

INDIRECT HOSPITAL COSTS AS A MARK-UP PERCENTAGE ON DIRECT COSTS IN BELGIUM



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expected to identify and shed light on the best possible solutions, in the context of an accessible, high-quality health care system with due regard for growing demand and budgetary constraints.

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All experts and stakeholders consulted within this report were selected because of their involvement in the topic of this report. Therefore, by definition, each of them might have a certain degree of conflict of interest to the main topic of this report.

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LIST OF ABBREVIATIONS

ABBREVIATION	DEFINITION
APR-DRG/SOI	All Patient Refined Diagnosis Related Group/Severity of Illness
BFM	Budget of Financial Means
Cat	Category
DRG	Diagnosis Related Group
FFS	Fee-for-service
FPS	Federal Public Service
FTE	Full-Time Equivalent
IQR	Interquartile Range
KCE	Belgian Health Care Knowledge Centre
KU Leuven	Katholieke Universiteit Leuven
MAHA	Model for Automatic Hospital Analyses
MARZ – PCMNH	Minimum chart of accounts for hospitals
MRI	Magnetic Resonance Imaging
MUG – SMUR	Mobile emergency group
MZG – RHM	Minimal Hospital Data
PET	Positron Emission Tomography
Q	Quartile
RD	Royal Decree
RIZIV – INAMI	National Institute for Health and Disability Insurance
UGent	Universiteit Gent
ULB	Université Libre de Bruxelles



■ SCIENTIFIC REPORT

1 INTRODUCTION

1.1 Reform of two closely intertwined financing sources: the hospital budget and nomenclature

In KCE Report 229, a conceptual framework for the reform of the Belgian hospital payment system was developed.¹ In addition to a new organisation of the hospital landscape, two main reforms were proposed: one addressing the way hospitals are financed, another covering the remuneration of physicians. The proposal for the hospital budget was to introduce a case-based payment system with tariffs based on actual costs. For the remuneration of physicians the preferred model was to keep a fee-for-service (FFS) reimbursement, but only to cover the “cognitive and physical labour” of the physician (professional fee) and not the costs directly or indirectly linked to the provision of their services (operating or practice costs). Another proposal was to recalibrate the fees of the different medical specialties. The reform proposals were based on an international comparison of the remuneration of medical specialists and hospital payment systems, a grey literature search for Belgian reports and a broad consultation of Belgian and international experts and stakeholders.

To fully understand the rationale for these reform proposals, which are supported by a large number of experts and stakeholders in the healthcare sector, we first describe how hospitals and physicians are currently financed. Next, we describe the current reform plans for hospitals and physicians.

1.1.1 *The remuneration of physicians*

How are fees determined in Belgium?

In 1963, with the introduction of compulsory health insurance, Belgium opted for a model of conventions and agreements between providers and sickness funds with a FFS reimbursement for the care provided. For every service provided by a physician, a fee is paid by the health insurance and the patient. Most physicians are self-employed and are (mainly) paid on a FFS basis. A minority of physicians working in non-university hospitals and (most)



physicians working in university hospitals are salaried. Outside hospital walls, a small but increasing number of general practitioners are paid on a lump sum basis. The actual tariff per service is described in a very detailed nomenclature. This fee schedule is a list of billing codes representing medical and paramedical fees for services and products that are fully or partially reimbursed by the compulsory health insurance system. In general, services or products not included in the fee schedule are not reimbursable.

The list of billing codes in the nomenclature is determined by Royal Decree and is updated regularly. The type of reimbursable services and their amounts are determined through a process of negotiations with the various parties involved within the National Institute for Health and Disability Insurance (RIZIV – INAMI). The negotiated fee or “convention tariff” is settled in agreements (for physicians and dentists) and conventions (for other healthcare providers).¹

The tariff is supposed to cover the cognitive and physical labour of the physician (the professional fee), but in most cases also part of the costs directly or indirectly linked to the provision of the service. These operating or practice costs may include the costs of nursing, allied healthcare, caring, technical, administrative, maintenance or other supportive staff but also the costs related to the use of rooms, costs of purchasing, renovation and maintenance of equipment and costs of materials not included in the hospital budget.

The nomenclature: obsolete tariffs and income imbalances between specialties

Although in the early years of the introduction of the nomenclature, a number of objective criteria were used to determine tariffs (such as the complexity of the service or the time needed to provide the service), over the course of the years the link between physician fees and objective criteria has been distorted and tariffs have become mainly the result of negotiations. This resulted in substantial fee level imbalances between more lucrative, mainly technical procedures and the more “cognitive” services, such as consultations. This has led to large income imbalances between physicians,

which cannot be explained by differences in workload, risk or expertise only.^{1,2}

Moreover, the nomenclature is too infrequently revised and updated in line with evolutions in technology. Therefore, the fee schedule is assessed as obsolete and often not in line with evolutions in medical science and practice.

