of PT for standard diseases;

<sup>i</sup> Some services may be invoiced on the spot but the cumulative fee is limited by day (manipulation, thermotherapy, traction, waves, etc).

- In 15% of care episodes, the treatment consisted only of perinatal PT;
- in 8% of care episodes, the treatment consisted of PT for standard diseases followed by outpatient PT for Fa-listed conditions;
- in 6.8% of care episodes, the treatment consisted of PT for standard disease that was continued in outpatient.
- In outpatient, when the treatment commenced with physiotherapy:
  - in 79.4% of care episodes, the treatment consisted only of PT for standard disease;
  - in 6.6% of care episodes, the treatment consisted only of PT for Fa-listed conditions;
  - in 3% of care episodes, the treatment consisted only of PT for E-listed conditions.
- For hospitalised patients, when the treatment started with a convention:
  - in 39.2 % of the cases, cardiac rehabilitation is the only rehabilitation;
  - in 7.9% of care episodes, the cardiac rehabilitation convention continues on an outpatient basis;
  - in 16.5% of care episodes, the cardiac rehabilitation convention is followed by PT for Fa-listed conditions;
  - in 15.3% of care episodes, the cardiac rehabilitation convention is followed by PT for standard disease;
- In outpatient, when the treatment started with a convention:
  - cardiac rehabilitation is the only rehabilitation in 45.9% of the cases.

See details in Appendix 13.

#### 3.4.3.5 *Third intention treatment*

The most common third treatment was PT for Fa-listed conditions (see details in Appendix 13).

### **Key points**

Rehabilitation pathways

**The rehabilitation pathways differ, depending on whether or not the treatment was started during hospitalisation or not.**

**Two thirds of episodes that started during hospitalisation, include one type of rehabilitation only. This means that 2/3 of episodes initiated in hospital, there is no rehabilitation in outpatient.**

**When a care episode is initiated for an outpatient, almost 94% of all episodes covered only one kind of rehabilitation. Physiotherapy constituted the first intention treatment in 91.9% of care episodes.**

**Combinations of treatment types (per episode) varied but were not really significant compared to the overall number of care episodes.**

**The first intention treatment consisted of Physical and Rehabilitation Medicine for 29.6% of rehabilitation episodes that began in hospital.**

**Physical and Rehabilitation Medicine was quite frequent as a second-line treatment in outpatient care (20%), if the episode was initiated in outpatient care.**

**The 2004 reform in Physical and Rehabilitation Medicine had an impact on the kind of treatment in Physical and Rehabilitation Medicine for care episodes begun in hospital except for the frequency of Physical and Rehabilitation Medicine as first-line treatment. The reform has, as far as the data in the IMA sample show, drastically reduced the utilisation of fee-for-service Physical and Rehabilitation Medicine procedures.**

### 3.5 HOMOGENOUS CARE EPISODES

Combinations of treatments are relatively rare within the whole of care episodes. Therefore, this chapter describes homogenous care episodes i.e. those for which there is only one kind of treatment. No distinction is made between inpatient and outpatient treatment. These homogenous care episodes represent 83 567 (88.26%) out of a total of 94 678 episodes.

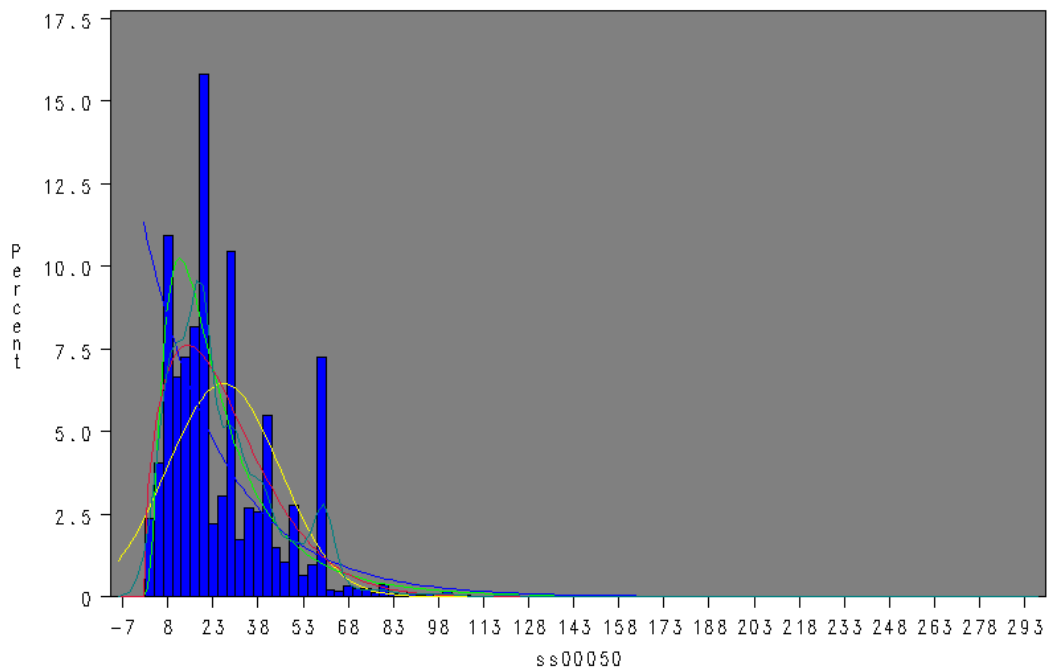
All tables are in Appendix 14. We describe all the moments of distribution since these distributions do not fit any model.

#### 3.5.1 Homogeneous care episodes: number of acts per care episode, according to the type of intervention or type of disease

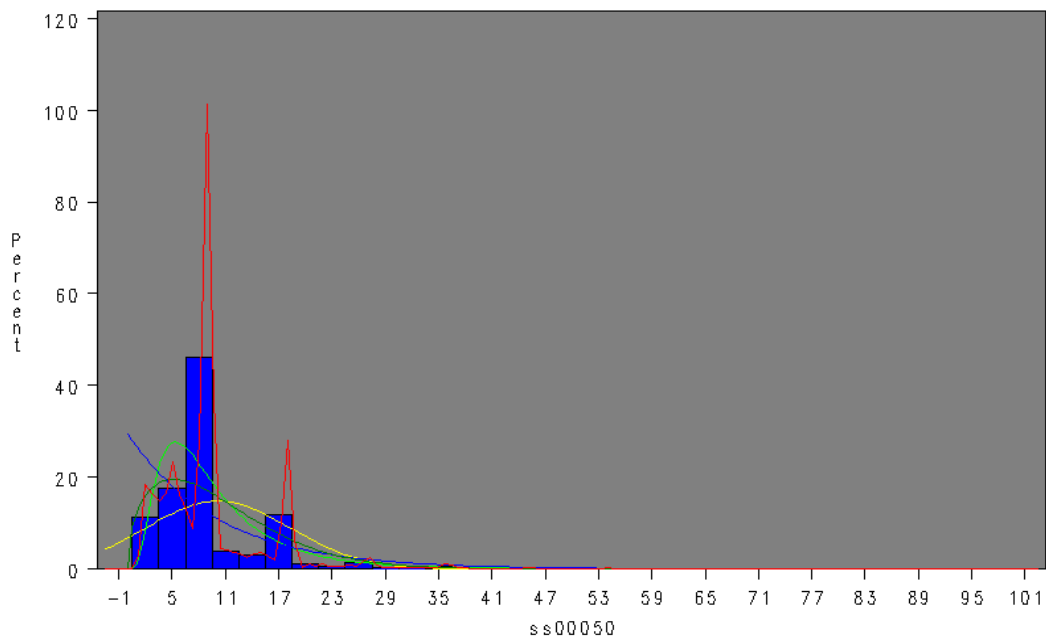
None of the distribution models is statistically acceptable for modelling the consumption per care episode. Kolmogorov-Smirnov test always concludes that the data are poorly adjusted for the different parametric curves (p-value always < 0.01).

Nevertheless, a log-linear model (in lemon green) adjusts rather well to the distribution of most treatments (see Appendix 14), except for Fa-listed conditions and standard diseases (see graphs below). For standard diseases, the distribution has 2 modes corresponding to 9 and 18 sessions, as allowed by the nomenclature. For Fa-listed conditions, there are several peaks (midpoints of class: 8, 20, 29, 59; length of class = 3). These peaks correspond to the maximum sessions allowed by prescription. The last peak is near the maximum sessions allowed by the nomenclature (60 sessions).

**Figure 11 : Distribution of the physiotherapy sessions for Fa-listed conditions**



ss00050 = number of sessions during the rehabilitation episodes

**Figure 12 : Distribution of the physiotherapy sessions for standard diseases**

ss00050 = number of sessions during the rehabilitation episodes

### 3.5.2 Number of acts and duration of homogeneous care episode per type of treatment

#### 3.5.2.1 Main findings

The main characteristics of the consumption are as follows:

- Most patients (90%) have fewer sessions than the number defined by the nomenclature.
- The number of treatment sessions per episode is limited: the high values concern barely 1% of care episodes.
- Median values are low:
  - 9 sessions for standard disease,
  - Less than 20 sessions for acute Fa-listed conditions , chronic Fb-listed conditions and E-listed conditions,
  - 7 sessions for K15 and K20 PRM sessions.
- Only 10% of patients consumed more than the following number of sessions within an homogeneous care episode:
  - 18 sessions for standard disease;
  - 56 sessions for Fa-listed conditions;
  - 60 sessions for Fb-listed conditions;
  - 92 sessions for E-listed conditions;
  - 24 K15-K20 PRM sessions;
  - 31 60 minutes multi-disciplinary PRM sessions (K30);
  - 41 120 minutes multi-disciplinary PRM sessions (K60).
- These moments were higher for the treatments performed in outpatient than for the inpatient treatments.

#### 3.5.2.2 Length of episode

The length of the episode showed that a K15-K20 PRM treatment lasted no longer than physiotherapy for standard disease. Multi-disciplinary PRM is more limited in time than physiotherapy for Fa-listed conditions and Fb-listed conditions.

These differences in the duration of the care episode are in part linked to whether or not the care episode started during hospitalisation.

The distribution characteristics of the number of services or sessions, of the cost for compulsory insurance and of the duration of the care episode according to type of treatment are given in Appendix 14.

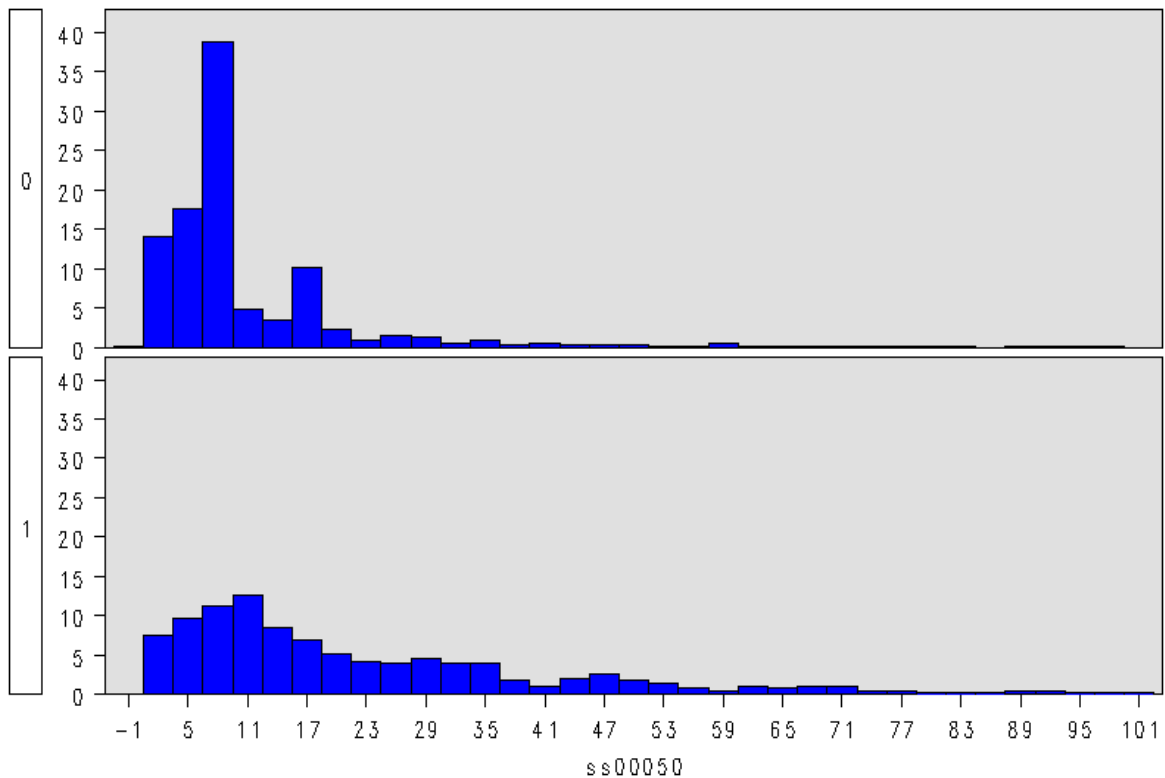
### 3.5.2.3 *Standard diseases with or without second session*

Ninety percent of episodes for standard diseases were treated with less than 18 sessions (see Figure 13, upper graph). The duration of care episodes lasted less than 77 days for 90% of the care episodes. Hardly 5% of care episodes involved more than 21 sessions.

However, standard diseases that benefited from a second session on the same day for serious problems during hospitalisations had a different distribution as illustrated (see Figure 13, lower graph). The percentiles 90 were 55 acts and 106 days.

For details, see Appendix 14.

**Figure 13 : Number of acts per episode for standard diseases depending on whether or not there was a second session the same day**



Vertical axis:

0 = no second session required by certain hospital procedures

1 = involving a second session required by certain hospital procedures

Horizontal axis:

ss00050 = number of sessions during the rehabilitation episodes

### 3.5.3 Number of acts and duration of care episode per age class, social status and type of treatment

The differences between age classes are found in particular in the highest consumption groups (upper quartile and higher percentile). The underlying disorder may act as a confounding factor: that is the reason why the last part of the study will focus on the models for specific surgical operations.

### 3.5.3.1 *Number of acts and duration of care episode by social status and type of treatment*

The BIM/non BIM status has an influence on the treatment: the number of multi-disciplinary PRM sessions per episode is greater for non-BIM patients. The influence of age in these differences will be analysed below.

Tables in Appendix 14.

### 3.5.3.2 *Link between age or social status and the number of acts consumed per care episode*

There is a link between the age and the number of acts within a homogeneous care episode. There are statistically significant differences in consumption patterns between age classes, except for multi-disciplinary sessions (see Appendix 15). Nevertheless, it is impossible to control for the treated disorder, which restricts any definitive conclusion. BIM/non-BIM social status could also be a confounding factor.

The graphs presented in Appendix 15 depict the follow-up curves (survival analysis). For each number of acts in a treatment, the curves show the proportion (or probability) of patients failing to complete their treatment. The main results are:

- When we control for the age class, there is a statistically significant ( $\alpha=0.01$ ) association between social security status and pattern of consumption. This is true for standard diseases and fee-for-service PRM services.
- When we control for the social status, there is a statistically significant association between age class and pattern of consumption for most types of treatment, except for multi-disciplinary PRM sessions.

These results indicate that age should be considered as an important factor in explaining the quantity of acts within the care episodes. On the other hand, social status and gender do not appear to be major explanatory factors. Nor should one neglect the possible confounding impact of the illness requiring the rehabilitation. Apart from age, it could explain the differences between age classes which were observed for the standard diseases in particular.

## **Key points**

Homogeneous care episodes

**For homogenous care episodes (i.e. 88% of all episodes, including one kind of rehabilitation), 90% of patients have less than the maximum number of sessions defined in the nomenclature.**

**The median number of treatment sessions per episode are as follows:**

- **9 sessions for standard disease,**
- **7 sessions for K15-K20 PRM services,**
- **< 20 sessions for Fa-, Fb- and E-listed conditions.**

**Percentile 90 values for the number of sessions per episode are:**

- **18 sessions for standard disease,**
- **24 sessions for Physical and Rehabilitation Medicine K15-K20,**
- **56 sessions for Fa-listed conditions,**
- **31 sessions for 60 minutes multi-disciplinary PRM sessions (K30),**
- **41 sessions for 120 minutes multi-disciplinary PRM sessions (K60).**

**Age is an important factor to explain the number of sessions per homogeneous care episode. Social status and gender do not appear as major explanatory factors.**

**There is a statistically significant trend for age in the care consumption for standard diseases and E-listed conditions, regardless of gender and statutory affiliation.**

**There is no trend between age classes in the pattern of consumption for multi-disciplinary PRM sessions.**

## 3.6 SUMMARY

### 3.6.1 Methods

The descriptive analysis of IMA sample data on the consumption of rehabilitation care presents novel insights into rehabilitation care in Belgian residents.

The analysis assessed the importance of rehabilitation care in indicating:

- the frequency of rehabilitation care in the general population and between various types of rehabilitation care;
- the average consumption per patient, both in general and by type of care.

Finally, these claims data allow the definition of care episodes in order to present:

- a description of rehabilitation care episodes;
- a description of the care pathway followed by patients per care episode;
- A description of care consumption per care episode.

### 3.6.2 Results

#### 3.6.2.1 *General observations*

The general observations concern two main topics:

The overall frequency of rehabilitation care in Belgian residents is high:

- Every year, some 13.5% of the patients in the IMA sample required some form of rehabilitation.
- Over the entire 3-year period, one out of every four patients required some form of rehabilitation care. During the 3 years in our analysis 3.09% of the sample received rehabilitation care in a recurrent manner, whether continuous (chronic care) or continual (repeated, but with intervals of interruption).
- In 2005, 12.42% of sampled residents required physiotherapy.
- In 2005, 2.57% of sampled residents required Physical and Rehabilitation Medicine.