A wide variety of deductions

Article 154 of the Hospital Act of 7 August 1987 stipulates that hospital physicians should cede part of their fee to the hospital, to help finance the costs directly or indirectly related to the provision of medical activities in the hospital.³ This compulsory financial agreement between the hospital management and the hospitals’ physicians is, however, not regulated by law. There is no general framework regulating the scale and the destination of the deductions. Instead, they are the result of negotiations between the management and the physicians, which results in a lot of variability in the type of financial agreements across hospitals. Different forms of cost arrangements exist: deductions as a percentage of costs, real cost coverage, or a mix of arrangements (for example, real cost coverage for direct costs combined with a contribution in terms of a percentage for indirect cost coverage).¹

A new catalogue and distinction between professional fee and practice costs

In September 2019, a reform of the nomenclature of physician fees was launched. The main objectives of the reform are to:⁴

- correct unreasonable income differences between general practitioners and medical specialists and between medical specialists of different disciplines;
- update the nomenclature and adapt it to evolving medical activity and new models of healthcare delivery (e.g. telemedicine, multidisciplinary care, etc.);



- improve the internal logic, readability and transparency of the nomenclature;
- introduce incentives that promote cooperation and quality;
- distinguish the professional part from the part covering practice costs directly or indirectly linked to the provision of medical services and which are not covered by other sources.

The reform consists of several phases and is supported by research teams:

- Phase 1: restructuring and adjustment of the description of medical acts. This phase has been divided into three sectors which are allocated to different teams:
 - Technical medical-surgical acts (ULB team);
 - Automated and associated medical-technical acts (clinical biology, pathological anatomy, nuclear medicine, radiotherapy and genetics) (Möbius team);
 - Consultations and associated acts (UGent team and a working group of the Medicomut).
- Phase 2.1: establishing the relationship between the various acts on the basis of objective criteria by means of a relative value scale for the professional part of the fees (ULB and KU Leuven teams for technical medical-surgical acts including in vivo nuclear medicine, Möbius team for automated and associated medical-technical acts except clinical biology and in vivo nuclear medicine; and a working group of the Medicomut for clinical biology and for consultations and associated acts).
- Phase 2.2: development of a relative value scale for all acts based on the practice costs related to the provision of medical activities in the hospital (ULB and KU Leuven teams for technical medical-surgical acts

including in vivo nuclear medicine, Möbius team for automated and associated medical-technical acts, except in vivo nuclear medicine and a working group of the Medicomut for consultations and associated acts^a). The teams call on a selection of hospitals or laboratories to develop the relative value scale (see Chapter 3).

1.1.2 The hospital budget

A DRG-based hospital budget allocation

The hospital budget, called the Budget of Financial Means (BFM), is a closed-end budget, yearly determined by the Federal Public Service (FPS) Public Health. The BFM consists of several parts and subparts, of which subpart B2 is the largest (32.4% of the BFM in 2022 for general hospitals⁵). Subpart B2 covers the costs of clinical services of nursing and other staff (but not medical staff) and medical products. Also for the subpart B2 a budget is set at the national level. The national closed-ended budget for subpart B2 is allocated to individual hospitals on the basis of a point system by which the national budget is divided by the total number of B2-points “earned” by all hospitals. This gives the monetary value of one B2-point. Points are earned by the activity delivered. A central concept are the “justified activities”, which are based on the number and type of admissions during a reference year. A national average length of stay per APR-DRG/SOI (All Patient Refined Diagnosis Related Group/Severity of Illness) is calculated, which is then applied to the case-mix of each hospital. Multiplying the national average length of stay per APR-DRG/SOI with the case-mix of a hospital gives the number of justified patient days for the hospital.⁶

Hence, contrary to many other countries, there is no DRG-based payment per case in Belgium but an APR-DRG/SOI-based budget allocation, with weights based on average length of stay (no cost weights).

^a As the concrete method of this working group has not yet been defined, we will not discuss it in the remainder of this report.



A complex and untransparent calculation of the individual hospital budget

The distribution of the national hospital budget to the individual hospitals is based on a multifaceted calculation with a specific calculation method and parameters for each subpart. Although the rules and exceptions on each rule have on itself a rationale, over the course of the years the entire system and calculation method have become very complex and untransparent.¹ Moreover, sometimes corrections are made with many years delay, making it difficult for hospitals to monitor their results.

A drive for production

With a national closed-end hospital budget, expenses can be controlled at the macro level. The way the national budget is allocated to individual hospitals, allows to stay within the predefined budget. An increase in activity (and hence an increase in the number of points) reduces the monetary value of the B2-point.

However, since the medical-technical possibilities will always be larger than the available budget, competition between healthcare providers is inevitable. The current rules to allocate the hospital budget encourage hospitals to increase activity, possibly resulting in inappropriate admissions and premature discharges. As a consequence of the closed-end budget at the national level, the budget share of each hospital not only depends on the own activity but also on the activity level of all other hospitals. The post-factum adjustment of each hospital's share of the closed overall budget is a source of financial uncertainty for the hospitals.

Towards a DRG-based tariff per case

Justified beds, the basic concept in the BFM, are based on the national average length of stay per pathology group (APR-DRG/SOI), which is then applied to the case-mix of each hospital. However, a pathology-weighted length of stay is only a proxy for resource use or cost.⁷ One of the lessons learned from international experience is the importance of the availability of high-quality and recent cost data.⁸ However, in Belgium there is currently no compulsory collection of patient-level cost data.

In the reform plans of minister Vandenbroucke it is stipulated that the current payment system will be replaced by a case-based payment, based on costs.⁹ This tariff per APR-DRG/SOI will include care-related components currently financed by the BFM, pharmaceuticals, medical devices and part of physician fees (practice costs). Also in other countries, DRG-type payments are never all-inclusive, but are combined with other types of payments.

1.2 Scope, research objective and methods

The scope of the outsourced studies (to teams of KU Leuven, ULB, Möbius and a working group of the Medicomut) is restricted to the development of a relative value scale for the professional fee (phase 2.1) and direct practice costs (phase 2.2). To get a full picture of all costs linked to providing medical services in hospitals, KCE was asked by the minister of Public Health to **estimate indirect costs as a mark-up percentage on direct costs for general hospitals** (university and non-university). Psychiatric hospitals and categorical hospitals (only in Flanders) are beyond the scope of this study.

This study is complementary to the work performed by the research teams responsible for phase 2.2 of the reform of physician fees. However, the scope of this study is broader. The "direct cost studies" focus on technical medical-surgical acts and automated and associated medical-technical acts. In this study, also for other services such as nursing departments a mark-up percentage will be calculated. After all, if the current DRG-based budget allocation is to be replaced by an APR-DRG/SOI-based payment per case, insight in the underlying costs is needed to determine the tariff per DRG. Hence, also for this (announced) reform, it is important to have an estimation of indirect costs, on top of direct costs.

The method that was used in this report, closely resembles the method used in KCE Report 178 (Manual for cost-based pricing of hospital interventions), but other choices were made.² In that manual indirect (or overhead) costs were calculated as a percentage of direct costs, excluding physician costs. At this moment, the only available source for cost data of all Belgian hospitals is the Finhosta database of the FPS Public Health. Throughout the report it should be kept in mind that the hospital accounting rules in Finhosta



were never set up to calculate the costs of specific medical activities, for example at the level of a nomenclature code as it is the case in the direct practice cost studies of KU Leuven, ULB and Möbius.

Methodological details for each part of the study are provided in the respective chapters and in the Supplement to this report^b.

The general research objective of the report, the estimation of an indirect cost mark-up percentage on direct costs, can be detailed into the following **research questions**:

- How can hospital costing data be classified into direct and indirect costs? Which costs should be excluded?
- What are the strengths and limitations of Finhosta for the calculation of direct and indirect costs of hospitals? How can indirect costs be allocated to specific services?
- What are the advantages and disadvantages of a generic mark-up for all services versus a differentiated mark-up?

The report is structured as follows. In Chapter 2 a short description of cost accounting rules for Belgian hospitals and of the Finhosta data is given. The selection of included costs and the classification into direct and indirect costs is explained in Chapter 3. The results of a thorough check of the Finhosta data, as well as some preliminary descriptive analyses are described in Chapter 4. In Chapter 5 indirect costs as a mark-up percentage of direct costs are calculated for different groups of cost centres. Chapter 6 concludes with a discussion and an overview of limitations of this study.

2 COST ACCOUNTING RULES FOR BELGIAN HOSPITALS

2.1 Legal framework of hospital accounting

Minimum chart of accounts

The legal framework of hospital accounting was first introduced by the Hospital Act of 23 December 1963.¹⁰ The Hospital Act of 7 August 1987 coordinates all changes to the Act of 1963.³ Article 78 of the Hospital Act of 7 August 1987 stipulates that hospital accounts must be made up according to the minimum chart of accounts for hospitals (*Minimumindeling van het Algemeen Rekeningenstelsel voor de Ziekenhuizen*, MARZ / *Plan comptable minimum normalisé des hôpitaux*, PCMNH) (via reference to article 4 of the Act of 17 July 1975 on the accounts of companies).

The Royal Decree (RD) of 14 December 1987 on the annual accounts of hospitals, replaced by the RD of 19 June 2007, defines the adjustments for hospitals of the RD of 8 October 1976 on the annual accounts of companies. Compared to other companies, hospitals have more accounting obligations. For example, they are subject to a modified chart of accounts and they are required to keep analytical accounts, showing the cost of provided services.¹¹ This means, specifically, that the chart of accounts also contains a profit and loss statement per final cost centre. The legal cost accounting model consists of three components: cost centres, an allocation method and allocation keys.

^b All appendices can be found in the Supplement, published as a separate document on our website. It can be accessed from the same referral page as the current document.



The RD of 14 August 1987,¹² defines the format and modalities of the MARZ – PCMNH. Only accounts and subaccounts that are defined in this layout, can be used for the official reporting to the FPS Public Health. The accounts are classified in seven classes, but only class 6 “costs” (*lasten / charges*) is relevant for this study. The list of cost accounts can be found in Appendix 1.

Final and temporary cost centres

The list of possible **cost centres** can be found in Appendix 2. The list consists of two main groups: temporary (or non-final) cost centres and final cost centres. The temporary cost centres are further subdivided in: accounts of costs awaiting a destination; common cost centres; and auxiliary cost centres. Final cost centres are subdivided in: nursing departments; medical-technical services, consultations and pharmacy; and non-hospital activities.

Article 3 of the RD of 14 August 1987 stipulates that costs which cannot be attributed immediately to a final cost centre, are provisionally recorded in accounts called “accounts of costs awaiting a destination” (*Rekeningen van kosten die wachten op een bestemming / Charges en attente d'affectation*). In Appendix 3 of the RD the use of the accounts is clarified.

Also the allocation method is defined by law.¹² Following a stepwise allocation or “**cascade**” method (*laken / drap de lit*), costs are allocated to a subsequent cost centre, without a backwards allocation to previous cost centres. The cascade method requires that costs are allocated to another temporary cost centre or to a final cost centre. Hence, some costs have to be allocated in several steps before they end up in the final cost centre. The main purpose of this cascade method is to increase comparability of costs (on the final cost centres) between hospitals.¹⁰

The cascade method is schematically represented in Appendix 3. For example, the cost centre depreciation is a cost centre awaiting a destination. Part of the costs recorded in the cost centre depreciation is first allocated to the cost centre kitchen, which is a common cost centre to be further allocated. In a next step, part of the costs recorded in the cost centre kitchen is allocated to the cost centre operating theatre, which is an auxiliary cost

centre to be allocated. In the final step part of the costs is allocated to the final cost centre delivery room.