Certain markers are distinctive for rehabilitation care consumption:

- Consumption of rehabilitation care was positively related to the age of the patient. Women, if older than 25, were more likely to consume rehabilitation care than men.

#### 3.6.2.2 *Episode-based observations*

Regrouping patient claims data by distinct care episode showed that 2/3 of all involved patients received only one episode of rehabilitation care over the analysed 3-year period. There appeared to be regional preferences for specific types of rehabilitation care.

Further observations include:

Overall typology of care episodes:

- 87.31% of care episodes concerned only one type of rehabilitation (either physiotherapy or PRM or a rehabilitation convention involving physiotherapy).
- Almost 5% of care episodes were related to childbirth, 8.70% were related to conditions that could clearly be identified as chronic (Fb and E-listed conditions), up to 10% regard acute Fa-listed conditions.
- Certain districts have higher proportions of care episodes with sequences with PRM or sequences with physiotherapy (compared to the national average).
- Care episodes vary, depending on whether they were initiated in an inpatient or outpatient setting, respectively.



- For inpatient rehabilitation (care episode starting for an inpatient), the 2004 reform in PRM produced an impact on the kind of PRM treatment, but not on the frequency of PRM as first-line treatment.
- Physical and Rehabilitation Medicine is characterised by a relatively high frequency as a second-line treatment in outpatient care (20%), provided that the episode was initiated in outpatient care.
- Combinations of treatment types (per episode) vary greatly, but account for few patients and were relatively insignificant compared to the overall number of care episodes.

Number of treatment sessions per homogeneous care episode:

- For homogenous care episodes, i.e. those including but one kind of rehabilitation (88% of all care episodes), 90% of the patients do not receive more than the legally foreseen number of treatment sessions.
- Consumption per episode (as expressed by number of treatment sessions) had the following median values:
  - 9 sessions for standard disease
  - 7 sessions for K15-K20 PRM services
  - < 20 sessions for Fa-, Fb- and E-listed diseases.
- Percentile 90 values were as follows:
  - 18 sessions for standard disease
  - 24 sessions for K15-K20 PRM services
  - 56 sessions for F-listed conditions,
  - 31 sessions for multi-disciplinary PRM during 60 minutes
  - 41 sessions for multi-disciplinary PRM during 120 minutes
- Age is an important factor in explaining the number of sessions per care episode. Contrarily, statutory affiliation and gender do not appear as major explanatory factors per type of treatment:
  - Controlling for statutory affiliation and sex, there is a statistically significant trend for age (groups) in the care consumption for standard conditions and E-listed conditions, regardless of gender and statutory affiliation.
  - There is no trend among age classes in the pattern of consumption with relation to multi-disciplinary Physical and Rehabilitation Medicine.
  - For other treatment types, the trend is not considered statistically significant for all combinations of statutory affiliation and gender.

**Rehabilitation care in Belgian residents is very common: every year some 13,5% of the patients in the IMA sample require some form of rehabilitation care.**

**Relevant factors for explaining rehabilitation care consumption are patient's age and gender, with older and female patients consuming markedly more often and consuming slightly more care per care episode.**

**Almost 5% of care episodes are related to childbirth, 8.7% are related to conditions that can clearly be identified as chronic (Fb and E-listed conditions), up to 10% regard F acute-listed conditions.**

**For homogenous care episodes, i.e. those including only one kind of rehabilitation (88% of all episodes), the legally foreseen number of treatment sessions is not surpassed for 90% of patients. Median values are low: respectively 9 sessions for standard diseases, 7 for PRM K15-K20 and less than 20 sessions for Fa, Fb and E-listed conditions.**

## **4 DESCRIPTION AND ANALYSIS OF THE CONSUMPTION OF REHABILITATION CARE FOR SOME SPECIFIC SURGERY PROCEDURES**

### **4.1 RESEARCH QUESTIONS AND METHODOLOGY**

#### **4.1.1 Research question**

The objective of this part is to identify variables that predict the type of rehabilitation e.g. variables linked to the health care context (hospital or physician), the type of intervention and the patient's socio-demographic characteristics. First, cost and number of sessions were studied in detail. Second, a statistical model was developed that looked for an explanation of this consumption.

#### **4.1.2 Descriptive statistical analysis of rehabilitation consumption**

Statistical analyses (descriptive and explanatory) of consumption related to rehabilitation for specific surgical procedures include:

- The number of sessions, under the K and M nomenclature codes (outpatient and inpatient);
- The duration of rehabilitation treatment;
- The cost of care, based on the type of coverage (physiotherapy or mono- or multi-disciplinary PRM).

For each surgical intervention under study the analyses examine significant differences between five pathways of rehabilitation: mono-disciplinary PRM, multi-disciplinary PRM, PT, mixture of PT and mono-disciplinary PRM, mixture of PT and multi-disciplinary PRM.

#### **4.1.3 Construction of an explanatory model of the type of treatment prescribed in first instance**

A logistic regression model will consider the type of treatment followed in first instance: mono-disciplinary PRM, multi-disciplinary PRM and physiotherapy. A simple binary model tests the probability of treatment by PRM versus physiotherapy. Another model tests the probability of treatment by multi-disciplinary PRM versus mono-disciplinary rehabilitation (PT or PRM).

#### **4.1.4 Data limits and methodological choices**

The IMA provides claims data on the services covered by the compulsory health insurance, labelled with nomenclature codes and delivered in both ambulatory care settings and hospitals. Data contain all interventions paid by the national compulsory health insurance and all rehabilitation occurring one year after these surgical procedures.

Claims data do not register the reason for which a patient is treated or examined; there is no registration of diagnosis, co-morbidities or complications. Registration of those diagnoses is provided by the clinical minimum data set for hospitalised patients. However, the deadlines did not allow using these data as they are only available and validated at least 3 years after registration.

#### 4.1.5 Limits related to the selection of the surgical interventions

The choice of surgical procedures, mainly orthopaedic ones,<sup>i</sup> does not allow drawing global conclusions on the whole of PRM in Belgium. Nevertheless, the data provide important information on the selected surgical interventions. These interventions represent a significant part of the total activity of multi-disciplinary PRM in the compulsory health insurance system<sup>k</sup>.

The most important surgical procedures that require physiotherapy or PRM were targeted. These procedures are usually followed by rehabilitation treatment invoiced according to the nomenclature K or M. The intervention justifies the necessity for rehabilitation but there is no information on complication or co-morbidity.

The interventions under study usually require mono-disciplinary rehabilitation. The choice between mono- and multi-disciplinary rehabilitation sometimes depends on the situation of the patient. For specific disorders, such as stroke (CVA), multi-disciplinary rehabilitation is a recommendation of good clinical practice.

However, neurological disorders, which represent a major part of the PRM activity, were not selected because the differences in functional status of this group are too important. This heterogeneity could not be reduced since information on the functional status was not available. Neurological disorders were therefore deliberately excluded from the analysis. To maximize homogeneity, we also excluded all procedures that are not done on a "regular" base.

Finally, situations that can benefit from conventions were also excluded.

Most procedures are performed during classical hospitalisation, with the exception of two procedures often performed in outpatient:

- Carpal tunnel release (nomenclature code 287836)
- Meniscectomy (nomenclature code 300333).

#### 4.1.6 Classification of surgery procedures

The surgical procedures selected were grouped (Table 17). These groups were dictated by the nature of the procedures, their mutual anatomical site and possible similar seriousness. It has been checked that there were no noticeable differences between the procedures grouped together for the distributions of

- prevalence of the different type of rehabilitation beginning the rehabilitation course;
- the combination of rehabilitation during the care episodes;
- the length of hospital stay;
- the number of sessions for each type of rehabilitation;
- the length of the rehabilitation episodes for each type of rehabilitation;
- delay between the surgical intervention and the first rehabilitation treatment;
- proportion of episodes excluded.

In particular, for the group of femoral fracture, no major differences were observed between surgical treatment by osteo-synthesis (i.e. fusion) and by prosthesis. There are, however, differences for distribution of age (year) between surgery for fracture of diaphysis of femur (mean = 59 years old; median = 69 years old and lower quartile = 29 years old), and the other operations put in the same group (mean > 74 years old; median > 79 years old; lower quartile > 67 years old). But no differences were observed for the variables listed above.

<sup>i</sup> This group of orthopaedic interventions still represents almost 50% of the disorders motivating multi-disciplinary PRM. Source: Christian sickness fund; On 24 980 disease-mentions for its members in 2006: 37.2 % are for 402 A listed complaints, 13.4 % for 404A listed complaints et 11.5% for 501B listed complaints).

<sup>k</sup> By comparison with RIZIV-INAMI data in 2005, the rehabilitation for these surgery procedures (only the rehabilitation after application of all exclusion criteria) counted for 22% of K30 sessions, 25% of K60 sessions multi-disciplinary PRM and 40% of PT sessions for Fa-listed conditions.

Even for the proportion of patients who did not pursue rehabilitation after hospitalisation, no major differences between these different femur fractures were observed. Moreover, anticipating on future results, we can confirm statistically the rationale of the classification of these different surgery procedures in one group: when trying to build a model to predict the type of first rehabilitation during hospitalisation for each group of surgery, neither the kind of surgical procedure, nor the age classes appeared to be an explanatory factor for this group of femoral fracture.

On the contrary, for the group of surgical procedures on both shoulder and upper arm there were noticeable, but not major differences between surgical treatment by osteosynthesis and by prosthesis for type of revalidation (more frequently multi-disciplinary PRM for arthroplasty<sup>l</sup>), length of hospitalisation (longer for arthroplasty), number of sessions when PT is the only rehabilitation (20 PT sessions more for arthroplasty) given, delay between surgery and first rehabilitation treatment (rehabilitation beginning slightly faster for arthroplasty) and age of patients (slightly older for arthroplasty). Anticipating on future results, we can confirm statistically the rationale of the classification of these different surgery procedures in one group: when trying to build model for prediction of the type of first rehabilitation during hospitalisation for each group of surgery separately, neither the kind of surgical procedure, nor the age classes appeared to be an explanatory factor for this group of interventions on both shoulder and upper arm.

For the group of the arthrodesis<sup>m</sup> of dorso-lumbar vertebrae, differences were observed only in type of revalidation (more frequently multi-disciplinary PRM for arthrodesis of the cervical spine - see Appendix 17 Table 141). Type of surgery has an influence on the choice of first rehabilitation.

Details on each surgical procedure are available in Appendix 16 (Table 120 till Table 125, Table 139) and Appendix 17 (Table 141).

The operation was classified as “inpatient” if the surgery was performed during classical hospitalisation. The “outpatient” designation was utilised for procedures performed during one day hospitalisation.

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<sup>l</sup> Arthroplasty is an orthopaedic procedure in which the arthritic or dysfunctional joint surface is replaced with a prosthesis.

<sup>m</sup> Arthrodesis is the artificial induction of joint ossification between two bones via surgery. Arthrodesis of the spine refers to the fusion of two or more vertebrae. Spinal arthrodesis is done most commonly in the dorso-lumbar or the cervical region of the spine.

Table 17 : Classification of the procedures

Type	Classification	Outpatient Inpatient	Nomenclature code	Specification	Nbr
Breast	Mastectomy <sup>n</sup>	Inpatient	226940	Excision of axillary (armpit) lymph glands	394
			226984	Total mastectomy with anatomopathology during surgery	566
			227006	Total mastectomy	1583
			227065	Partial mastectomy	2820
Cervical spine	Cervical spine operation	Inpatient	281105	Arthrodesis of cervical vertebrae	1224
			281120	Surgical treatment of a cervical herniated disk	610
Dorso-lumbar spine	Arthrodesis of the dorso-lumbar spine	Inpatient	281562	Posterior vertebral arthrodesis with bone graft	29
			281584	Posterior vertebral arthrodesis with notched bone graft or extensive excision	156
			281643	Posterior inter-articular arthrodesis	92
			281665	Anterior arthrodesis or screws between vertebrae	848
			281680	Posterior intrarachidian arthrodesis between vertebrae	708
			281746	Laminectomy with arthrodesis	109
	Herniated disk	Inpatient	281783	Surgical treatment of herniated disk other than cervical	5828
			281805	Surgical treatment of herniated disk with arthrodesis	803
Upper limbs	Fracture of forearm	Inpatient	284583	Surgical treatment of forearm fracture (distal part)	2654
	Carpal tunnel release	Outpatient	287836	Carpal tunnel release	1320
	Shoulder and upper arm, major surgery	Inpatient	283345	Shoulder arthroplasty with humeral prosthesis	549
			283824	Surgical treatment of fracture of neck of humerus	857
			283861	Surgical treatment of fracture of shaft of humerus	690

<sup>n</sup> Mastectomy is the medical term for the surgical removal of one or both breasts, partially or completely.

Type	Classification	Outpatient Inpatient	Nomencla- ture code	Specification	Nbr
	Shoulder, minor surgery	Inpatient	283242	Surgical treatment of scapulo-humeral subluxation	1013
			283485	Surgical treatment of fracture of clavicle (collar bone)	175
			287022	Surgical treatment of ruptured rotator cuff	5837
Lower limbs	Knee prosthesis	Inpatient	290286	Femoro-tibial arthroplasty with jointed prosthesis	11494
	Ankle fracture	Inpatient	290640	Surgical treatment of unimalleolar ankle fracture	1135
			290662	Surgical treatment of bimalleolar ankle fracture	1176
	Femur fracture	Inpatient	289321	Surgical treatment of femoral shaft fracture	715
			289365	Surgical treatment of per- or intertrochanteric femoral fracture	3580
			289380	Surgical treatment of femoral neck fracture by fusion	1074
			289402	Surgical treatment of femoral neck fracture by prosthesis	1048
	Fracture of tibia	Inpatient	290566	Surgical treatment of tibial shaft fracture	945
	Knee ligament or subluxation	Inpatient	290021	Surgical treatment of kneecap subluxation	650
			294103	Plasty of cruciate ligament(s) of the knee	692
	Hallux valgus	Inpatient	293344	Surgical treatment of hallux valgus (bunion deformity)	2467
	Meniscectomy	Outpatient	300333	Partial or total meniscectomy	17532
	Meniscectomy	Inpatient	300344	Partial or total meniscectomy	3455
	Hip prosthesis	Inpatient	289041	Hip arthroplasty with femoral prosthesis	1431
			289085	Hip arthroplasty with total prosthesis	13026
Treatment of urinary incontinence	Inpatient	432084	Surgical treatment of urinary incontinence, one way	433	
		432106	Surgical treatment of urinary incontinence, two ways	1047	

#### 4.1.7 Number of cases

The number of cases per surgical procedures is summarized in the following table (Table 18). Not all the patients undergoing this type of surgery systematically benefited from post-operative rehabilitation. For some procedures, more than half the patients received no rehabilitation (at least no rehabilitation that was reimbursed by the compulsory health insurance) during the year after the operation: surgical treatment for fracture of the collar bone, surgical operation for urinary incontinence, suture of an extensor tendon of the hand and carpal tunnel release performed in one day hospitalisation. All data are presented in Table 18 below.

Table 18 : Number of procedures, number without rehabilitation during the following year

Type	Designation	Nomen- clature	Outpatient versus Inpatient	Total procedures (for 1 year)	Nbr of procedures without rehab. the following year	Perc. of procedures without rehab. the following year
Mastectomy	Excision of axillary (armpit) lymph glands	226940	Inpatient	903	223	25%
	Total mastectomy with anatomopathology during surgery	226984	Inpatient	941	163	17%
	Total mastectomy	227006	Inpatient	2649	407	15%
	Partial mastectomy	227065	Inpatient	4762	982	21%
Cervical spine	Posterior arthrodesis of cervical vertebrae	281061	Inpatient	18	3	17%
	Occipito-cervical arthrodesis of cervical vertebrae	281083	Inpatient	19	1	5%
	Arthrodesis of cervical vertebrae	281105	Inpatient	2491	701	28%
	Surgical treatment of cervical herniated disk	281120	Inpatient	1395	445	32%
Dorso- lumbar spine	Posterior vertebral arthrodesis with bone graft	281562	Inpatient	43	2	5%
	Posterior vertebral arthrodesis with notched bone graft or extensive excision	281584	Inpatient	265	19	7%
	Posterior inter-articular arthrodesis	281643	Inpatient	174	25	14%
	Anterior arthrodesis or screws between vertebrae	281665	Inpatient	1403	204	15%
	Posterior intrarachidian arthrodesis between vertebrae	281680	Inpatient	1560	346	22%
	Laminectomy with arthrodesis	281746	Inpatient	163	12	7%
	Surgical treatment of herniated disk other than cervical	281783	Inpatient	9165	1866	20%
	Percutaneous nucleotomy for herniated disk	300366	Inpatient	102	15	15%
Upper limbs	Surgical treatment of a herniated disk with arthrodesis	281805	Inpatient	1221	197	16%
	Surgical treatment of scapulo-humeral subluxation	283242	Inpatient	1435	244	17%
	Shoulder arthroplasty with humeral prosthesis	283345	Inpatient	724	29	4%
	Surgical treatment of fracture of clavicle (collar bone)	283485	Inpatient	551	274	50%
	Surgical treatment of fracture of neck of humerus	283824	Inpatient	1352	150	11%
	Surgical treatment of fracture of shaft of humerus	283861	Inpatient	1128	161	14%
	Surgical treatment of forearm fracture (distal part)	284583	Inpatient	6084	1638	27%
	Surgical treatment of ruptured rotator cuff	287022	Inpatient	7515	820	11%
Suture of extensor tendons of hand	287501	Inpatient	409	207	51%	



Type	Designation	Nomen- clature	Outpatient versus Inpatient	Total procedures (for 1 year)	Nbr of procedures without rehab. the following year	Perc. of procedures without rehab. the following year
	Carpal tunnel release	287836	outpatient	9127	5171	57%
	Carpal tunnel release	287840	Inpatient	667	220	33%
Lower limbs	Hip arthroplasty with femoral prosthesis	289041	Inpatient	2359	84	4%
	Hip arthroplasty with total prosthesis	289085	Inpatient	16054	547	3%
	Surgical treatment of femoral shaft fracture	289321	Inpatient	1224	79	6%
	Surgical treatment of per- or intertrochanteric femoral fracture	289365	Inpatient	5956	271	5%
	Surgical treatment of femoral neck fracture by fusion	289380	Inpatient	1677	116	7%
	Surgical treatment of femoral neck fracture by prosthesis	289402	Inpatient	1701	77	5%
	Surgical treatment of kneecap subluxation	290021	Inpatient	864	83	10%
	Femoro-tibial arthroplasty with jointed prosthesis	290286	Inpatient	13468	237	2%
	Surgical treatment of tibial shaft fracture	290566	Inpatient	1481	194	13%
	Surgical treatment of a unimalleolar ankle fracture	290640	Inpatient	1952	459	24%
	Surgical treatment of a bimalleolar ankle fracture	290662	Inpatient	1815	294	16%
	Surgical treatment of a hallux valgus (bunion deformity)	293344	Inpatient	6000	2217	37%
	Plasty of cruciate ligament(s) of the knee	294103	Inpatient	976	92	9%
	Partial or total meniscectomy	300333	outpatient	31957	10650	33%
	Partial or total meniscectomy	300344	Inpatient	5782	1249	22%
Incontinence	Surgical treatment of urinary incontinence, one way	432084	Inpatient	1672	824	49%
	Surgical treatment of urinary incontinence, two ways	432106	Inpatient	6405	3432	54%
			TOTAL	157609	35430	22%

#### 4.1.8 Exclusion criteria

Patients with very atypical profiles were excluded in order to identify common traits in the follow-up of the populations who had rehabilitation. Details relating to the exclusions are given in Appendix 16. The causes for exclusion are as follows.