A third component of the cost accounting method of hospitals are the **allocation keys** that determine which part of the costs that are allocated to a subsequent (temporary or final) cost centre. An overview of the allocation key per temporary cost centre is given in Appendix 3. Some of the allocation keys are criticised because they insufficiently reflect how costs are related to final cost centres.¹⁰ For example, the key to allocate energy costs (mainly in cost centre 040 (heating) and cost centre 030 (maintenance)) to subsequent cost centres is the surface (m²) of these cost centres. Of course, the real energy costs also depend on the type of (final) cost centre, for example a general ward versus a radiotherapy room. Another criticism is that some auxiliary cost centres are fully allocated to nursing departments. For example, costs recorded in cost centre medical costs are allocated only towards the nursing departments, with the number of admissions as driver. However, the cost centre medical costs includes costs for the float pool nurses, who can also be deployed in medical-technical services.

The allocation of costs to subsequent cost centres is done in proportion to the relevant allocation key (such as the surface (m²), full-time equivalent staff numbers, nursing days, etc.).¹⁰

In addition to the cost centres, allocation method and allocation keys, a fourth element called “**cost element**” (*kostprijsselement / élément constitutif du prix de revient*) is defined in the cost accounting method. The cost element groups costs according to their nature.¹² An overview is given in Appendix 4 (see also article 5 and appendix 1 of the RD of 14 August 1987).¹² A cost centre and a cost element are assigned to each cost. This holds for costs recorded in temporary and final cost centres. Costs that are allocated to other temporary or to final cost centres, are assigned the cost element of the cost centre from which the costs are distributed. The



cost element allows a link to be drawn with the hospital funding via the BFM^c. For example, costs with a suffix 0 or 1 can be financed by subparts A1 (depreciation of movable and immovable investments and financial charges; transferred to the federated authorities since the 6th State reform of 2014) and A2 (investment and depreciation costs of MRI-units, PET-scanners and radiotherapy). Costs with a suffix 2 to 8 are (partly) financed by subpart B1 (common services, also called “hotel services”) and costs with suffix 9 are mainly financed by subpart B2.

2.2 Finhosta

Article 86 of the Hospital Act of 1987 stipulates that hospitals have to transfer, on an annual basis, data on their financial condition, the operating results, the auditor's report and all statistical data related to the hospital, to the Minister of Public Health.³ The RD of 14 December 1987 defines the rules and the time limit for the communication of these data by the hospital manager.¹³

The collection and processing of this reporting is implemented by the FPS Public Health and is called Finhosta. The purpose of the software application Finhosta is to collect statistical and financial data on Belgian hospitals and to support drawing up the BFM. Based on the relevant RDs, the FPS Public Health provides detailed manuals for the Finhosta data collection, which are publicly available on the website of the FPS (manuals in Dutch – <https://www.health.belgium.be/nl/gezondheid/organisatie-van-de-gezondheidszorg/ziekenhuizen/financiering-ziekenhuizen/finhosta-1> and French – <https://www.health.belgium.be/fr/sante/organisation-des-soins-de-sante/hopitaux/financement-des-hopitaux/finhosta/brochures-finhosta>).

The Finhosta data collection consists of multiple tables in four domains: budget, yearly collections, financial auditor and social agreements (see Figure 1). The tables in blue were made available to the research team of KCE for this study. Figure 2 and Table 1 provide an overview and short description per Finhosta table.

^c In this study, the cost element was not taken into account for the calculation of the indirect cost mark-up percentage because it is mainly used for financing purposes.

**Figure 1 – Finhosta data collection****Budget**

- Table 1 – General accounting
- Table 2 – Analytical accounting
- Table 3 – Allocation keys per cost centre and budget item
- Table 5 – Equipment including costs for modernisation
- Table 7 – Semestrial overview of the numbers and amounts of the radiotherapy lump sums
- Table 8 – Annual number of licensed beds, billed inpatient days, patients on January 1, admissions, patients on December 31, discharges, deaths, realised inpatient days, patients under observation (formerly involuntary committed), cost centres

Financial auditor

- Table 21 – Balance sheet after allocation as approved by the auditor
- Table 22 – Profit-and-loss account after allocation as approved by the auditor
- Table 23 – Profit-and-loss account by final cost centre

Yearly collections

- Table 9 – Justification of rent per cost centre for immovable property
- Table 10 – Cost of investment loans by financial institution
- Table 12 – Depreciations by cost centre
- Table 13 – Personnel expenses and personnel data by cost centre
- Table 14 – Out-of-hours services of personnel by cost centre
- Table 17 – Statement of formation expenses, intangible & financial fixed assets
- Table 18 – Statement of tangible fixed assets
- Table 19 – Secured debts
- Table 20 – Liabilities related to taxes, salaries and social expenses

Social agreements

- Table 131 – Social agreements – end-of-career measures

Note: The tables in blue were made available to the research team of KCE for this study.

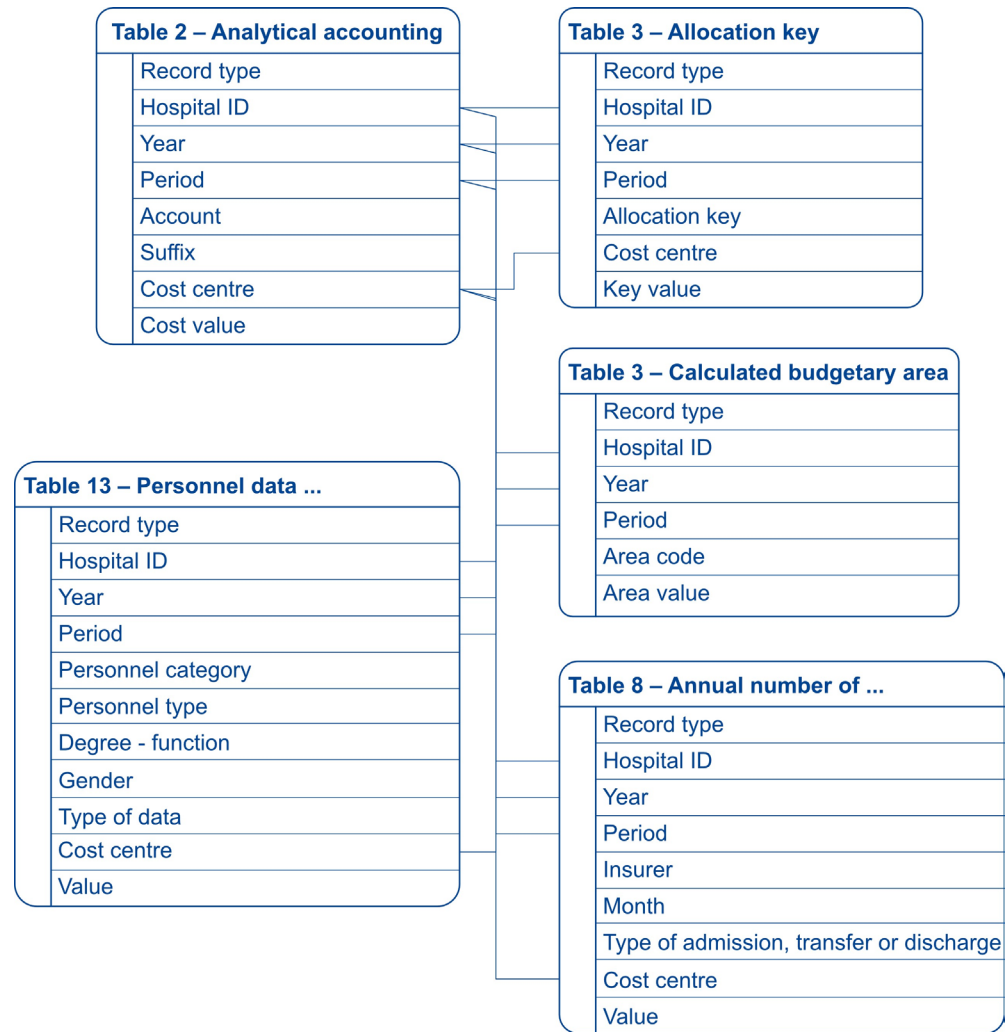
**Figure 2 – Selected Finhosta tables**

**Table 1 – Description of selected Finhosta tables**

Data set	Description
Table 2 – Analytical accounting	Table 2 contains all expenses/costs (class 6) and all revenues (class 7) as registered in the hospital's analytical accounting. For the purpose of this study, only costs were requested. Each cost value is registered on a specific account for a specific cost centre and suffix. Acceptable accounts and cost centres, as well as rules for recording and suffix, are described in the previously mentioned royal decrees, and conveniently bundled in the manuals of the FPS Public Health.
Table 3 – Allocation keys per cost centre and budget item	Table 3 contains allocation keys that allow costs recorded in a temporary cost centre to be allocated to other temporary or final cost centres (<i>laken / drap de lit</i>).
Table 8 – Annual number of licensed beds, number of invoiced days, number of patients on 1 January, number of admissions, number of patients on 31 December, number of discharges including deaths, number of realised patient days, number of patients under observation	Table 8 contains per cost centre information on beds, stays and patient characteristics.
Table 13 – Personnel expenses and personnel data by cost centre	Table 13 contains information on personnel characteristics by cost centre, such as staff category (salaried, administrative, nursing, medical, etc.), staff type (statutory, temporary, subsidised, etc.) or degree (see appendix 4 of the RD of 14 August 1987 ¹²).



3 THE CLASSIFICATION INTO DIRECT AND INDIRECT COSTS

The classification of costs into direct and indirect costs is not a straightforward exercise, and is largely related to the internal organisation of a hospital. Costs are not direct or indirect in isolation, but in relation to a cost object. In cost accounting, the following terminology is used.¹⁴

A **cost object** (or output) is a final product, process or service that is costed. It consumes resources or generates costs. Cost objects can be a specific type of consultation, diagnosis (or DRG), therapy, rehabilitation care, a full care programme or a treatment episode for a specific pathology.²

Direct costs can be defined as costs for which there is a causal relationship between the considered cost and the cost object. Since there is a quantifiable link with the cost object, direct costs can be allocated directly to the cost object. **Indirect costs** do not have such unambiguous link with a cost object because the measurement or registration of costs per cost object is not possible, or because it is a general cost. Indirect costs are allocated to a cost object using a cost driver.