##### 4.1.8.1 *Surgical procedures excluded for insufficient data relating to the rehabilitation*

##### ***Surgical procedures for persons who do not benefit from the coverage of “minor risks” by health insurance***

Restrictions on reimbursement may influence the type of rehabilitation. Some people are not entitled to “minor risks” i.e. do not have compulsory insurance coverage<sup>o</sup> for PT or PRM, except when hospitalised or suffering from E-listed disorders, or in relation to childbirth (PT). These patients are likely to opt for rehabilitation treatment with PRM. Complete information is therefore not available in relation to their whole rehabilitation, in particular on an outpatient basis.

There are not many patients in this situation. These patients are more often treated by PRM (p-value  $\chi^2 < 0.0001$ ). The logistic regression model (chapter 4.5) confirms that this characteristic is decisive in the choice of treatment, regardless of the type of surgery.

**Table 19 : Distribution of patients receiving their initial rehabilitation treatment at the hospital, according to the type of rehabilitation and according to their right to the totality of compulsory insurance coverage**

Type of rehabilitation received in first instance	Right to minor risks = right to the totality of compulsory insurance coverage		Total
	No	Yes	
PRM	1801 78.00%	25595 43.54%	27396
PT	506 21.91%	33181 56.44%	33687
Convention with PT	2 0.09%	11 0.02%	13
Total	2309 100.00%	58787 100.00%	61096

##### ***Persons admitted in nursing homes after hospitalisation***

There is no information on PT care given to persons admitted to nursing homes (MRS/RVT). Episodes of care with admission in nursing homes after hospitalisation were therefore excluded.

<sup>o</sup> According to the regulations applicable to care dispensed during the period under study. The regulations have since changed. All the socially insured benefit from minor risk coverage since 01/01/2008.

#### 4.1.8.2 *Surgical procedures excluded because they are linked to complex hospital stays*

- Exclusion when other procedures of the list were performed during the same hospital stay;
- Exclusion when other major procedures were performed during the same hospital stay;
- Exclusion of persons re-hospitalised during the rehabilitation episode in a service other than an SP rehabilitation service.

#### 4.1.8.3 *Exclusion of rehabilitation episodes for which the reason for rehabilitation remains uncertain*

- Exclusion of episodes with a rehabilitation that occurred too late. This way, we minimised the risk of erroneously linking a rehabilitation to a surgical operation. The maximum delay between surgical intervention and start of rehabilitation was fixed at 60 days except for:
  - mastectomies or ganglial excisions (maximum period fixed at 90 days);
  - hip arthroplasties (maximum period fixed at 30 days).

This was the most important reason for exclusion. The distributions of the periods between the operation and the first session, classified by surgical procedure and expressed in number of days, are in Appendix I 6

#### 4.1.8.4 *Exclusion of rehabilitation episodes lasting more than one year*

#### 4.1.8.5 *Exclusion of rehabilitation episodes linked to particularly lengthy hospitalisations*

- All stays with a total duration (including stay in SP service) exceeding 180 days (six months);
- Exclusion of outlier hospital stays. These outliers were defined separately for each surgical operation based on the distributions of stay durations. The maximum permissible stay duration corresponds to the 95th percentile of the distribution of stay durations.

#### 4.1.9 Homogeneity of the populations treated

The episodes selected consisted therefore of rehabilitation episodes with the following characteristics:

- Episode is preceded by one single surgical operation from the list of interventions.
- No other major surgery is performed during the hospital stay and hospital stay is not abnormally long.
- Episode not interrupted by readmission, except in the rehabilitation service.
- Rehabilitation episode begins within a certain delay after the surgical operation.
- Rehabilitation episode is not spread over more than 365 days.

The analyses (see further) looked for differences within the populations based on:

- Indicators of functional dependence based on conventions (conventions relating to nursing lump sums, E-listed disorders, attendance allowance, etc). Nevertheless, there is no information on diagnosis and co-morbidity.
- Proxy ASA: that identifies patients in good or relatively poor health based on the outpatient consumption of medications before the operation. This proxy ASA score is binary: "A patient treated with a class ATC medication for less than 90 days over the course of the year prior to the operation is considered to be in good health". This score was developed and utilised within the framework of a previous study by the IMA.<sup>15</sup> This proxy ASA offers good concordance with the ASA score or "Physical Status Score".

#### 4.1.10 Importance of rehabilitation for the selected cases

The following table (Table 20) presents some key information:

- Total number of rehabilitation episodes after each type of surgical operation: more than 115 500 rehabilitation episodes out of a total of 157 600 surgery procedures.
- Number of episodes excluded because of a late beginning of the rehabilitation (more than 30, 60 or 90 days after the surgical operation, depending on the operation): 10 100 episodes were excluded.
- Number of exclusions on other grounds: almost 10 000 for all procedures.
- Number of episodes after exclusions: this proportion of useful episodes varies from 15 to 89 % according to the surgery procedure.

The total percentage of surgical procedures without rehabilitation as described above indicates the proportion of patients having undergone the operation but without any recorded rehabilitation within the predetermined delay. This percentage was high for the following surgical procedures:

- Surgical treatment of urinary incontinence - two ways (70% of patients);
- Surgical treatment of fractured collar bone (59% of patients);
- Suture of an extensor tendon of the hand (60% of patients);
- Procedures for carpal tunnel release (73% of patients).

The percentage of procedures without rehabilitation is low for procedures such as spinal arthrodesis, arthroplasty of the hip, and plasty of cruciate ligaments of the knee (<10%).

Table 20 : Number of episodes, number of exclusions with due cause, % without rehabilitation

Type	Designation	Nomen- -clature	Out- patient versus In- patient	Nbr rehab. epi- sodes	Nbr episodes excluded because rehab. began too late	Perc. episodes excluded because rehab. began too late	Perc. without rehab.	Exclusion on other grounds (e.g. missing data)	Nbr included episodes	Perc. included episodes in relation to nbr procedures
Mastectomy	Excision of axillary (armpit) lymph glands	226940	Inpat	555	70	12.6%	<b>32.4%</b>	82	<b>403</b>	44.6%
	Total mastectomy with anatomopathology during surgery	226984	Inpat	755	56	7.4%	<b>23.3%</b>	115	<b>584</b>	62.1%
	Total mastectomy	227006	Inpat	2108	169	8.0%	<b>21.7%</b>	316	<b>1623</b>	61.3%
	Partial mastectomy	227065	Inpat	3681	328	8.9%	<b>27.5%</b>	488	<b>2865</b>	60.2%
Cervical spine	Posterior arthrodesis of cervical vertebrae	281061	Inpat	13	1	7.7%	<b>22.2%</b>	3	<b>9</b>	50.0%
	Occipito-cervical arthrodesis of cervical vertebrae	281083	Inpat	18	2	11.1%	<b>15.8%</b>	5	<b>11</b>	57.9%
	Arthrodesis of cervical vertebrae	281105	Inpat	1648	264	16.0%	<b>38.7%</b>	145	<b>1239</b>	49.7%
	Surgical treatment of a cervical herniated disk	281120	Inpat	850	166	19.5%	<b>43.8%</b>	68	<b>616</b>	44.2%
Dorso- lumbar spine	Posterior vertebral arthrodesis with bone graft	281562	Inpat	37	2	5.4%	<b>9.3%</b>	6	<b>29</b>	67.4%
	Posterior vertebral arthrodesis with notched bone graft or extensive excision	281584	Inpat	199	3	1.5%	<b>8.3%</b>	40	<b>156</b>	58.9%
	Posterior inter-articular arthrodesis	281643	Inpat	157	15	9.6%	<b>23.0%</b>	48	<b>94</b>	54.0%
	Anterior arthrodesis or screws between vertebrae	281665	Inpat	1121	122	10.9%	<b>23.2%</b>	132	<b>867</b>	61.8%
	Posterior intrarachidian arthrodesis between vertebrae	281680	Inpat	1032	161	15.6%	<b>32.5%</b>	157	<b>714</b>	45.8%
	Laminectomy with arthrodesis	281746	Inpat	154	3	1.9%	<b>9.2%</b>	41	<b>110</b>	67.5%
	Surgical treatment of a herniated disk other than cervical	281783	Inpat	7044	639	9.1%	<b>27.3%</b>	499	<b>5906</b>	64.4%
	Percutaneous nucleotomy of herniated disk	300366	Inpat	78	12	15.4%	<b>26.5%</b>	17	<b>49</b>	48.0%
Surgical treatment of a herniated disk with arthrodesis	281805	Inpat	1027	98	9.5%	<b>24.2%</b>	124	<b>805</b>	65.9%	
Upper limbs	Surgical treatment of scapulo-humeral subluxation	283242	Inpat	1146	45	3.9%	<b>20.1%</b>	75	<b>1026</b>	71.5%
	Shoulder arthroplasty with humeral prosthesis	283345	Inpat	668	10	1.5%	<b>5.4%</b>	81	<b>577</b>	79.7%
	Surgical treatment of fracture of clavicle (collar bone)	283485	Inpat	239	49	20.5%	<b>58.6%</b>	13	<b>177</b>	32.1%
	Surgical treatment of fracture of neck of humerus	283824	Inpat	1129	60	5.3%	<b>15.5%</b>	154	<b>915</b>	67.7%
	Surgical treatment of fracture of shaft of humerus	283861	Inpat	928	59	6.4%	<b>19.5%</b>	138	<b>731</b>	64.8%
	Surgical treatment of forearm fracture (distal part)	284583	Inpat	4030	876	21.7%	<b>41.3%</b>	412	<b>2742</b>	45.1%
	Surgical treatment of ruptured rotator cuff	287022	Inpat	6507	177	2.7%	<b>13.3%</b>	415	<b>5915</b>	78.7%
	Suture of one extensor tendon of hand	287501	Inpat	184	37	20.1%	<b>59.7%</b>	11	<b>136</b>	33.3%
	Carpal tunnel release	287836	Outpat	2880	1501	52.1%	<b>73.1%</b>	49	<b>1330</b>	14.6%

Type	Designation	Nomen- -clature	Out- patient versus In- patient	Nbr rehab. epi- sodes	Nbr episodes excluded because rehab. began too late	Perc. episodes excluded because rehab. began too late	Perc. without rehab.	Exclusion on other grounds (e.g. missing data)	Nbr included episodes	Perc. included episodes in relation to nbr procedures
	Carpal tunnel release	287840	Inpat	349	101	28.9%	<b>48.1%</b>	44	<b>204</b>	30.6%
Lower limbs	Hip arthroplasty with femoral prosthesis	289041	Inpat	2242	21	0.9%	<b>4.5%</b>	345	<b>1876</b>	79.5%
	Hip arthroplasty with total prosthesis	289085	Inpat	15399	75	0.5%	<b>3.9%</b>	1409	<b>13915</b>	86.7%
	Surgical treatment of femoral shaft fracture	289321	Inpat	1083	25	2.3%	<b>8.5%</b>	217	<b>841</b>	68.7%
	Surgical treatment of per- or intertrochanteric femoral fracture	289365	Inpat	5608	37	0.7%	<b>5.2%</b>	821	<b>4750</b>	79.8%
	Surgical treatment of femoral neck fracture by fusion	289380	Inpat	1573	22	1.4%	<b>8.2%</b>	252	<b>1299</b>	77.5%
	Surgical treatment of femoral neck fracture by prosthesis	289402	Inpat	1604	3	0.2%	<b>4.7%</b>	244	<b>1357</b>	79.8%
	Surgical treatment of kneecap subluxation	290021	Inpat	732	24	3.3%	<b>12.4%</b>	56	<b>652</b>	75.5%
	Femoro-tibial arthroplasty with jointed prosthesis	290286	Inpat	13432	146	1.1%	<b>2.8%</b>	1313	<b>11973</b>	88.9%
	Surgical treatment of tibial shaft fracture	290566	Inpat	1266	68	5.4%	<b>17.7%</b>	219	<b>979</b>	66.1%
	Surgical treatment of a unimalleolar ankle fracture	290640	Inpat	1404	134	9.5%	<b>30.4%</b>	125	<b>1145</b>	58.7%
	Surgical treatment of a bimalleolar ankle fracture	290662	Inpat	1497	152	10.2%	<b>24.6%</b>	143	<b>1202</b>	66.2%
	Surgical treatment of hallux valgus (bunion deformity)	293344	Inpat	3414	758	22.2%	<b>49.6%</b>	176	<b>2480</b>	41.3%
	Plasty of cruciate ligament(s) of the knee	294103	Inpat	732	3	0.4%	<b>9.7%</b>	30	<b>699</b>	71.6%
	Partial or total meniscectomy	300333	Outpat	19772	1958	9.9%	<b>39.5%</b>	216	<b>17598</b>	55.1%
Partial or total meniscectomy	300344	Inpat	4194	376	9.0%	<b>28.1%</b>	349	<b>3469</b>	60.0%	
Incontinence	Surgical treatment of urinary incontinence, one way	432084	Inpat	695	223	32.1%	<b>62.6%</b>	39	<b>433</b>	25.9%
	Surgical treatment of urinary incontinence, two ways	432106	Inpat	2262	1066	47.1%	<b>70.2%</b>	141	<b>1055</b>	16.5%
<b>TOTAL</b>	<b>TOTAL</b>	<b>TOTAL</b>	<b>TOTAL</b>	<b>115446</b>	<b>10117</b>	<b>8.8%</b>	<b>28.9%</b>	<b>9773</b>	<b>95556</b>	<b>60.6%</b>

## Key points

Selection of rehabilitation episodes

**The episodes selected answered to the following conditions:**

- They are preceded by one single surgical operation of the list;
- No other major surgery is performed during the hospital stay and the hospital stay is not abnormally long;
- Episode is not interrupted by readmission, except in a rehabilitation service;
- The episode begins within a maximum delay after the surgical operation;
- The rehabilitation lasts less than 365 days.

The selected episodes accounted for 15 to 89% of all surgery procedures, depending on the procedure.

For the following surgical procedures, more than 50% of procedures had no rehabilitation: surgical treatment of urinary incontinence, of fractured collar bone, of ruptured extensor tendons of the hand, and procedures for carpal tunnel release.

For arthrodesis of the dorso-lumbar spine, hip prosthesis and plasty of the cruciate knee ligaments, most surgical procedures had rehabilitation.

## 4.2 DESCRIPTION OF THE REHABILITATION EPISODES FOR EACH SURGICAL INTERVENTION

### 4.2.1 Type of rehabilitation in first instance

The type of rehabilitation given in first instance varies, not only depending on the type of surgery performed, but also according to whether or not the patient is hospitalised (cf. Table 21).

Treatment often begins during hospitalisation, except for fractures of the forearm, sutures of the extensor tendons of the hand, and procedures performed during “one day hospitalisation” (carpal tunnel release and meniscectomy).

PT is the most common first intention treatment: it is performed during hospitalisation in more than 2 patients out of 5, with the exception of fractures of forearm (17.5%) and ankle (28%), cervical spine operation (36%), meniscectomy (34%) and shoulder operations (major 35% and minor 24%).

PRM (mono or multi-disciplinary) is performed in first intention during hospitalisation in more than one patient out of five, except in relation to fractures of the forearm (12%), hallux valgus (19%), urinary incontinence (9%), mastectomy<sup>p</sup> (18%) and shoulder surgery (19%). PRM is rare in first instance on an outpatient basis, except mono-disciplinary PRM in relation to meniscectomy, carpal tunnel release and surgical treatment of urinary incontinence.

Mono-disciplinary PRM is common on an outpatient basis for all inpatient procedures (10 to 28%).

Multi-disciplinary PRM is the first instance treatment for more than one patient out of 3 following knee or hip arthroplasty. This type of treatment is also frequently observed following fractures of the femur (more than 20% of patients) and arthrodesis of the dorso-lumbar spine (13%).

<sup>p</sup> Mastectomy is the surgical removal of one or both breasts, partially or completely.