A **cost centre** is a centre in an organisation where costs of a group of similar activities are recorded.

In Finhosta, no (medically relevant) cost objects are defined. Instead, all direct and indirect costs incurred over a given period are assigned to cost centres. To classify costs into direct and indirect costs for this study, we took the classification in KCE Report 178 as a starting point.² However, since this study is complementary to the direct cost studies carried out by the research teams of KU Leuven, ULB and Möbius, a number of adjustments were made. The classification was discussed with the three research teams, which revealed that the three teams make different choices, albeit limited. We return to the differences between the teams in Chapter 5.

The final classification can be found in Appendix 1.

3.1 Scope of included costs

We started from the complete list of cost accounts in class 6 in Finhosta Table 2.

A basic principle to define the scope of included costs that was applied in this study, is that no distinction is made according to the (current) funding source. Hence, whether costs are financed by the federal or the federated authorities, by the hospital budget (BFM), day-care lump sums or by deductions on physician fees, plays no role in the selection of costs to be included.

Costs recorded in cost centres 900-990 (non-hospital related activities) are considered out of scope of this study. The starting point is all costs directly or indirectly made for the provision of medical services or made within other units such as nursing departments. Costs related to **physician fees** are, however, excluded. The definition of a new catalogue and the development of a relative value scale for the professional fees of medical specialists, and in a later phase the conversion of the scale into amounts in euros, are the subject of other studies. Since the professional fee is not intended to cover practice costs, no indirect cost mark-up percentage for physician fees is calculated. Therefore, all cost accounts related to physician fees were not taken into account. It concerns the following cost accounts:

- 6170 (agency workers, medical staff)
- 6190 (remunerations for medical specialists)
- 6191 (remunerations for dentists)
- 6200 (remunerations and direct social benefits for medical staff)
- 6210 (employer contributions for social insurance, medical staff)
- 6220 (employer premiums for non-statutory insurance, medical staff)
- 6230 (other staff costs for medical staff)
- 6240 (early retirement payments for medical staff)
- 62500 (wage provisions/allocations, medical staff).



The costs related to physician fees represent 21.4% of total costs in Finhosta 2019. It should, however, be noted that these costs only give a partial view of physician costs. Hospitals with salaried physicians record wages and related costs (such as employer contributions) in cost account 62. However, in hospitals with self-employed physicians, the way costs related to physician fees are recorded, depends on the central collection of fees which is obliged for hospitalised patients, including day care. The central collection can be organised by the hospital, by the medical board or by both. When the central collection is organised by the hospital, the financial accounts reflect all fees for medical, medical-technical and paramedical services. The fees are recorded in revenue account 709, the counterpart of the deductions is recorded as a cost in cost account 619. When the collection of fees is organised by the medical board, only part of the fees is recorded in the financial accounts. More specifically, only the part of the fees that is ceded to the hospital is recorded in revenue account 708 and no costs are recorded in cost account 619.¹ For ambulatory patients there is no central collection of fees.

A second group of cost accounts that was excluded are **exceptional costs** (cost account 66). Exceptional costs are costs that are not related to the actual care activity or to the care activity of the current year.¹⁰ Moreover, these costs do not occur regularly. They represent 0.9% of total costs in Finhosta 2019.

For the calculation of indirect cost mark-up percentages, **costs of pharmaceuticals and implants** are excluded. The rationale for this choice for medical-technical services (scope of the direct cost studies) is that these costs are not financed by physician fees. Moreover, the costs of pharmaceuticals include the costs of pharmaceuticals in the pathology-related lump sum reimbursement system as well as the cost of pharmaceuticals which are reimbursed per product, for example because of their high cost.¹ In some sensitivity analyses in Chapter 5, the costs of pharmaceuticals and implants are, however, included. It concerns the following cost accounts:

- 60000 (purchasing of pharmaceutical specialties)
- 60001 (purchasing of radioisotopes)

- 6007 (purchasing of synthesis material)
- 6016 (purchasing of radioactive material and isotopes non-pharmaceutical specialties)
- 608 (discounts for pharmaceuticals and other products)
- 609000 (stock changes of normal pharmaceutical specialties)
- 609001 (stock changes of radioisotopes)
- 60907 (stock changes of synthesis material and pharmaceutical trade in bandages and surgical truss)
- 60916 (stock changes of radioactive material and isotopes non-pharmaceutical specialties).

For cost account 608 (discounts for pharmaceuticals and other products) no distinction could be made between discounts for pharmaceuticals (excluded costs) and discounts for other products (indirect costs).

3.2 Direct versus indirect costs

Although in theory the difference between direct and indirect costs is clear, in practice it is more difficult. While the majority of cost accounts are unambiguously directly or indirectly related to (predefined) cost centres, for other cost accounts the classification into direct or indirect is context specific.



3.2.1 Temporary and final cost centres

Temporary cost centres with a significant number of medical acts

Some cost centres which are considered as temporary in Finhosta, are considered as final cost centres for the purpose of the current study. This decision was taken in consultation with the research teams of KU Leuven and ULB^d. The main reason for this modification is that a significant number of medical acts are provided in these cost centres. It concerns the following cost centres:

- 150 (emergency department)
- 151 (on-duty unit)
- 152 (mobile emergency group)
- 153 (paramedical intervention team)
- 160 (central sterile services department)
- 170 (anaesthesia unit)
- 180 (operating theatre)
- 181 (plaster room).