Table 21 : First rehabilitation after surgery

	First rehabilitation is given during hospitalisation				First rehabilitation is outpatient				Total
	PT	Multi-disc. PRM	Mono-disc. PRM	Total inpatient	PT	Multi-disc. PRM	Mono-disc. PRM	Total outpatient	Total nbr of cases
Arthrodesis of the dorso-lumbar spine	51,75%	12,70%	25,50%	89,94%	9,34%	0,25%	0,46%	<b>10,06%</b>	1969
Knee prosthesis	49,33%	<b>34,14%</b>	15,47%	98,93%	1,01%	0,06%	0,00%	<b>1,07%</b>	11973
Fractured ankle	28,06%	3,54%	18,64%	50,23%	48,40%	0,77%	0,60%	49,77%	2345
Fractured forearm	17,08%	1,97%	10,40%	29,45%	68,32%	0,73%	1,50%	<b>70,55%</b>	2740
Fractured femur	50,69%	<b>20,89%</b>	<b>25,88%</b>	97,45%	2,49%	0,05%	0,01%	<b>2,55%</b>	8245
Fractured tibia	47,19%	6,64%	<b>28,50%</b>	82,33%	17,57%	0,10%	0,00%	<b>17,67%</b>	979
Knee ligament or subluxation	43,23%	2,81%	17,17%	63,21%	35,60%	0,67%	0,52%	36,79%	1351
Hallux valgus	40,77%	0,12%	18,79%	59,68%	38,87%	0,20%	1,25%	40,32%	2480
Herniated disk	47,70%	5,51%	<b>27,88%</b>	81,09%	17,02%	1,22%	0,67%	18,91%	6711
Urinary incontinence	51,55%	0,47%	9,35%	<b>61,37%</b>	34,19%	0,27%	4,17%	38,63%	1486
Cervical spine operation	35,81%	4,05%	20,93%	<b>60,79%</b>	37,59%	0,86%	0,76%	39,21%	1854
Carpal tunnel release, one day	2,19%	0,75%	1,13%	<b>4,08%</b>	88,15%	1,28%	6,49%	<b>95,92%</b>	1325
Mastectomy	61,15%	0,60%	17,92%	79,67%	19,89%	0,05%	0,38%	20,33%	5475
One day meniscectomy	0,70%	0,23%	0,36%	<b>1,29%</b>	83,64%	0,78%	14,29%	<b>98,71%</b>	17596
Inpatient meniscectomy	33,60%	1,01%	20,05%	<b>54,66%</b>	43,67%	0,46%	1,21%	45,34%	3467
Hip prosthesis	47,71%	<b>33,39%</b>	17,88%	98,98%	1,01%	0,01%	0,00%	<b>1,02%</b>	15788
Shoulder & upper arm (major operation)	35,00%	9,72%	19,70%	<b>64,42%</b>	34,32%	0,85%	0,40%	35,58%	2223
Shoulder (minor operation)	24,11%	4,99%	14,47%	<b>43,58%</b>	53,74%	1,69%	1,00%	56,42%	7116
<b>TOTAL</b>	<b>35,26%</b>	<b>13,32%</b>	<b>15,36%</b>	<b>63,94%</b>	<b>32,42%</b>	<b>0,51%</b>	<b>3,12%</b>	<b>36,06%</b>	<b>95532</b>



#### 4.2.2 Rehabilitation combinations during the care episode

Rehabilitation within the framework of rehabilitation conventions is rare after the selected surgical procedures. This information is not included in the analyses.

Rehabilitation episodes are classified in 5 groups:

- Episodes with PT rehabilitation only;
- Episodes with mono-disciplinary PRM only;
- Episodes with multi-disciplinary PRM only;
- Episodes PT and mono-disciplinary PRM;
- Episodes with PT and multi-disciplinary PRM.

The following paragraphs describe the treatment received throughout the rehabilitation episode, regardless of the moment of treatment (Table 22):

- PT was the only type of rehabilitation received by more than 4 patients out of 5 after the following surgical procedures: fracture of forearm, urinary incontinence, carpal tunnel release and meniscectomy, both performed in “one day” hospitalisation. Apart from incontinence, these are also the surgical procedures in which the rehabilitation most often begins after hospitalisation (on an outpatient basis).
- More than half of all patients received multi-disciplinary PRM during rehabilitation after a hip or knee prosthesis and fracture of the femur. For these types of surgery, multi-disciplinary PRM was also associated with PT rehabilitation in 1/3 up to half of all patients. Only 1/3 of the rehabilitation episodes consisted only of PT. This was the lowest rate of all the surgical procedures.
- One patient in five received multi-disciplinary PRM during rehabilitation following shoulder or shoulder and upper arm surgery.
- Multi-disciplinary PRM was usually associated with PT for knee (53%) and hip prosthesis (43%) and fracture of the femur (36%),.
- Mono-disciplinary PRM was the only type of rehabilitation received throughout the entire care episode for more than one patient in ten following cervical spine surgery, fracture of the tibia or ankle, hallux valgus, urinary incontinence or mastectomy.

As a whole, PRM was performed in 40% of all rehabilitation episodes.

For details: see Appendix 17.

Table 22 : Distribution of care episodes according to the different types of rehabilitation

	All rehabilitation episodes					TOTAL
	% of episodes with PT alone	% of episodes with mono-disc. PRM alone	% of episodes with multi-disc. PRM alone	% of episodes with a mixture of PT and mono-disc. PRM	% of episodes with a mixture of rehabilitation with multi-disc. PRM <sup>q</sup>	
Arthrodesis of dorso-lumbar spine	56.7%	17.8%	11.7%	7.8%	6.0%	100.0%
Knee prosthesis	32.4%	0.3%	6.4%	7.7%	53.2%	100.0%
Fracture ankle	73.1%	12.2%	3.2%	6.4%	5.0%	100.0%
Fracture forearm	81.6%	7.0%	2.0%	4.9%	4.4%	100.0%
Fracture femur	34.8%	6.7%	9.6%	13.1%	35.7%	100.0%
Fracture tibia	58.3%	10.2%	4.8%	17.3%	9.4%	100.0%
Knee ligament or subluxation	75.5%	3.0%	1.6%	15.3%	4.5%	100.0%
Hallux valgus	78.5%	16.9%	0.3%	4.0%	0.3%	100.0%
Herniated disk	60.4%	17.0%	6.2%	11.2%	5.2%	100.0%
Incontinence	83.2%	11.6%	0.5%	3.4%	1.2%	100.0%
Cervical spine operation	68.1%	16.3%	4.3%	7.5%	3.8%	100.0%
Outpatient carpal tunnel release	87.2%	6.0%	2.2%	3.5%	1.1%	100.0%
Mastectomy	78.3%	10.7%	0.4%	9.8%	0.8%	100.0%
Outpatient meniscectomy	81.9%	7.1%	1.0%	8.7%	1.2%	100.0%
Inpatient meniscectomy	74.4%	8.4%	1.2%	13.5%	2.5%	100.0%
Hip prosthesis	33.7%	3.3%	13.7%	6.6%	42.7%	100.0%
Shoulder & upper arm	60.9%	4.9%	4.3%	13.7%	16.1%	100.0%
Shoulder, minor operation	74.8%	3.6%	4.1%	12.3%	5.1%	100.0%
TOTAL	59.3%	7.0%	5.6%	9.1%	19.0%	100.0%

<sup>q</sup> The episodes contain both PT and multi-disciplinary PRM. It can also contain mono-disciplinary PRM.

Care episodes that consist exclusively of mono-disciplinary PRM had a particular profile (Table 23). They usually began in hospital and were not continued on an outpatient basis (more than 90% of the episodes). This is also the case in the exclusively multi-disciplinary PRM rehabilitation episodes: more than 70% of the episodes were exclusively inpatient rehabilitation, with the exception of rehabilitations following shoulder surgery or knee prosthesis, meniscectomy and other knee interventions (see Appendix 17).

When the rehabilitation only consisted of PT, the profile showed a much greater contrast between the different interventions. Treatment commenced during hospitalisation was most often continued on an outpatient basis (see Appendix 17). These outpatient PT sessions were rarely performed in hospital (Table 24): less than 3% except for hip prosthesis, one day carpal tunnel release and mastectomy. This low percentage is also observed in the RIZIV-INAMI data of the year 2007<sup>r</sup>.

**Table 23 : Episodes consisting with mono-disciplinary PRM during hospitalisation: % cessation after hospitalisation**

Surgical procedures	% of mono-disc. PRM treatments stopped after hospitalisation	Number of episodes beginning during hospitalisation
Arthrodesis of dorso-lumbar spine	98%	343
Knee prosthesis	94%	33
Shoulder & upper arm	97%	104
Shoulder, minor operation	96%	208
Fractured ankle	100%	276
Fractured forearm	100%	161
Fractured femur	100%	552
Fractured tibia	100%	100
Knee ligament or subluxation	94%	35
Hallux valgus	100%	393
Herniated disk	99%	1116
Urinary incontinence	99%	123
Cervical spine operation	100%	296
One day carpal tunnel release	92%	12
Mastectomy	99%	567
Outpatient meniscectomy	94%	18
Inpatient Meniscectomy	95%	255
Hip prosthesis	100%	523

<sup>r</sup> Total outpatient PT activity according to place of dispensation, in 2007: 17 588 154 acts in private practice; 649 665 acts in hospital practice; 214 042 acts in group practice cabinet; 10 153 508 acts in the patient's home.

**Table 24 : Proportion of outpatient PT sessions in hospital (ambulatory)**

	<b>Percentage of outpatient PT sessions performed in hospital</b>
Arthrodesis of dorso-lumbar spine	0.66%
Knee arthroplasty	1.51%
Fractured ankle	1.29%
Fractured forearm	2.64%
Fractured femur	0.39%
Fractured tibia	0.91%
Knee ligament or subluxation	2.54%
Hallux valgus	1.01%
Herniated disk	1.31%
Urinary incontinence	2.24%
Cervical spine operation	2.70%
One day carpal tunnel release	4.91%
Mastectomy	3.53%
One day meniscectomy	2.88%
Inpatient meniscectomy	2.20%
Hip Prosthesis	6.17%
Shoulder & upper arm, major	0.66%
Shoulder, minor operation	1.28%
<b>Total</b>	<b>2.13%</b>

### 4.2.3 Differences between populations according to the type of rehabilitation

#### 4.2.3.1 *Length of stay in hospital*

Few differences were observed in the distribution of the length of stay in hospital for the different types of rehabilitation. The length of stay was longer when the rehabilitation consisted of multi-disciplinary PRM, but these differences were generally limited to rehabilitation occurring during hospitalisation.

The longest lengths of stay were observed for mixed "PT & multi-disciplinary PRM" rehabilitations following hip prosthesis.

Similarly, lengths of stay were longer for rehabilitation by exclusive or mixed multi-disciplinary PRM, following shoulder procedures, shoulder and upper arm procedures and knee arthroplasty.

Details in Appendix 17.

#### 4.2.3.2 *Patient characteristics*

Regardless of whether the patients received their rehabilitation on an outpatient basis (possibly with a care sequence during hospitalisation), or only during hospitalisation, there were few differences between the patient profiles based on the type of rehabilitation. These differences, although small, were statistically significant for most of the characteristics.

***Patients receiving rehabilitation only during hospitalisation***

For these patients, the association with the type of rehabilitation (see Appendix 17) was most marked, with:

- Stay in a specialist rehabilitation service;
- Unemployment rate in the statistical quarter (which is a proxy of the socio-economic status in that quarter);
- Income level of the household;
- “Minor risk” entitlement coverage: non-entitled patients received more multi-disciplinary PRM.

***Patients receiving outpatient rehabilitation (either exclusively or in combination with rehabilitation during hospitalisation)***

The highest degree of association with the type of rehabilitation (see Appendix 17) was observed with:

- Existence and type of rehabilitation during 30 days before surgery: patients who had PRM rehabilitation after surgery had more often received PRM rehabilitation before the intervention (except for the mono PRM rehabilitation);
- The household income level;
- “MAF” activated for the patient: patients receiving multi-disciplinary PRM rehabilitation were often in this situation. This occurred less frequently if the rehabilitation consisted exclusively of mono-disciplinary PRM.
- The proxy “health status” (“ASA” proxy): a greater proportion of persons in poorer physical health was noted among persons receiving multi-disciplinary rehabilitation with PT (mixed);
- Benefiting from compensation because of work incapacity attributable to disease or injury: fewer persons unable to work among mixed rehabilitations with multi-disciplinary PRM;
- Persons not entitled to “minor risk coverage” were also more prominently represented in exclusive multi-disciplinary rehabilitation.

**4.2.3.3 *Health care consumption associated with rehabilitation episodes***

The study analysed the cost of other forms of health care covered by compulsory insurance which could be influenced or have an influence on the course of rehabilitation. See details in Appendix 18.

***Surgical trusses/orthopaedics***

This refers to orthopaedic materials, surgical trusses to the extent to which there is a high probability that they are specifically associated with the operation and intervention under study.

There is no real difference in the frequency of consumption for surgical trusses/orthopaedics for the 5 types of rehabilitation.

***Medications***

This study makes no analysis of medications specifically associated with particular surgical procedures, in view of the work load involved for a relatively small return in terms of potential information.

Consumption analysis relating to reimbursable analgesics and anti-inflammatory drugs indicates very little or no difference between the various types of rehabilitation.

## Key points

Rehabilitation pathways for specific surgical interventions

**PRM (mono- or multi-disciplinary) was performed in first intention during hospitalisation in more than one patient out of five for most of surgery procedures.**

**PT was the only form of rehabilitation received by more than 4 patients out of 5 for surgical procedures: this rehabilitation most often began after hospitalisation on an outpatient basis.**

**Care episodes consisting exclusively of mono- or multi-disciplinary PRM usually began in hospital and were not continued on an outpatient basis.**

**There are few differences (nevertheless statistically significant) between populations who receive different types of rehabilitation. These differences are mainly in length of stay (longer hospitalisation stay for multi-disciplinary PRM) and socio-economical patient characteristics.**

**There is no real difference between populations who receive the different types of rehabilitation for the costs of other forms of health care covered by compulsory insurance (orthopaedic materials, surgical trusses, reimbursable pain killers and anti-inflammatory medication).**

### 4.3 PT AND PRM CONSUMPTION FOR SPECIFIC SURGICAL PROCEDURES

The analysis relates to:

- The number of sessions, under the different PT and PRM (outpatient and hospital) nomenclature codes;
- The duration of rehabilitation treatment;
- The cost of care for the statutory health insurance, depending on the type of rehabilitation (PT or mono-disciplinary or multidisciplinary PRM).

Rehabilitation within the framework of rehabilitation conventions is rarely offered after the selected surgical procedures. These data are not included in the analyses.

#### 4.3.1 Number of sessions per episode and per type of rehabilitation

As stated in Appendix 18 (Table 178 till Table 181), the number of rehabilitation sessions per care episodes is significantly different (statistically) depending on the type of rehabilitation. The differences are, however, small for some surgical procedures.

The distributions of rehabilitation programmes consisting exclusively of PT, exclusively multi-disciplinary PRM and mixed rehabilitation with mono-disciplinary PRM are more similar when one takes account of whether or not the rehabilitation episode occurs only during hospitalisation (see the 1st table in Appendix 18).

Survival curves according to Kaplan Meier<sup>s</sup> (Figure 13 till Figure 30 in Appendix 18) indicate for each number of sessions, the probability of termination of the care episode after a given number of sessions X (horizontal axis). In other words, each point of the curve shows the percentage of episodes not yet terminated. These curves were established for each type of rehabilitation, which then constituted an equal number of strata, as follows:

1. Episode consisting exclusively of PT;
2. Episode consisting exclusively of mono-disciplinary PRM;
3. Episode consisting exclusively of multi-disciplinary PRM;

<sup>s</sup> The Kaplan-Meier (1958) estimator is a product limit estimator. In this case, where all data were uncensored, Kaplan-Meier estimator reduces to the empirical distribution function. For each number of sessions observed among the care episodes, a calculation is made of The probability (frequency) of non-terminated episodes =  $1 - (d_i / y_i)$  where  $d_i$  is the number of terminating care episodes for a number of sessions  $i$  and  $Y_i$  is the number of non-terminated ('at risk') episodes just before this number of sessions.

4. Episode consisting of a mixture of PT and mono-disciplinary PRM;
5. Episode consisting of a mixture of PT and PRM, with sessions of multi-disciplinary PRM.

The survival curves in Appendix 18 depict terminations of treatments. The shape of the curves is relatively similar between the strata. For some interventions (inpatient meniscectomy and cervical spine surgery), rehabilitation programmes mixed with multi-disciplinary PRM nevertheless exhibit a perceptibly slower decrease in the frequency of persons still undergoing treatment.

Episodes consisting only of mono-disciplinary PRM are atypical. These episodes consist, for the large majority of patients (80%), of a very limited number of sessions, usually K15, K20 sessions provided exclusively during hospitalisation.

To compare the survival rates by strata, we performed non-parametric tests on the overall shape of distribution: The Wilcoxon rank test and the "logrank test". The Wilcoxon test gives greater weight to episodes consisting of fewer sessions than the log-rank test. By contrast, the Wilcoxon test gives less weight to episodes consisting of very large numbers of sessions ("outliers").

**Both statistical tests indicate the existence of statistically significant differences between strata for each surgical operation. But the curves are sometimes very close.**

**Overall, episodes that consist of one single type of rehabilitation have fewer sessions than episodes with mixed rehabilitation.**

**Episodes of exclusively mono-disciplinary PRM have fewer sessions than only multi-disciplinary PRM episodes. Those multi-disciplinary PRM episodes consist of fewer sessions than episodes consisting exclusively of PT. Mixed episodes have the highest number of sessions. PT in combination with multi-disciplinary PRM have in particular more sessions than mixed episodes with PT and mono-disciplinary PRM.**

Exceptions to this gradation are found for specific interventions. Their curves are very close for rehabilitations consisting exclusively of PT and for mixed rehabilitations (with or without multi-disciplinary treatment). The following surgical procedures have similar PT and mixed curves: hip prosthesis, fracture of femur and knee arthroplasty. These procedures are those where multi-disciplinary PRM is frequent.

Finally, for meniscectomies (both inpatient and outpatient), the curves are very close for rehabilitation programmes that consist exclusively of PT, with a mixture of PT and mono-disciplinary PRM and, finally, rehabilitation consisting exclusively of multi-disciplinary PRM.

**For the four surgical procedures listed above (hip prosthesis, fracture femur, knee arthroplasty, meniscectomy), rehabilitation, regardless of type (apart from mono-disciplinary PRM) appears to require the same number of sessions.**

#### 4.3.2 Length of episodes based on the type of rehabilitation

Length per care episode significantly differs according to the type of rehabilitation (cf. Appendix 19 Table 182 and Table 183). The differences are, however, small for certain surgical procedures.

The survival curves in Appendix 19 (Figure 31 till Figure 48) provide a graphic idea of the rate of distribution for each type of rehabilitation (strata). The two statistical tests indicate significant differences between the strata shapes for each surgical operation. The curves, however, are sometimes very close.

##### 4.3.2.1 Gradation in the length of rehabilitation according to the type of rehabilitation

There is a gradation between the types of rehabilitation. Mixed PT and PRM episodes with multi-disciplinary rehabilitation are longer than mixed PT and PRM episodes without multi-disciplinary PRM. The latter are longer than episodes consisting exclusively of PT.

Finally, episodes consisting only of mono-disciplinary PRM are episodes differ from other types of rehabilitation: these episodes are quite short, usually limited to K15 and K20 sessions provided during hospitalisation.

#### 4.3.2.2 *Rehabilitation after arthrodesis of the dorso-lumbar spine*

In relation to rehabilitation after arthrodesis of the dorso-lumbar spine, exclusively mono PRM and multi PRM rehabilitation mostly consists of very short episodes. Most episodes consisting exclusively of PT terminate rather rapidly, while mixed rehabilitation programmes continue for more than 60 days in more than 40% of all episodes.

#### 4.3.2.3 *Rehabilitation after herniated disk*

In the case of herniated disk s, the rehabilitation consumption profile for exclusively PT or multi-disciplinary PRM rehabilitation programmes are very similar. Half of all patients cease treatment rather rapidly, while the other half continue treatment, terminating gradually over a matter of days.

#### 4.3.2.4 *Rehabilitation after hip prosthesis and fracture of the femur*

For hip prostheses and fractures of the femur, survival curves exhibit shapes which are identical, but greater numbers of patients receive longer rehabilitation episodes after surgery for fracture of the femur.

#### 4.3.2.5 *Rehabilitation after knee arthroplasty*

Curves per type of rehabilitation exhibit totally different shapes for knee arthroplasty. Patients receiving mixed or exclusively multi-disciplinary rehabilitation consume in a very similar manner.

#### 4.3.2.6 *Similarities between rehabilitation after one day hospitalisation*

Survival curves for both mixed rehabilitation are very close in the case of mastectomy, hip and knee prosthesis, fracture of the ankle, femur and tibia, surgery only on the shoulder or on the shoulder and upper arm.

Survival curves are similar for exclusively PT or exclusively multi-disciplinary PRM following surgery performed in one day hospitalisation i.e. outpatient rehabilitation.

#### 4.3.2.7 *Length of episodes: two profiles*

A large proportion of patients stop rehabilitation after a few days, except in the case of arthrodesis of the dorso-lumbar spine, carpal tunnel release performed in one day, as well as in the case of non-mixed rehabilitation programmes following knee prosthesis, cervical spine surgery, mastectomy, hallux valgus, urinary incontinence and herniated disk .

For all other surgical procedures and, in particular, for mixed rehabilitation, the duration of rehabilitation is longer. A greater number of patients are still attending rehabilitation sessions after 150 days (all types of rehabilitation combined).

### 4.3.3 *Rehabilitation expenditure on compulsory insurance episodes per type of rehabilitation*

The compulsory insurance expenditure is highly variable depending on the intervention. Expenditure distributions by disorder and by type of rehabilitation are highly dispersed. The median cost of rehabilitation programmes consisting of a mixture of PT and multi-disciplinary PRM, or those consisting exclusively of multi-disciplinary PRM are at least twice as high as rehabilitation programmes consisting exclusively of PT.

In relation to the five most frequent surgical procedures, for nearly half of all cases, by multi-disciplinary PRM, the following was noted:

- For rehabilitations following knee and hip prosthesis: if the rehabilitation included PT and multi-disciplinary PRM, the median costs were almost twice as high as for rehabilitation consisting only of PT. These median expenditures add up to €1 000 after knee prosthesis and €900 after hip prosthesis.



- For knee prosthesis, there is large dispersion of expenditures for rehabilitation episodes with only multi-disciplinary PRM: for 75% of patient this type of rehabilitation costs less than €2 587.
- For hip prosthesis, only multi-disciplinary PRM costs for 75% of this type of rehabilitation less than €500, which is less than the upper quartile expenditure for rehabilitation episodes with only PT.
- For rehabilitations following fracture of femur: if the rehabilitation included PT and multi-disciplinary PRM, the median costs (€1 600) were three times as high as for rehabilitation consisting only of PT.

In relation to other frequent procedures which are not often followed by multi-disciplinary PRM, the following was noted:

- For rehabilitations following outpatient meniscectomy including PT and multi-disciplinary PRM, the median costs were 5 times as high as for rehabilitation consisting only of PT. Expenditures for rehabilitations including only PT are closer to those for rehabilitation with mixture of PT and mono-disciplinary PRM.
- For rehabilitations following a surgical shoulder procedure including PT and multi-disciplinary PRM, the median costs were almost twice as high as for rehabilitation consisting only of PT. Expenditures for rehabilitations including only PT are closer to those for rehabilitation with mixture of PT and mono-disciplinary PRM.

General remark in relation to the tables that follow: Mixture of PT and multi-disciplinary PRM means that an episode contains both PT and multi-disciplinary PRM. It can also contain mono-disciplinary PRM.

**Table 25 : Rehabilitation expenditure on compulsory insurance for knee arthroplasty**

Type of rehabilitation	N Obs	Mean	Lower 95% CL for Mean	Upper 95% CL for Mean	Lower Quartile	Median	Upper Quartile
Only PT	3852	696	685	708	475	652	899
Only mono-disc. PRM	30	161	86	235	64	128	168
Only multi-disc. PRM	352	1505	1372	1637	330	1046	2587
Mixture of PT and mono-disc. PRM	919	715	690	740	486	701	921
Mixture of PT and multi-disc. PRM	6341	1295	1275	1316	797	1069	1463

**Table 26 : Rehabilitation expenditure on compulsory insurance for hip prosthesis**

Type of rehabilitation	N Obs	Mean	Lower 95% CL for Mean	Upper 95% CL for Mean	Lower Quartile	Median	Upper Quartile
Only PT	5036	470	458	482	127	389	646
Only mono-disc. PRM	419	99	92	106	64	80	112
Only multi-disc. PRM	1441	570	531	608	174	291	497
Mixture of PT and mono-disc. PRM	988	636	587	684	324	518	816
Mixture of PT and multi-disc. PRM	6573	1132	1112	1153	607	893	1347

**Table 27 : Rehabilitation expenditure on compulsory insurance for fracture of femur**

Type of rehabilitation	N Obs	Mean	Lower 95% CL for Mean	Upper 95% CL for Mean	Lower Quartile	Median	Upper Quartile
Only PT	2166	642	618	666	206	521	893
Only mono-disc. PRM	309	160	140	180	64	108	186
Only multi-disc. PRM	393	1046	923	1169	232	581	1367
Mixture of PT and mono-disc. PRM	901	910	838	982	410	702	1082
Mixture of PT and multi-disc. PRM	2648	1877	1826	1928	921	1557	2521

**Table 28 : Rehabilitation expenditure on compulsory insurance for outpatient meniscectomy**

Type of rehabilitation	N Obs	Mean	Lower 95% CL for Mean	Upper 95% CL for Mean	Lower Quartile	Median	Upper Quartile
Only PT	14382	276	272	280	127	237	329
Only mono-disc. PRM	1232	51	45	56	16	16	19
Only multi-disc. PRM	164	1076	946	1205	474	826	1506
Mixture of PT and mono-disc. PRM	1535	445	426	463	227	298	569
Mixture of PT and multi-disc. PRM	217	1383	1243	1522	788	1154	1740

**Table 29 : Rehabilitation expenditure on compulsory insurance for intervention on shoulder (minor intervention)**

Type of rehabilitation	N Obs	Mean	Lower 95% CL for Mean	Upper 95% CL for Mean	Lower Quartile	Median	Upper Quartile
Only PT	5306	594	585	604	349	590	815
Only mono-disc. PRM	256	126	94	158	16	16	48
Only multi-disc. PRM	222	1481	1310	1652	413	1198	2367
Mixture of PT and mono-disc. PRM	876	700	671	728	438	683	849
Mixture of PT and multi-disc. PRM	365	1461	1346	1576	828	1000	1819

When a distinction is made, within each type of rehabilitation, between rehabilitation provided only in hospital or not, some expenditure differences amongst them are alleviated (see Appendix 20 Table 185). If we consider rehabilitation provided only in hospital, in general, expenditures for only PT rehabilitation are low and similar to those for only mono-disciplinary PRM. Even expenditures for only PT rehabilitation provided not only during hospitalisation are for most of the interventions close to expenditures for combined PT and mono-disciplinary PRM rehabilitation.

Median and upper quartile of expenditures for only PT rehabilitation provided not only during hospitalisation are not similar amongst the different groups of surgery procedures. For 75% of patients these expenditures are less than €800 except for PT after surgery for knee prosthesis (€900), fracture of femur (€1 050).

For the 3 groups of interventions, frequently followed by multi-disciplinary PRM, we observe that costs for rehabilitation only multi-disciplinary PRM delivered only during hospitalisation are relative close to those of ambulatory PT.

For 75% of patients expenditures are less than €600 for knee prosthesis, less than €1 200 for fracture of femur; less than €400 for hip prosthesis. When rehabilitation provided only during hospitalisation includes also PT, expenses are much higher: for 75% of patients less than €1 400 for knee prosthesis; less than €2 200 for fracture of femur; less than €1 400 for hip prosthesis.

### Key points

PT and PRM consumption for specific surgical interventions

#### In relation to the number of acts per rehabilitation episodes:

- The number of sessions per episode differs greatly between types of rehabilitation, for the same intervention.
- However hip prosthesis, femur fracture, knee arthroplasty have the same number of sessions, independently of the type of rehabilitation (except PRM mono).
- More similarities between the number of sessions for any type of rehabilitation if we separate inpatient versus outpatient rehabilitation;
- One type of rehabilitation during the episode exhibits less acts per episode than « mixed » rehabilitation.
- Most mono-disciplinary PRM treatments stop after hospitalisation.
- The number of acts per episode is smaller for multi-disciplinary PRM than for PT.

#### In relation to the length of episodes:

- Length is shorter for PRM mono then for PT, which is shorter than mixed rehabilitation programs.
- Two profiles are observed: many patients with specific interventions stop after a few days; patients with « mixed » rehabilitation have longer episodes, often longer than 150 days.

#### In relation to the costs for compulsory health insurance:

- Costs for compulsory health insurance are high, even for the same procedure and the same type of rehabilitation.
- For 75% of rehabilitation episodes of PT continuing after hospitalisation, expenditures are less than €800 except for PT after surgery for knee prosthesis (€900) and fracture of femur (€1 050).
- As regards surgical procedures which are frequently followed by multi-disciplinary PRM, median expenditures for rehabilitation episodes with PT and multi-disciplinary PRM add up to €1 000 after knee prosthesis, €1 600 after fracture of femur and €900 after hip prosthesis. These median expenditures are at least twice as high as those for only PT.

## 4.4 FACTORS ASSOCIATED WITH REHABILITATION CONSUMPTION

The following analyses study if other factors than the type of rehabilitation are associated with the number of sessions per episode:

- Functional dependence indicators. Conventions existing prior to surgery give an indication on the patient dependence (lump sum approvals for home nursing, dependence during consecutive stays in nursing homes, approved E-listed disorder, attendance allowance, etc). It will not, however, be possible to control the seriousness of the disorders while there is no information on diagnosis and co-morbidity.
- “Proxy ASA” which identifies the patients in good or relatively poor health, based on his/her consumption of medications before the operation (see definition in Appendix I6).
- Demographic characteristics of the patient (age, sex).

- Available social data (increased coverage beneficiary status, income level with relation to MAF<sup>t</sup>, unemployed, disability, handicap, minimum living allowance beneficiary).
- Domicile: the place of residence was used to characterise the sociological profile of the person by reference to the unemployment rate for the statistical quarter.<sup>16</sup> Three classes were constructed:
  - Unemployment rate less than 7%.
  - Unemployment rate between 7 and 15%.
  - Unemployment rate of 15% or more.
- Characteristics of the hospital (existence of rehabilitation SP service within the hospital, general hospital, university, private versus public hospital, hospital size (less than 250 beds, 250 to 499 beds, 500 beds and more), number of PRM physicians in the hospital (less or more than 5) and an anonymized identification of the hospital (to identify any possible outlier).
- Speciality of the surgeon.
- Speciality of the prescribing physician.

Rehabilitation episodes related to patients who did not have rights to reimbursement for outpatient PT and patients admitted in nursing homes after surgery procedure are not included in this analysis.

#### 4.4.1 Factors associated with the probability of continuing treatment

Survival curves show that some variables are associated with the number of sessions for most surgical procedures. These are:

- Existence (and type) of rehabilitation (PT, PRM or non-PRM) before the surgical procedure;
- Reimbursement approval for E-listed disorder or multi-disciplinary PRM;
- Beneficiary of an assistance allowance to the aged (with handicap of category III, IV or V), of an allowance for the disabled who are in incapacity to work or of an allowance for handicapped person ;
- Activation of the “MAF” (see above), regardless of the reasons;
- Rehabilitation during hospitalisation only;
- Total length of stay in hospital (including stay in SP rehabilitation service);
- Classes of age: age is systematically correlated with the probability to continue treatment after X sessions. Age nevertheless has a statistically significant relationship with rehabilitation following arthrodesis of the dorso-lumbar spine, cervical spine surgery, any fracture, herniated disk, incontinence, “one day” carpal tunnel release, meniscectomy, hip prosthesis and shoulder surgery. In these cases the prolongation of rehabilitation sessions (probability of remaining in treatment) increases with age.

On the other hand, characteristics of the hospital and patient-linked variables have an influence in a limited number of surgical procedures. The patient gender has no systematic, statistically significant influence.

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t Explanation: The MAF (Maximum sum of invoice) system was created in 2001 to guarantee access to care for low-income persons. The system has been adapted several times. In 2004 and 2005, it consisted of the following configuration:  
 Social MAF: insured persons are fully reimbursed for the conventional fees if the sum of their expenses exceeds a ceiling of 450 EUR. In theory, BIMs are automatically entitled to this status.  
 MAF income: this permits persons with moderate-income to enjoy the same advantages as social MAF beneficiaries. The ceiling is 450 EUR for moderate-income households and 650 EUR for moderate-income married couples.  
 MAF fiscal: for persons ineligible for both categories listed above. the “Moderator Ticket” (patient expense) ceiling system is also applicable, but the reimbursement for moderator tickets exceeding the ceiling only applies against personal income tax. The ceiling for each household is based on the gross taxable income of the married couple.

For further details, see Appendix 22. Rank Tests for the Association of number of sessions with Covariates Pooled over Strata.

#### 4.4.2 Factors associated with the probability of continuing the treatment: survival curve based on the length (days) of the rehabilitation episodes

Age (age class) is associated with the duration of the rehabilitation episode (not always in a linear manner<sup>u</sup>), except for the following interventions:

- Surgical treatment for a fractured ankle,
- Plasty of cruciate knee ligaments or surgical treatment of kneecap subluxation (p-value for Wilcoxon test <0.05 but 0.8779 for Log rank test),
- Hallux valgus (p-value for Wilcoxon test 0.1031 but <0.05 for Log rank test),
- Surgical treatment of fractured forearm (p-value for Wilcoxon test = 0.5621 but <0.05 for Log rank test),
- Cervical spine surgery (p-value for Wilcoxon test 0.169 but <0.05 for Log rank test).

#### 4.4.3 Construction of an explanatory model of the treatment continuation rate (hazard rate)

A model building<sup>v</sup> identifies the respective influence of covariates on the treatment continuation. The methods and detailed results are found in Appendix 22.

The principal explanatory parameters commonly found for all surgical procedures are the following:

- The parameter "**Patient did not receive rehabilitation sessions during hospitalisation only**" is significantly associated with the prolongation of treatment. There is a major impact whose size varies according to the intervention (value from 2.5 to more than 250). This means that patients who continue their treatment after hospitalisation, or patients treated on an outpatient basis, have a 2.5 to 250 time greater possibility of still being in treatment than someone receiving rehabilitation during hospitalisation only. As shown in Table 23 (see also Tables 173 and following in Appendix 17), the number of patients receiving treatment during hospitalisation only is very high for certain surgical procedures.
- The **type of rehabilitation** also plays a statistically significant role in relation to almost all types of surgery (with the exception of hallux valgus and mastectomy). Depending on the surgical operation, the odds ratio for the exclusively PT rehabilitation is 0.18 to 0.72 compared to mixed rehabilitation with multi-disciplinary PRM. This means that the median number of sessions for patients treated by PT represent 18% to 72% of the median number of sessions when the patient receives mixed rehabilitation with multi-disciplinary PRM. In fact, the differences observed in lengths of treatment depending on the type of rehabilitation appear in large part to be linked to the disruption or continuation of treatment after hospitalisation.
- **Gender** is sometimes a statistically significant explanatory factor depending on the type of surgery. The difference between men and women is, however small. When this parameter is statistically significant, the odd ratio is at least 0.80. This also means that, all other things being equal, the median number of sessions is 20% lower in men compared to women.
- When the "**age class**" parameter is statistically significant, there is a small increase with age (reference group: patients older than 80 years). For example, for a hip prosthesis, the odd ratio for individuals aged 30 years was

u Statistically significant difference with each type of rehabilitation: p-value of Chi2 for Logrank test and Wilcoxon test < 0.05).

v Parametric regression model log normal: accelerate failure time model.