The adjustment of the type of cost centre for the above list of cost centres, implies that also the allocation process (cascade method) has to be adapted. The general rule for the allocation of temporary cost centres to final cost centres is to apply the allocation key proportionally across cost centres which “receive” indirect costs. For example, if an amount of € 1 000 depreciation has to be allocated to cost centres with a total area of 150 m², the area of each receiving cost centre determines the share of the € 1 000.

For the newly created final cost centres (150-181), part of the Finhosta cascade process can be applied. More specifically, the following temporary cost centres are allocated to cost centres 150-181: 000-080, 091 and 093. However, following Finhosta rules, cost centres 090, 092, 100-142 and 190 are not allocated to cost centres 150-181. In order to also allocate temporary cost centres 090, 092, 100-142 and 190 to final cost centres 150-181, assumptions about the value underlying the allocation keys should be made. For example, cost centre 090 (medical costs) is only allocated to nursing department (hospitalisation wards) cost centres, with the number of nursing days as allocation key. There is, however, only a weak relation between the number of nursing days and cost centres 150-181, and moreover, no information is available on how the number of nursing days could be defined for these cost centres. Hence, it was decided not to allocate cost centres 090, 092, 100-142 and 190 to final cost centres 150-181.

A detailed calculation of the (adapted) cascade process can be found in Appendix 3. The change from temporary to final cost centre for cost centres 150-181, increases total indirect costs by € 805 329 047, which equals 3.54% of total costs^e.

Distinction between temporary and final is not the same as distinction between direct and indirect

Although the majority of costs that are recorded in temporary cost centres are labelled as indirect costs, in actual practice also direct costs can be recorded in temporary cost centres. These costs are allocated to final cost centres via the cascade process. The research teams of KU Leuven, ULB and Möbius, on the other hand, can allocate direct costs recorded in temporary cost centres to the relevant final cost centres, in consultation with the participating hospitals.

^d The ULB team keeps cost centre 160 (central sterile services department) as a temporary cost centre.

^e Based on data from 100 hospitals included in the analyses in Chapter 5 (see section 4.4).



3.2.2 Classification by type of costs

Staff costs

Direct staff costs are defined as costs of nursing and caring staff (category 3 in Finhosta Table 13), allied healthcare and other staff (category 4), and other scientific staff (category 5), if recorded in final cost centres. Allied healthcare and other staff concerns laboratory and medical imaging technologists, dieticians, physiotherapists, speech therapists, audiologists, psychologists, etc. Other scientific staff concerns biochemists, physicists, pharmacists, etc. in medical-technical departments and other.¹⁵

These costs are recorded in the following cost accounts:

- Agency workers (6173 nursing staff, 6174 allied healthcare staff, 6175 other staff)
- Remunerations for nursing staff (6192) and allied healthcare staff (6193)
- Remunerations and direct social benefits (6203 nursing staff, 6204 allied healthcare staff, 6205 other staff)
- Employer contributions for social insurance (6213 nursing staff, 6214 allied healthcare staff, 6215 other staff)
- Employer premiums for non-statutory insurance (6223 nursing staff, 6224 allied healthcare staff, 6225 other staff)
- Other staff costs (6233 nursing staff, 6234 allied healthcare staff, 6235 other staff)
- Wage provisions/allocations (62503 and 62513 nursing staff, 62504 and 62514 allied healthcare staff, 62505 and 62515 other staff).

Indirect staff costs are defined as costs related to salaried (category 1) and administrative (category 2) staff, both when recorded in temporary or final cost centres. Salaried staff concerns cleaning, kitchen and laundry staff, maintenance staff, technicians, etc. Administrative staff concerns department managers, executive secretaries and assistants, medical

secretaries, accountants, analysts, programmers, economists, telephonists, social assistants, clerks, etc.

These costs are recorded in the following cost accounts:

- Agency workers (6171 salaried staff, 6172 administrative staff)
- Remunerations and direct social benefits (6201 salaried staff, 6202 administrative staff)
- Employer contributions for social insurance (6211 salaried staff, 6212 administrative staff)
- Employer premiums for non-statutory insurance (6221 salaried staff, 6222 administrative staff)
- Other staff costs (6231 salaried staff, 6232 administrative staff)
- Wage provisions/allocations (62501 and 62511 salaried staff, 62502 and 62512 administrative staff).

There is one exception to this rule: costs of salaried staff recorded in cost centre 160 (central sterile services department) are defined as direct costs. In the direct cost studies relying on cost data provided by voluntarily participating hospitals, it was found that these staff members can be directly attributable to the care process. Therefore, also in this study, the costs of salaried staff recorded in cost centre 160 are considered direct costs. Finhosta data alone do not allow to take such decision. Instead, additional data provided by hospitals is needed. Hence, if hospitals have certain tasks being carried out by administrative staff, while in other hospitals these tasks are performed by nursing or caring staff, the costs are in the first case considered indirect costs and in the second case direct costs.

Also the costs of nursing and caring staff (category 3), allied healthcare and other staff (category 4), and other scientific staff (category 5) are considered indirect costs but only if recorded in temporary cost centres.



Costs recorded in cost account 624 (early retirement payments) are considered indirect costs because these costs cannot be linked to the current workforce. Instead, they relate to former employees who are currently retired. Also costs recorded in cost account 618 (payments for board members or managers without employment contract) are considered indirect costs.