0.70 (younger patients have on average 30% fewer sessions than patients older than 80 years).

The other age classes have higher odds ratios but do not differ widely between each other. In the context of a fractured femur, the spread is more obvious: patients under the age of 30 had an odd ratio of 0.50 compared to patients 80 years old or more. For one-day meniscectomy, the ratio was inversed: younger patients had higher odds ratio than older patients.<sup>w</sup>

- **Patient survival** one year after the surgical operation usually implies - when this parameter is statistically significant - that the survivors have a higher odds ratio. The median duration of rehabilitation is therefore nearly 50% higher in the case of hip prostheses, for example.
- The socio-economic status of the patient (unemployment rate in the statistical quarter of residence) is a statistically significant parameter. The 2 categories "low unemployment rate" (less than 7%) and "unemployment rate close to average" (from 7 to 15%) have very close odds ratios. By contrast, patients who live in statistical quarters in which the unemployment rate exceeds 15%, consume 10 to 15% more sessions than the residents of other statistical quarters, for most types of surgery. Nevertheless, the relation is inversed for knee procedures (meniscectomies, ligaments and subluxation).
- **The odd ratio for the length of hospital stay** is otherwise interpreted. For the great majority of interventions, it is about 1.04. That means that for each additional day of hospitalisation, the median number of sessions increases by 4%. The longer the hospitalisation, the greater the probability that the patient will be still in rehabilitation compared to a person who left the hospital.
- Whether or not the patient receives **rehabilitation treatment during the 30 days before surgery** exerts a statistically significant influence on most types of surgery. Patients not receiving such rehabilitation treatment before the intervention have an odd ratio around 0.70.

Apart from these factors, the other parameters do not exert any systematic or major influence on the various types of surgery.

- The "**proxy ASA**": after incorporation of the other variables in the model, this proxy ASA does not have any significant influence, except in the case of hallux valgus.
- The **characteristics of the hospital** have no systematic or major influence for any form of surgery.
- The influence of the **prescribing physician** depends on the intervention. The odds ratio for general practitioners is higher for urinary incontinence and meniscectomy, but not so high for hallux valgus, herniated disk or shoulder surgery.
- The **income level** of the patient has little importance.
- **Benefit of increased coverage (BIM)** only applies in the case of fracture of the femur and hip prosthesis. Non-beneficiaries of the coverage (no BIM) have a relatively smaller risk.

<sup>w</sup> Younger patients have therefore, a higher probability of undergoing rehabilitation consisting of more sessions (all other things being equal). But these parameters were not statistically significant.

**Key points**

Factors associated with rehabilitation consumption

**The most decisive factor in the number of rehabilitation sessions is the cessation of treatment when the patient leaves the hospital. Many patients (in different proportions depending on the intervention), do not continue their rehabilitation on an outpatient basis.**

**Therefore the duration of the hospital stay has a major influence on the duration of treatment.**

**The number of sessions is thereafter clearly associated with the type of rehabilitation, although the magnitude of its influence varies according to the surgical operation.**

**Age, gender, socio-economic status and whether or not the patient already had rehabilitation before surgery also exert an influence with regards to certain surgical procedures.**

**4.5 EXPLANATORY MODEL OF THE TYPE OF TREATMENT PRESCRIBED IN FIRST INSTANCE**

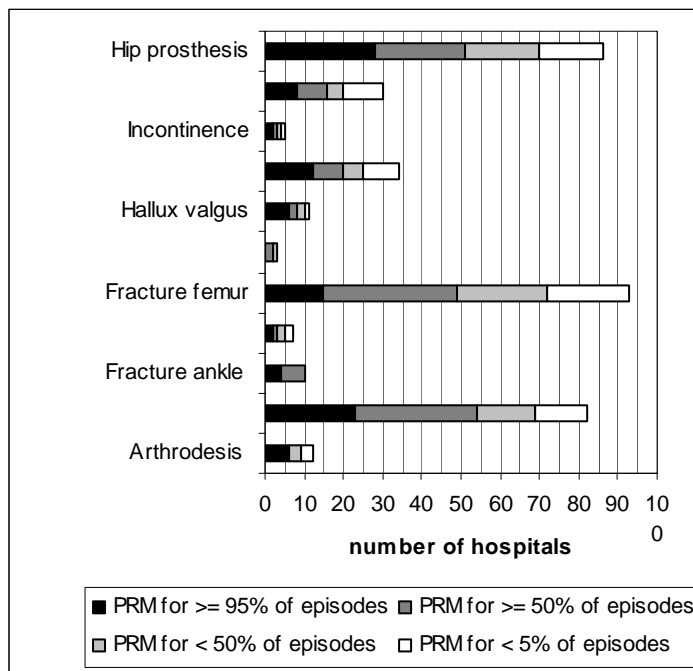
**4.5.1 Choice of the first rehabilitation treatment**

**4.5.1.1 Frequency of two types of rehabilitation: PT and PRM**

We have shown that the choice of the first rehabilitation treatment was linked to the intervention (Table 21). The choice, however, largely depends on the hospital. In hospitals that have both PT and PRM, and a sufficient number of interventions (minimum 20 per surgery procedure), many treatments begin with PRM for most patients.

Figure 14 presents the rehabilitation according to the surgical intervention. Hospitals that systematically begin rehabilitation with inpatient PT are classified as white. Those that systematically begin with PRM are classified as black. Those that provide PRM to more than 50% of patients (but not systematically), were classified as dark grey. Those that provide PRM to less than 50% of patients were classified as light grey.

**Figure 14 : PRM beginning rehabilitation episodes during hospitalisation, for each surgical procedure: number of hospitals per class of % of episodes which begins with PRM**



Only hospitals with a minimum of 20 rehabilitation episodes that begin during hospitalisation.

A wide dispersion in practice is noted between hospitals.

- For some interventions, the choice of PRM as first rehabilitation treatment is almost systematic in certain hospitals;
- The proportion of hospitals that choose PRM in first intention for more than 4 patients out of 5 is high. Nearly 40% of the hospitals make this first treatment choice for hip and knee prosthesis and herniated disk. For all other surgical procedures, more than 20% of all hospitals choose PRM as first intention for more than 80% of all patients.

The choice of PRM as first intention rehabilitation is practised systematic, or quasi-systematic for the different surgical procedures. Among 54 hospitals with more than 5 different procedures involving at least 20 rehabilitation episodes nearly half of them (46.30%) practice in this manner : for 4 surgical procedures on 5 (or more) they begin with PRM for 80% or more of the procedures.

This practice does not appear linked to the characteristics of the hospital. None of the following characteristics shows a statistically significant correlation (test Chi<sup>2</sup>) with this systematic practice:

- University hospital versus general hospital.
- Private or public status.
- Whether or not the hospital disposed of its own rehabilitation specialists.
- Whether or not the hospital disposed of specialist beds for locomotor or neurological rehabilitation (S2 or S3 service).
- Number of PRM physicians in the hospital (less versus more than 5 PRM physicians).
- The capacity of the hospital (fewer than 250 beds, between 250 and 500 beds, more than 500 beds).
- The legally defined hospital catchment area.

**Among the hospitals able to provide either PT or PRM and with sufficient numbers of interventions, half of hospitals (46.3%) began by providing PRM to at least 80% of their patients.**

**The choice of beginning systematically (or quasi) a treatment with PRM is not linked to the characteristics of the hospital: it is specific to each individual hospital.**

#### 4.5.1.2 *Choice of multi-disciplinary PRM*

Multi-disciplinary PRM in hospital is offered systematically, or quasi-systematically, in a few hospitals as a first treatment.

With regards to procedures performed in hospital for which at least 30 patients<sup>x</sup> received rehabilitation upon hospitalisation, it was noted that, in certain hospitals more than 80% of the patients received first treatment multi-disciplinary PRM.

The choice of multi-disciplinary PRM as first intention rehabilitation in-hospital for more than 80% of patients is a systematic practice (in 4 surgical procedures on 5, or even more) in 6 hospitals out of 48 (that is 12.5% presenting at least 30 patients for 5 surgical procedures).

The percentages vary according to the surgical procedure as illustrated in the table below. It attains 24% for knee prosthesis out of a total of 80 hospitals and 21 % for hip prosthesis.

x Minimum number of cases to 30, since this particular form of rehabilitation is theoretically less frequent.



**Table 30 : Multi-disciplinary PRM for first inpatient treatment: hospitals choosing it for more than 80% of rehabilitated patients**

	Hospitals NOT beginning inpatient rehabilitation with multi-disciplinary PRM for > 80% of all patients with rehabilitation	Hospitals beginning inpatient rehabilitation with multi-disciplinary PRM for > 80% of all patients with rehabilitation	Number of hospitals presenting $\geq 30$ cases of rehabilitation for the surgical procedure in question
Arthrodesis of dorso-lumbar spine	10 83.33%	2 16.67%	12
Knee prosthesis	61 76.25%	19 23.75%	80
Cervical spine surgery	7 87.50%	1 12.50%	8
Fractured forearm	4 100.00%	0 0.00%	4
Fractured femur	71 88.75%	9 11.25%	80
Inpatient knee ligament repair	17 100.00%	0 0.00%	17
Herniated disk	31 96.88%	1 3.13%	32
Mastectomy	21 100.00%	0 0.00%	21
Hip prosthesis	68 79.07%	18 20.93%	86
Shoulder + upper arm	7 100.00%	0 0.00%	7
Minor shoulder operation	14 93.33%	1 6.67%	15

**The choice of first intention multi-disciplinary PRM during hospitalisation is practised systematically, or quasi-systematically, in 6 of the 48 concerned hospitals.**

#### 4.5.2 Probability of beginning rehabilitation with PRM, regardless of the nature of surgery

The following analyses examine the factors associated with one particular type of patient rehabilitation. Are these explanatory variables linked to the care context (characteristics of the hospital or surgeon), the type of surgical procedures involved and to the patient characteristics?

##### 4.5.2.1 Methodology

The results of the binomial logistical regressions are expressed in odds ratios. If the odd ratio is greater than 1, the risk of occurrence of "rehabilitation beginning with PRM" is greater for this category compared to the category of reference.

Rehabilitation episodes of patients who do not have rights to all interventions of compulsory health insurance and patients who are admitted in a nursing home after the surgical procedures are included. We select only episodes which begun in hospitals involving at least 20 rehabilitation cases per surgical procedures.

We only included rehabilitation episodes for hospitals who have the choice between PRM and PT. Only 11 hospitals among 117 do not have any PRM physician.

#### 4.5.2.2 Choice of beginning with PRM when the first course of rehabilitation treatment is received during hospitalisation

##### **Model building based on patient characteristics**

A model only taking account of patient characteristics is not satisfactory. Its predictive power (0.67) is little better than chance (where probability of prediction = 0.5). The parameters below increase the chances that the patient will receive PRM instead of PT as first intention treatment:

- No minor risk entitlements (no rights to all interventions of compulsory health insurance that is outpatient PT) makes these patients 25 times more likely to receive PRM first.
- Having PRM within the 30 day-period before the operation makes these patients 4 times more likely to receive PRM first.
- Poor vital prognosis (patients dying the year following the operation) makes these patients 1.5 times more likely to receive PRM first.
- Rehabilitation during hospitalisation only makes these patients 1.6 times more likely to receive PRM first.

The type of surgical procedure also plays a role. Among surgical procedures, only fractures of the tibia and, to a lesser extent, procedures on the shoulder and the upper arm, have a greater odd ratio<sup>y</sup> than hip prostheses (exhibiting the highest percentage of first intention PRM). For all other procedures, compared to hip prosthesis, the probability of receiving PRM is lower, e.g. for mastectomy, hallux valgus and incontinence.

Other parameters are significant but do not greatly increase the chances of receiving PRM rehabilitation as first treatment:

- Socio-economic status (income level, unemployment rate in the statistical quarter of residence, entitlement to attendance allowance);
- Patient health status (proxy ASA);
- Patient dependency: nursing home resident, work disability, "proxy ASA", MAF entitlement;
- Age and gender.

**Table 31 : Probability of beginning rehabilitation with PRM versus PT based on patient socio-health characteristics**

Effect	DF	WaldChi-square	Pr > ChiSq
Minor risk entitlements	1	497.3626	<.0001
Age class	5	24.4747	0.0002
Death during the following year of surgery	1	49.1321	<.0001
Work disability (insurance coverage)	1	6.6360	0.0100
Income level	4	23.8065	<.0001
Active MAF (full reimbursement of health care)	1	12.0508	0.0005
Rehabilitation during the month beforehand	2	311.9920	<.0001
Unemployment rate in the statistical quarter of residence	2	1986.2482	<.0001
Gender	1	15.4201	<.0001
Rehabilitation during hospitalisation only	1	174.4475	<.0001
ASA (health status proxy)	1	6.6099	0.0101
Presence in MRPA or MRS during month preceding surgery	1	6.5333	0.0106
Presence in MRPA or MRS after hospitalisation	1	4.8593	0.0275
Allowance linked to dependence	1	8.0645	0.0045
Type of surgery	16	951.6972	<.0001

<sup>y</sup> Nevertheless confidence interval includes value "1". This limits the robustness of these measured effects.

**Table 32 : Probability of beginning rehabilitation with PRM versus PT based on patient socio-health characteristics: odds ratio**

		<i>Analysis of Maximum Likelihood Estimates</i>				
<b>Parameter</b>		<b>Esti- mate</b>	<b>Pr &gt; ChiSq</b>	<b>Odds ratio</b>	<b>95% Wald Confidence Limits</b>	
Intercept		-0.3218	0.0019	<b>0.725</b>		
Minor risk entitlements	No vs yes	3.2426	<.0001	<b>25.599</b>	19.252	34.04
Age class versus 30-49 years class	Under 30	-0.0712	0.2110	<b>0.931</b>	0.833	1.041
	50 - 59	0.0673	0.0551	<b>1.070</b>	0.999	1.146
	60 - 69	0.1445	0.0001	<b>1.155</b>	1.072	1.245
	70 - 79	0.1519	<.0001	<b>1.164</b>	1.079	1.256
	80 and over	0.1507	0.0006	<b>1.163</b>	1.066	1.268
Death during year following surgery	No vs yes	0.3979	<.0001	<b>1.489</b>	1.332	1.664
Work Disability (allowance by health insurance)	No vs yes	-0.0821	0.0100	<b>0.921</b>	0.865	0.981
Income levels versus highest level	Unknown	-8.0065	0.8947	<b>0.000</b>	<0.001	>999.9
	Social MAF for BIM	0.0785	0.0022	<b>1.082</b>	1.029	1.138
	Low income	0.1397	0.0018	<b>1.150</b>	1.054	1.255
	Modest income	0.1615	<.0001	<b>1.175</b>	1.099	1.257
Active MAF (Reimbursement in full)	No vs yes	0.0925	0.0005	<b>1.097</b>	1.041	1.156
Rehabilitation during the month preceding surgery	None vs PT	0.0267	0.4025	<b>1.027</b>	0.965	1.093
	PRM vs PT	1.4703	<.0001	<b>4.351</b>	3.670	5.158
Unemployment rate in statistical quarter of residence versus rate <7%	Median rate	-0.2069	<.0001	<b>0.813</b>	0.779	0.849
	Rate>15%	-1.0796	<.0001	<b>0.340</b>	0.323	0.357
Gender	Male vs female	-0.0823	<.0001	<b>0.921</b>	0.884	0.960
Rehabilitation during hospitalisation only	No vs yes	0.4810	<.0001	<b>1.618</b>	1.506	1.737
ASA (health status proxy)	Good health vs poor	0.0526	0.0101	<b>1.054</b>	1.013	1.097
Presence in MRPA or MRS during month preceding surgery	No vs yes	0.1729	0.0106	<b>1.189</b>	1.041	1.357
Presence in MRPA or MRS after hospitalisation	No vs yes	0.1010	0.0275	<b>1.106</b>	1.011	1.210
Allowance linked to dependence	No vs yes	-0.1362	0.0045	<b>0.873</b>	0.794	0.959
Arthrodesis of dorso-lumbar spine	vs hip prosthesis	-0.1667	0.0067	<b>0.846</b>	0.750	0.955
	Knee prosthesis	0.0049	0.8567	<b>1.005</b>	0.953	1.060
Fractured ankle		-0.0229	0.7656	<b>0.977</b>	0.841	1.136
Fractured forearm		-0.2597	0.0019	<b>0.771</b>	0.655	0.909
Fractured femur		-0.1181	0.0004	<b>0.889</b>	0.832	0.949
Fractured tibia		0.3185	0.0743	<b>1.375</b>	0.969	1.951
Knee ligament or subluxation		-0.5773	<.0001	<b>0.561</b>	0.472	0.668
Hallux valgus		-0.7110	<.0001	<b>0.491</b>	0.429	0.562
Herniated disk		-0.3038	<.0001	<b>0.738</b>	0.685	0.795
Urinary incontinence		-1.5178	<.0001	<b>0.219</b>	0.179	0.269
Cervical spine operation		-0.1112	0.1245	<b>0.895</b>	0.776	1.031
Mastectomy		-1.1004	<.0001	<b>0.333</b>	0.305	0.363
One day meniscectomy		-0.3210	0.0294	<b>0.725</b>	0.543	0.968
Inpatient meniscectomy		-0.4035	<.0001	<b>0.668</b>	0.601	0.743
Shoulder + upper arm		0.0516	0.4792	<b>1.053</b>	0.913	1.215
Shoulder		-0.2174	<.0001	<b>0.805</b>	0.738	0.878

The models based on patient characteristics are rather inefficient. The predictive power is hardly better than random performance (rate of concordance of 67.5 versus 50 by pure chance).

**Table 33 : Model building of the probability of beginning rehabilitation with PRM versus PT based on patient socio-health characteristic: Association of Predicted Probabilities and Observed Responses**

Percent Concordant	67.5	Somers' D	0.356
Percent Discordant	31.9	Gamma	0.358
Percent Tied	0.5	Tau-a	0.178
Pairs	687902688	c	0.678

**Table 34 : Model building of the probability of beginning rehabilitation with PRM versus PT based on patient socio-health characteristic: Classification table**

Prob Level	Correct		Incorrect		Percentages				
	Event	Non-Event	Event	Non-Event	Correct	Sensi-tivity	Speci-ficity	False POS	False NEG
0.500	17197	15608	11320	8349	62.5	67.3	58.0	39.7	34.8

***Model building based on patient characteristics with integration of hospital identity***

The model that integrates the identification of the hospital (i.e. the hospital's registration number as defined by the Ministry of Public Health), is more efficient than the model taking account of patient-linked parameters only. For the value of the AIC criterion its predictive power, which rises to 95% (sensitivity = 90 and specificity = 89), **this model is the preferred model** (cf. Appendix 23). It eliminates a series of variables presented in the preceding model which only considered the patient characteristics. Exit:

- Parameters linked to the socio-economic status (income level, attendance allowance beneficiary);
- Parameters linked to health status;
- Parameters linked to patient dependence;
- Gender.

This model slightly changes the influence of the preserved patient-linked parameters. The decisive factors are similar:

- Absence of entitlement to "minor risks" makes the patients 71 times more likely to receive PRM first;
- Presence or absence, and the nature of, rehabilitation during the 30-day period before hospitalisation: PRM before hospitalisation makes these patients 5 times more likely to receive PRM first;
- Type of surgery.

The hospital identity plays a decisive role. Depending on the hospital where the operation took place, the probability of receiving PRM as first rehabilitation treatment is more than 100 times higher than that of the hospital of reference. The hospital of reference was selected because the majority of surgical procedures were available there, and because it offered the 2 types of rehabilitation in a relatively median fashion, on a first intention basis.

The details of the odds ratios for the parameters, with the exception of the hospital identifier, are set forth below. For details on the odds ratios for all 104 hospitals, the reader is referred to Appendix 23.

**Table 35 : Model building of the probability of beginning rehabilitation with PRM versus PT, with introduction of the hospital identifier: odds ratio (for individual hospital odd ratio see Appendix 23)**

<b>Parameter</b>		<b>Estimate</b>	<b>Pr &gt; ChiSq</b>	<b>Odds ratio</b>	<b>95% Wald Confidence Limits</b>	
Intercept		0.6733	0.0001	1.961	0.6733	0.0001
Minor risk entitlements	No vs yes	4.2612	<.0001	70.893	50.440	99.638
Age class versus 30-49 years class	Under 30	-0.2418	0.0088	0.785	0.655	0.941
	50 – 59	0.0893	0.1111	1.093	0.980	1.220
	60 - 69	0.0906	0.1027	1.095	0.982	1.221
	70 – 79	0.0881	0.1090	1.092	0.981	1.216
	80 and over	0.1625	0.0123	1.176	1.036	1.336
Death in year following surgery	No vs yes	0.2377	0.0132	1.268	1.051	1.531
Rehabilitation during the month preceding surgery	None vs PT	0.0354	0.4935	1.036	0.936	1.147
	PRM vs PT	1.6487	<.0001	5.200	4.073	6.640
Unemployment rate in statistical quarter of residence	Median rate vs <7%	-0.0562	0.1221	0.945	0.880	1.015
	Rate >15%	-0.1543	0.0028	0.857	0.775	0.948
Presence in MRPA or MRS during the month preceding surgery	No vs yes	0.2447	0.0321	1.277	1.021	1.598
Presence in MRPA or MRS after hospitalisation	No vs yes	0.1917	0.0120	1.211	1.043	1.407
Arthrodesis of dorso-lumbar spine	Vs hip prosthesis	-0.2570	0.0125	0.773	0.632	0.946
Knee prosthesis		-0.0107	0.8120	0.989	0.906	1.081
Fractured ankle		-0.4364	0.0010	0.646	0.499	0.838
Fractured forearm		-0.1858	0.1826	0.830	0.632	1.091
Fractured femur		-0.2126	0.0002	0.808	0.724	0.903
Fractured tibia		-0.4348	0.0985	0.647	0.386	1.084
Knee ligament or subluxation		-0.7784	<.0001	0.459	0.350	0.603
Hallux valgus		-0.8909	<.0001	0.410	0.326	0.516
Herniated disk		-0.3552	<.0001	0.701	0.617	0.796
Urinary incontinence		-3.0025	<.0001	0.050	0.035	0.070
Cervical spine operation		-1.1875	<.0001	0.305	0.242	0.385
Mastectomy		2.0544	0.0071	7.802	1.747	34.849
One day meniscectomy		-2.5949	<.0001	0.075	0.065	0.086
Inpatient meniscectomy		-0.8327	0.0002	0.435	0.282	0.670
Shoulder + upper arm		-0.4415	<.0001	0.643	0.539	0.767
Shoulder		-0.6419	<.0001	0.526	0.420	0.660

**Table 36 : Model building of the probability of beginning rehabilitation with PRM versus PT based on patient socio-health characteristics and identification of hospital: Association of Predicted Probabilities and Observed Responses**

<b>Percent Concordant</b>	95.2	<b>Somers' D</b>	0.905
<b>Percent Discordant</b>	4.7	<b>Gamma</b>	0.906
<b>Percent Tied</b>	0.1	<b>Tau-a</b>	0.452
<b>Pairs</b>	688481404	<b>c</b>	0.953

**Table 37 : Model building of the probability of beginning rehabilitation with PRM versus PT based on patient socio-health characteristics characteristics and identification of hospital: Classification table**

Prob	Correct		Incorrect		Percentages				
	Event	Non-Event	Event	Non-Event	Correc t	Sensi- tivity	Speci- ficity	False POS	False NEG
0.500	22883	23902	3036	2675	89.1	89.5	88.7	11.7	10.1

Even in the absence of data on the functional status of the patient, this model provides an almost exact prediction of the type of rehabilitation (PRM versus PT).

The hospital identity (i.e. the hospital's registration number as defined by the Ministry of Public Health) where the rehabilitation begins, is of first importance. Additional information include the type of surgery, the patient's coverage for "minor risks", the presence and nature of rehabilitation before the operation and, to a lesser extent, the age and unemployment rate of the statistical quarter of residence.

#### 4.5.2.3 *Probability of beginning rehabilitation with multi-disciplinary PRM during hospitalisation*

##### **Model building based on patient characteristics**

The rate of concordance (nearly 79%) is clearly better than that obtained for the model building of the probability of prescribing PRM in first intention, regardless of the type of PRM. The specificity of this model is very good, but sensitivity is poor.

The most important parameters are:

- Lack of coverage for "minor risks" makes these patients 42 times more likely to receive multi-disciplinary PRM;
- Having received PRM during the 30-day period before the intervention of PRM makes these patients 4 times more likely to receive multi-disciplinary PRM versus patients receiving PT during the 30-day period before the operation;
- Surviving for one year following surgery makes patients 1.6 times more likely to receive multi-disciplinary PRM than patient with poorer diagnoses;
- Being under the age of 30 reduces the likelihood of receiving multi-disciplinary PRM by one third compared to patient between 30 and 59. Being older slightly increases these chances.

The other statistically significant parameters have an odds ratio close to 1.

**Table 38 : Model building of the probability of beginning rehabilitation with multi-disciplinary PRM versus mono-disciplinary rehabilitation (PRM or PT) based on patient socio-economic characteristics: statistically significant variables**

Type III Analysis of Effects			
Effect	DF	Wald Chi-Square	Pr > ChiSq
Minor risk entitlements	1	1129.5758	<.0001
Age class	5	23.0393	0.0003
Death during the year afterwards	1	45.1503	<.0001
Income levels	4	18.4245	0.0010
Rehabilitation during month preceding surgery	2	324.9210	<.0001
Unemployment rate in statistical quarter of residence	2	917.5646	<.0001
Rehabilitation during hospitalisation only	1	33.1269	<.0001
ASA (health condition proxy)	1	10.3829	0.0013
Presence in MRPA or MRS during month preceding surgery	1	12.6379	0.0004
Presence in MRPA or MRS after hospitalisation	1	27.0171	<.0001
Allowance linked to dependence	1	5.6485	0.0175
Type of surgery	16	2651.5925	<.0001

**Table 39 : Model building of the probability of beginning rehabilitation with multi-disciplinary PRM versus mono-disciplinary rehabilitation (PRM or PT) based on patient socio-health characteristics: odds ratio**

Parameter	Estimate	Pr > Chi Sq	odds ratio	Wald 95% confidence interval
Intercept	-1.5571	<.0001	0.211	
Minor risk entitlements	No vs yes	<.0001	42.305	34.005 52.630
Age class versus 30-49 years class	Under 30	0.0006	0.696	0.566 0.856
	50 - 59	0.2004	1.069	0.965 1.184
	60 - 69	0.0204	1.124	1.018 1.240
	70 - 79	0.0670	1.095	0.994 1.208
	80 and over	0.1216	1.089	0.977 1.214
Death during year following surgery	No vs yes	<.0001	1.624	1.410 1.870
Income level versus highest level	unknown	0.9955	0.000	<0.001 >999.9
	Social MAF for BIM	0.0001	1.118	1.056 1.184
	Low income	0.0354	1.107	1.007 1.216
	Modest income	0.0010	1.123	1.048 1.203
Rehabilitation during month preceding surgery	None vs PT	0.1647	1.059	0.977 1.148
	PRM vs PT	<.0001	3.938	3.352 4.628
Unemployment rate in statistical quarter of residence	Median rate vs <7%	<.0001	0.811	0.770 0.854
	Rate > 15%	<.0001	0.360	0.336 0.385
Rehabilitation during hospitalisation only	No vs yes	<.0001	0.781	0.718 0.850
ASA (health condition proxy)	In good health vs not	0.0013	1.084	1.032 1.139
Presence in MRPA or MRS during month preceding surgery	No vs yes	0.0004	1.362	1.149 1.615
Presence in MRPA or MRS after hospitalisation	No vs yes	<.0001	1.338	1.199 1.493
Allowance linked to dependence	No vs yes	0.0175	0.876	0.785 0.977
Arthrodesis dorso-lumbar spine	vs hip prosthesis	<.0001	0.385	0.328 0.451
Knee prosthesis		0.1386	1.043	0.986 1.103
Fractured ankle		<.0001	0.103	0.074 0.146
Fractured forearm		<.0001	0.114	0.080 0.162
Fractured femur		<.0001	0.610	0.565 0.658
Fractured tibia		<.0001	0.028	0.007 0.120
Knee ligament or Subluxation		<.0001	0.106	0.073 0.153
Hallux valgus		0.8360	0.000	<0.001 >999.99
Herniated disk		<.0001	0.134	0.118 0.152
Urinary incontinence		<.0001	0.006	0.002 0.025
Cervical spine operation		<.0001	0.137	0.104 0.180
Mastectomy		<.0001	0.009	0.006 0.014
Meniscectomy one day		<.0001	0.336	0.225 0.501
Meniscectomy Inpatient		<.0001	0.022	0.014 0.035
Shoulder + upper arm		<.0001	0.342	0.280 0.417
Shoulder		<.0001	0.213	0.187 0.243

**Table 40 : Model building of the probability of beginning rehabilitation with multi-disciplinary PRM versus mono-disciplinary rehabilitation (PRM or PT) based on patient socio-health characteristics: Association of Predicted Probabilities and Observed Responses**

Percent Concordant	78.8	Somers' D	0.582
Percent Discordant	20.7	Gamma	0.584
Percent Tied	0.5	Tau-a	0.206
Pairs	488440569	c	0.791

**Table 41 : Model building of the probability of beginning rehabilitation with multi-disciplinary PRM versus mono-disciplinary rehabilitation (PRM or PT) based on patient socio-health characteristics: Classification table**

Prob Level	Correct		Incorrect		Sensi-		Speci-		Percentages	
	Event	Non-Event	Event	Non-Event	tivity	ficity	False POS	False NEG		
0.500	1718	40116	261	10379	79.7	14.2	99.4	13.2	20.6	

**Model building of the probability of beginning rehabilitation with multi-disciplinary PRM, considering the identity of the hospital**

The inclusion of the identity of the hospital (i.e. the hospital's registration number as defined by the Ministry of Public Health) slightly improves the predictive power. Some variables linked to patient socio-economic status disappear (unemployment rate of statistical quarter for instance) and are replaced by variables linked to dependence (level of dependence, nursing home resident). By contrast, the odds ratio values of the parameters already present in the preceding model evolve very little. The percentage of concordance of this new model is noticeably better (rate of concordance 94.5%, sensitivity 0.74, specificity 94).

An intermediary model based on the characteristics of the hospital (instead of its identification) was also tested (cf. following table). It is less efficient (rate of concordance 89.9%, sensitivity 59.6, specificity 94.6).

**Table 42 : Model building of the probability of beginning rehabilitation with multi-disciplinary PRM versus mono-disciplinary rehabilitation (PRM or PT): Significant variables in a model including the characteristics of the hospital**

Availability or non-availability of specialist rehabilitation beds at the hospital	1	369.0959	<.0001
Patient stay in a specialist rehabilitation bed	1	27.3805	<.0001
General hospital vs university or assimilated hospital	1	5.7690	0.0163
STATUS (public vs private hospital)	1	52.6401	<.0001
Hospital capacity	2	830.3476	<.0001
HOSPITAL REGION (legally defined catchment areas)	34	6109.1417	<.0001
Number of PRM physicians in the hospital	1	428.8677	<.0001

The choice of multi-disciplinary PRM therefore appears to be strongly linked to the hospital, rather than to the characteristics of the patient.

For the value of the odds ratio of all parameters of this model: see details in Appendix 23.

**Even in the absence of data on the functional status of the patient, a model provides an almost exact prediction of probability that a patient will have first multi-disciplinary PRM versus mono-disciplinary rehabilitation (PRM or PT). The hospital identity (i.e. the hospital's registration number as defined by the Ministry of Public Health) where the rehabilitation begins plays a major role. Additional parameters are rights to reimbursements « minor risks », the surgery procedure, rehabilitation limited to the period of hospitalisation, and some patient characteristics linked to dependency or age:**



- Patients who received PRM within the 30-day period before surgery were three times as likely to receive multi-disciplinary PRM as first rehabilitation.
- Patients who have a moderate level of dependency for ADL, i.e. level A, are 1.4 times as likely to receive multi-disciplinary PRM as first rehabilitation as patients without any known dependency.
- Patients who stay in a nursing home before or after surgery are respectively 1.3 and 1.4 times as likely to receive multi-disciplinary PRM as first rehabilitation.
- Patients who survive one year after surgery are 1.4 times as likely to receive multi-disciplinary PRM as patients who died.
- Patients older than 50 are 1.2 times as likely to receive multi-disciplinary PRM as first rehabilitation than patient of 30 to 49 years; patients younger than 30 are 0.6 times as likely to receive multi-disciplinary PRM.

#### 4.5.2.4

*Choice of PRM as first rehabilitation treatment when the first treatment is on an outpatient basis: model building based on patient characteristics and identification of hospital*

The selected model takes account of all types of surgery and of the hospital identity (i.e. the hospital's registration number as defined by the Ministry of Public Health). Adding the hospital identity gives a rate of concordance of 92% (sensitivity 55 and specificity 98.3). Without this last parameter, the rate of concordance is 78% (specificity 99.5 but sensitivity 4.8).

The variables linked to the patient characteristics are common to the 2 models and their odds ratios are relatively close:

- Patients who already received PRM in the 30-day period before surgery were 66 times as likely to receive PRM as first rehabilitation.
- Patients who received no PT in the 30-day period before surgery were three times as likely to receive PRM as first rehabilitation.
- Patients living in statistical quarters with high unemployment rate were twice as likely to receive PRM.
- All types of surgery had a perceptibly lower likelihood of receiving PRM in first intention on an outpatient basis than one-day meniscectomy patients.
  - Patients without long unemployment period, who do not benefit of minimum subsistence allowances, are less likely to receive PRM as first rehabilitation.
  - The statistical quarter where patients live has also an influence on the probability to get PRM first.

**Socio-economically disadvantaged patients have more chance of receiving PRM as first treatment when rehabilitation begins on an outpatient basis.**  
**The hospital in which the surgery was performed is also an important explanatory parameter of the nature of the first rehabilitation even when it begins after hospitalisation.**

## Key points

Explanatory model of the type of treatment prescribed in first instance

**Half of the hospitals begin with PRM for more than 80% of patients and for most studied surgery procedures (4/5 or more surgery procedures). These figures show that there is a systematic choice for PRM by the hospital, independently of the patient's characteristics.**

**One out of eight hospitals begins with multi-disciplinary PRM for more than 80% of patients and for most studied surgery procedures (4/5 or more surgery procedures). The proportion of hospitals that choose first for multi-disciplinary PRM vary according to the surgical procedure.**

**Even in the absence of data on the functional status of the patient, a model provides an almost exact prediction of the choice of first rehabilitation treatment: the identification of the hospital in which the rehabilitation begins is of first importance. Additional parameters common to all models are the type of surgery and the "minor risks" coverage of the patient.**

**Other factors influence the choice of PRM versus PT for hospitalised patients: presence and nature of rehabilitation before the operation and, to a lesser extent, the age of the patient and the unemployment rate of the statistical quarter of residence.**

**Some patient demographic / socio health status characteristics influence the choice of multi-disciplinary PRM versus mono-disciplinary rehabilitation (PRM or PT) in hospitalised patients.**

**Surprisingly, the hospital where the surgery was performed is also an important explanatory parameter of the nature of the first rehabilitation treatment even when it begins after hospitalisation.**

**Therefore we conclude, for the procedures under study (orthopaedic procedures, urinary incontinence and mastectomy), that:**

**There are statistically significant differences in the choice of treatment according to the surgical procedure.**

**The preferences of the hospital have a major influence on the choice of the type of rehabilitation especially for the 3 following surgical procedures: knee arthroplasty, hip prosthesis and fracture of the femur.**

**Being covered by the health insurance for "minor risks" also influences the choice of first rehabilitation in hospital.**

**Socio-economic characteristics, health status and dependence of patient play a minor role in predicting the nature of first rehabilitation for these surgery procedures.**

## **5 DISCUSSION AND GENERAL CONCLUSION ON THE CONSUMPTION OF REHABILITATION SERVICES IN BELGIUM**

This analysis of the consumption of physical and rehabilitation medicine and physiotherapy relies on claims data invoiced to the statutory health insurance. The administrative dataset provided by the Common Sickness Funds Agency (IMA) offers detailed information on health expenditures although it lacks specific information on the health and functional status of the individual patient. Therefore, the data were completed by proxy indicators of the patients' dependence and health status, and by information on occurrence of death.

### **5.1 SUMMARY OF THE DESCRIPTIVE FINDINGS**

The descriptive part of the study shows that rehabilitation is very common among Belgian residents. Every year, 13.5% of the patients in the IMA sample require some form of rehabilitation care. Age and gender influence this consumption of care: older and female patients consume more often and have slightly more care per episode. Almost 8.70% of this consumption is related to conditions that can be identified as chronic and serious (Fb and E-listed conditions).

### **5.2 FACTORS RELATED TO THE TYPE OF REHABILITATION AFTER SURGICAL INTERVENTIONS**

The third part of the study describes the rehabilitation consumption for specific surgical procedures i.e. orthopaedic interventions, mastectomy and surgical treatment of urinary incontinence. This group represents almost 50% of the disorders eligible for multi-disciplinary PRM and accounts for 22% of all multi-disciplinary PRM activities. Other exclusion criteria (e.g. complex interventions, outliers in length of stay, missing information on the treatment for "minor risk patients") were applied to maximize the homogeneity within the groups of surgical interventions.

The most influential factor for the choice of rehabilitation is the identity of the hospital (based on the hospital's registration number as defined by the Ministry of Public Health) where the rehabilitation begins. Statistical models based on the characteristics of the hospital that were available in this dataset are less satisfying than those using the identity of the hospital.

Additional predictive factors for the type of rehabilitation are the patient's coverage for "minor risks" and the presence or type of rehabilitation before the operation. The type of intervention and some socio-demographic or health related characteristics of the patient predict the rehabilitation to a lesser extent.

### **5.3 LIMITS OF THE STUDY OF REHABILITATION CONSUMPTION**

This study is limited to the rehabilitation of uncomplicated cases after specific (mainly orthopaedic) surgical interventions. The conclusions might therefore not be applicable to more complicated orthopaedic interventions or to other diseases such as neurological disorders or burns. In particular, neurological disorders might present another profile of rehabilitation as they often require a multi-disciplinary treatment. Neurological disorders were deliberately excluded for two main reasons. First the available data did not allow the identification of these patients in the sample. Secondly, the range of severity might largely vary within this group of patients as for example for patients who suffer from a stroke.

Another shortcoming is the grouping of diseases to obtain a sample size that allowed statistical analyses. The same label (e.g. arthrodesis of dorso-lumbar spine) could cover different disorders, age ranges, or lesion sites. Moreover, one surgical procedure can be done for patients with different functional status according to the nature and the severity of the underlying disorder.

Finally, many hospital characteristics could not be identified in the IMA database. In the same way, many patient characteristics were unknown in the administrative database e.g. the level of education, the level of income, the functional status, the living conditions (at home versus institution, alone versus family). Living conditions (e.g. residency in nursing home before or after surgery) can, in particular, have an influence on the objectives of the rehabilitation and therefore the possible choice of multi-disciplinary PRM.

## 5.4 DISCUSSION OF THE RESULTS

### 5.4.1 Specificity of PRM medicine

In most countries, the PRM specialist is responsible for the medical diagnosis and the establishment of a treatment plan in multi-disciplinary rehabilitation. It is up to him to orient the patient towards a mono-disciplinary treatment (e.g. physiotherapy) or a multi-disciplinary approach for the complex cases. In the latter situation, the PRM specialist coordinates the multi-disciplinary team. Finally, follow-up PRM consultations guarantee the quality of the rehabilitation care and allow a possible new orientation of the treatment according to the functional results. The PRM specialist is not remunerated on a fee-for-service basis, but his salary is included in the all-in funding allocated to specialised rehabilitation centres.

Belgium and France are the only countries where patient and physician have the choice between physiotherapy and PRM. They can opt for the system that seems to offer the most favourable reimbursement conditions and/or that seems to give the best quality of care. Furthermore, there is no waiting list that would preclude from choosing one or another system. Finally, in Belgium, the PRM specialist is prescriber and provider at the same time: he/she can prescribe sessions that will then be provided by an allied health professional (e.g. physiotherapist) but for which he will be remunerated by the statutory health insurance.

Unfortunately, the methodology of this study does not provide an answer on the important question about the specificity of a rehabilitation treatment with PRM medicine in comparison with a treatment with physiotherapy. In particular, the specificity of a multi-disciplinary treatment could not be brought to the fore using this study design. A previous KCE report concluded that multi-disciplinary treatments play a significant role in the rehabilitation of specific disorders such as stroke (KCE report 40). This added value should be also considered for a range of other complex disorders that do not benefit today from this PRM treatment but follow any rehabilitation pathway.

Finally, the specificity of mono-disciplinary PRM medicine in general versus physiotherapy is difficult to identify in the literature: scientific studies analyze specific treatments for specific disorders independently of the caregiver.

### 5.4.2 Influence of the PRM reform in 2004 on the consumption of rehabilitation medicine

The PRM reform in 2004 introduced the possibility to benefit from multidisciplinary sessions for a limited list of disorders. This nomenclature could be used if the patient had a complex situation that required a multidisciplinary rehabilitation. The reform of PRM nomenclature in 2004 had an impact on the rehabilitation consumption by hospitalised patients. The number of episodes including 60 minutes sessions decreased and those including 120 minutes sessions increased.

On the other hand, the consumption of fee-for-service mono-disciplinary PRM procedures decreased drastically. Moreover, physiotherapy provided to hospitalised patients also declined after the reform. These findings could be interpreted as a shift in the use of the nomenclature as longer sessions were allowed for disorders that benefited from shorter treatments beforehand.

### 5.4.3 Costs of rehabilitation in the different pathways

Costs per rehabilitation episode for compulsory health insurance are highly spread, even for the same procedure and for the same type of rehabilitation.

The relative similarity of expenditures distribution between different types of rehabilitation is rather surprising, depending on the fact that rehabilitation is or is not delivered only during hospitalisation. Expenditures for physiotherapy and mono-disciplinary PRM rehabilitation are rather similar when the rehabilitation is only provided during hospitalisation. The expenditures are also similar for physiotherapy episodes and episodes combining physiotherapy and mono-disciplinary PRM when the rehabilitation continues after hospitalisation.

The findings also enlighten the high expenditures per episode of rehabilitation when this episode includes multi-disciplinary PRM, particularly for frequent surgical procedures that are frequently followed by multi-disciplinary PRM.

### 5.4.4 Factors that influence the type of rehabilitation in Belgium

The only factor that should determine the type of rehabilitation is the functional status of the patient. The importance of the functional status has been previously pointed out by recent KCE reports. The KCE report 57 (Organisation and financing of musculoskeletal and neurological rehabilitation in Belgium) strongly pleaded for the systematic recording of a functional assessment measure. These data are available in other countries for large post-acute musculoskeletal and neurological disorders often (but not always) treated on an inpatient basis. The KCE report 40 (Functional status of the patient: a potential tool for the reimbursement of physiotherapy in Belgium?) highlighted the difficulty to collect those data for more standard disorders in outpatient settings.

This study highlights that many other factors seem to have an influence on the revalidation pathways in Belgium. Even without information on the functional status, the statistical models are able to predict the type of rehabilitation received by the patient.

First, there is a strong influence of the fee-for-service nomenclature system on rehabilitation practices. A first example is that more than half of the patients received multi-disciplinary PRM after a hip or knee prosthesis or fracture of the femur, as is allowed by the nomenclature. There can indeed be a need for multi-disciplinary treatment, such as occupational therapy to improve the activities of daily living (ADL) when the patient has to return to a home situation where he has limited social support. As stated above, some results do suggest that a limited score on the dependence scale is associated to multi-disciplinary PRM. However, the question arises as to which proportion of patients who have the right to benefit from multi-disciplinary sessions, really need them. The second illustration of the influence of the nomenclature is the preferential consumption of PRM medicine by patients who were not entitled to outpatient physiotherapy reimbursement (no reimbursement for "minor risks"). This status was clearly associated with PRM consumption during the hospitalisation. A third example is the influence of the reform in Physical and Rehabilitation Medicine in August 2004. This reform consisted in the introduction of a limitative list of disorders having access to multi-disciplinary treatments in PRM.<sup>4</sup> This reform had an impact on the type of first intention treatment: to the benefit of multi-disciplinary treatment and to the benefit of longer sessions.

Second, there is the major influence of the hospitals on the choice of the type of rehabilitation. This is true for three interventions in particular i.e. hip and knee prosthesis and fracture of the femur. The choice for PRM appears quite independent of the functional status as half of the hospitals systematically begin with PRM for most patients and for most surgical procedures.

It can be hypothesized that the following elements (not identified in the dataset) could be hidden behind the variable 'identity of the hospital' (based on the hospital's registration number as defined by the Ministry of Public Health) and influence the choice concerning rehabilitation:

- the nomenclature as explained above;
- the fees charged to the patients by the hospital. Patient out-of-pocket payments and supplements might influence the choice of the physician as well as the patient;
- the employment status of the physicians and physiotherapists (salaried versus independent status);
- the specialty of the physician referring towards rehabilitation;
- the professional collaboration between services in the hospital (e.g., between the orthopaedic and PRM services);
- the associations between the hospitals and the different services for rehabilitation.

The third influence on the choice of type of rehabilitation is the availability of care. The composition of the care sequences illustrates this point. PRM is the first intention treatment when the care begins in hospital (29.6% of the episodes under study). This proportion is much lower when the first treatment begins in an outpatient setting (7.2% after 2004).

#### 5.4.5 Correspondence between rehabilitation needs and treatment

As stated above, the functional rehabilitation should depend on the functional status of the patient. The design of this study does not allow any conclusion on the matching between the type of rehabilitation (physiotherapy, mono- or multi-disciplinary PRM treatment) and the functional status of the patient. However, a striking finding is that many patients do not benefit from any treatment whilst another group of patients with the same intervention benefit from multi-disciplinary rehabilitation. On the other hand, many PRM treatments stop after hospitalisation whereas another group of patients with the same intervention go on with an outpatient treatment (mostly physiotherapy).

This report showed that factors independent of the functional status have a definite influence on the decision to begin a type of rehabilitation. The absence of treatments reported at the beginning of this study can also be influenced by external factors that are not related to the medical condition. Barriers that need to be considered to explain the absence of rehabilitation include financial, organisational (linked to the health care) or other factors independent of the health care system (e.g. difficulty to combine rehabilitation sessions with working conditions).

## 6 REFERENCES

1. Kiekens C, Van Rie K, Leys M, Cleemput I, Smet M, Kesteloot K, et al. Organisation et financement de la réadaptation locomotrice et neurologique en Belgique. Bruxelles: Centre fédéral d'expertise des soins de santé (KCE); 2007. D2007/10.273/19 Available from: [http://kce.fgov.be/index\\_fr.aspx?SGREF=3461&CREF=9490](http://kce.fgov.be/index_fr.aspx?SGREF=3461&CREF=9490)
2. Kiekens C, Van Rie K, Leys M, Cleemput I, Smet M, Kesteloot K, et al. Organisatie en Financiering van Musculoskeletale en Neurologische Revalidatie in België. Brussel: Federaal Kenniscentrum voor de Gezondheidszorg (KCE); 2007. D2007/10.273/18 Available from: [http://kce.fgov.be/index\\_nl.aspx?SGREF=5272&CREF=9489](http://kce.fgov.be/index_nl.aspx?SGREF=5272&CREF=9489)
3. Thonnard JL, Arnould C, Penta M, Nielens H, Pendeville E, Van Den Steen D, et al. Functional status of the patient: a potential tool for the reimbursement of physiotherapy in Belgium? Brussels: Belgian Health Care Knowledge Centre (KCE); 2006. D/2006/10.273/53 Available from: [http://kce.fgov.be/index\\_en.aspx?SGREF=5223&CREF=8059](http://kce.fgov.be/index_en.aspx?SGREF=5223&CREF=8059)
4. Rijksinstituut voor Ziekte- en Invaliditeitsverzekering [updated 01/12/2007; cited 07/04/2008]. Nomenclatuur van de geneeskundige verstrekkingen - Hoofdstuk V Artikel 23 - Fysiotherapie - Interpretatieregels. Available from: <http://www.riziv.fgov.be/care/nl/nomenclature/pdf/art23.pdf>
5. Rijksinstituut voor Ziekte- en Invaliditeitsverzekering [updated 01/03/2008; cited 07/04/2008]. Nomenclatuur van de geneeskundige verstrekkingen - Hoofdstuk V Artikel 22 - Fysiotherapie. Available from: <http://www.riziv.fgov.be/care/nl/nomenclature/pdf/art22.pdf>
6. Rijksinstituut voor Ziekte- en Invaliditeitsverzekering [updated 01/01/2007; cited 08/04/2008]. Omzendbrief VI nr. 2006/430 van 21 december 2006 - Tarieven geneesheren fysiotherapie vanaf 1.1.2007. Available from: <http://www.riziv.fgov.be/insurer/nl/rate/pdf/2007/doctors/phys20070101nl.pdf>
7. Rijksinstituut voor Ziekte- en Invaliditeitsverzekering [updated 01/01/2007; cited 09/07/2008]. Nomenclatuur van de geneeskundige verstrekkingen - Hoofdstuk III Artikel 7 - Kinesitherapie. Available from: <http://www.riziv.fgov.be/care/nl/nomenclature/pdf/art07.pdf>
8. Rijksinstituut voor Ziekte- en Invaliditeitsverzekering [updated 01/01/2007; cited 09/07/2008]. Nomenclatuur van de geneeskundige verstrekkingen - Hoofdstuk III Artikel 7 - Kinesitherapie - Interpretatieregels. Available from: <http://www.riziv.fgov.be/care/nl/nomenclature/pdf-IRI/art07IRI.pdf>
9. Rijksinstituut voor Ziekte- en Invaliditeitsverzekering [updated 01/01/2007; cited 09/07/2008]. Lijst van zware aandoeningen - E-lijst. Available from: <http://www.riziv.fgov.be/care/nl/kines/general-information/nomenclature/article7/listeE.htm>
10. Thonnard JL, Arnould C, Penta M, Nielens H, Pendeville E, Van Den Steen D, et al. Functional status of the patient: a potential tool for the reimbursement of physiotherapy in Belgium? - Appendices. Brussels: Belgian Health Care Knowledge Centre (KCE); 2006. D/2006/10.273/42 Available from: [http://kce.fgov.be/index\\_en.aspx?SGREF=5223&CREF=7810](http://kce.fgov.be/index_en.aspx?SGREF=5223&CREF=7810)
11. The Section Physical and Rehabilitation Medicine of the European Union of Medical Specialists (UEMS). White book on physical and rehabilitation medicine in Europe. 2006. Available from: <http://www.leeds.ac.uk/medicine/rehabmed/PDF%20papers/White%20book.pdf>
12. World Health Organisation (WHO);c 2008 [cited 08/07/2008]. International Classification of Functioning, Disability and Health (ICF). Available from: <http://www.who.int/classifications/icf/en/>
13. WHO FIC Collaborating Centre in the Netherlands. Nederlandse vertaling van de International Classification of Functioning, Disability and Health (ICF). Bilthoven: 2002. Available from: <http://www.rivm.nl/who-fic/in/ICFwebuitgave.pdf>
14. Institut national d'assurance maladie-invalidité. Rapport standardisé: Secteur 6: Kinésithérapeutes (Dépenses comptables: 200612). Bruxelles: Mai 2007.
15. De Gauquier K, Diels J, Di Zinno T, Guillaume J, Mertens R. Preoperatieve onderzoeken 2003 - Feedback Kwaliteitspromotie. Brussel: 2005. Available from: [http://www.nic-ima.be/library/documents/quality%20projects/Preop\\_IMA\\_NI%2020050628.pdf](http://www.nic-ima.be/library/documents/quality%20projects/Preop_IMA_NI%2020050628.pdf)
16. Lorant V, Van Oyen H, Thomas I. Contextual factors and immigrants' health status: Double jeopardy. Health Place. 2008;14(4):678-92.





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