Although the aim was to define all costs of management staff as indirect costs, it cannot be excluded that some hospitals assign the costs of management staff members who are also a medical specialist to medical staff instead of administrative staff. The costs of head nurses (recorded in nursing and caring cost accounts and final cost centres), on the other hand, are considered to be direct costs.

Costs of medical equipment

Costs of medical equipment are considered **direct costs**, regardless of whether they are recorded in temporary or final cost centres. These costs are recorded in the following cost accounts:

- 6103 (rent, rental charges and leasehold debts)
- 6135 (maintenance and repairs)
- 6303 (depreciation)
- 63051 (depreciation and amortisation of fixed assets)

Note that when the maintenance of medical equipment is done by external contractors, the costs are recorded in cost account 6135. When, on the other hand, maintenance is done in-house, these costs are recorded in cost accounts related to salaried staff (maintenance staff) as indirect costs. Hence, hospitals that maintain medical equipment in-house will have lower direct costs and higher indirect costs.

Costs of medical material

Costs of material are considered **direct costs**, regardless of whether they are recorded in temporary or final cost centres. These costs are recorded in the following cost accounts:

- 600 (purchases of pharmaceutical products, except for the excluded costs mentioned in section 3.1)
- 601 (purchases of non-sterile medical products)
- 6063 (purchases of disposables)
- 6090 (stock changes of pharmaceutical products, except for the excluded costs mentioned in section 3.1)
- 6091 (stock changes of non-sterile medical products)
- 60963 (stock changes of disposables).

Other indirect costs

Other indirect costs, regardless of whether recorded in final or temporary cost centres:

- Other purchases
 - 602-, 603-, 604-, 605-, 606- (except for 6063), 607-accounts
 - Associated stock changes (609-accounts)
- Other services and additional supplies
 - Other 61-accounts (except the excluded cost accounts and costs of medical equipment (cost account 6103 and 6135))
- All other depreciation and amortisations (63-accounts) (other than for medical equipment)
- Other operating expenses (64-accounts)
- Financial costs (65-accounts).



Indirect, indirect direct and direct costs

In principle, indirect costs can be further classified into indirect costs and indirect direct costs. The first category refers to overhead costs of the hospital, such as heating or maintenance costs. Indirect direct costs refer to overhead costs of a specific (group of) cost centre(s), such as staff costs recorded in these cost centre(s). We will return to this distinction in Chapter 5. In Chapter 4 no such distinction is made.

3.3 Methodological approach in direct cost studies

In the direct cost studies (phase 2.2) that are conducted in the context of the reform of the nomenclature, direct costs are assessed only for cost centres related to technical medical-surgical acts and to automated and associated medical-technical acts. More information on these studies can be found on the website of RIZIV – INAMI.^f

Although the concrete approach differs between teams, the mission of the three teams is to develop a relative value scale for medical acts, based on a valuation of the direct practice costs of each medical act. Hence, the scope of the direct cost studies is not based on a selection of cost centres or cost accounts in the Finhosta database, but on a broad selection of nomenclature codes within units where the medical acts take place in the hospital and in which the activities generate fees. The information is collected in voluntarily participating hospitals or laboratories.

The Finhosta accounting data do not allow to calculate direct and indirect costs at the level of a nomenclature code. Instead, the smallest unit for which an indirect cost mark-up percentage can be calculated is a cost centre. In Chapter 5 we will return to the implications of working with a different aggregation unit in the direct cost studies and this study.

^f https://www.riziv.fgov.be/SiteCollectionDocuments/hervorming_nomenclatuur_oproep_deelneming_ziekenhuizen_ligkul_fase2_2.pdf for KU Leuven;

4 DATA CHECKING AND PRELIMINARY ANALYSES

Finhosta data for 2019 were requested from the FPS Public Health. The research teams analysing direct practice costs are mainly working with 2019 data, since the data for the COVID-19 period may be distorted and not fully representative. There are, however, two exceptions. First, since the nomenclature for genetics has substantially changed since 2019, the Möbius team collected direct cost data for 2021. However, since costs of genetics cannot be distinguished from the costs of clinical biology in the data available for this study, we use data for 2019 instead of 2021. Second, it was decided that for clinical biology a prospective data collection would be initiated in the course of 2023 instead of using 2019 data. However, since the 2019 direct cost data will be used as a benchmark, also in this study indirect cost data for 2019 will be used for clinical biology.

4.1 Data checking by the FPS Public Health

The cost accounting data collected by the FPS Public Health are subject to a thorough check by the FPS. An overview of checks performed by the FPS is available upon request to KCE.

Finhosta Tables 2, 3 and 13 are the most important tables for the purpose of this study. We provide, by way of illustration, some examples of the checks that are performed on these tables:

- Cost centre 490 can only be used if the hospital has a licensed function intensive care (Table 2)
- Cost centre 263 can only be used if the hospital has a licensed function perinatal care (Table 2)

https://www.riziv.fgov.be/SiteCollectionDocuments/reforme_nomenclature_appel_candidature_hopitaux_gedis_phase2_2.pdf for ULB and https://www.riziv.fgov.be/SiteCollectionDocuments/hervorming_nomenclatuur_oproep_deelneming_ziekenhuizen_laboratoria_mobius.docx for Möbius.



- Costs recorded in cost centres 000-014 (accounts of costs awaiting a destination) are accepted but are preferably recorded in cost centres 020-990 (Table 2)
- An allocation key cannot be missing while data are present in the cost centre to allocate (Table 3)
- A long list of checks linking specific allocation keys to specific cost centres (Table 3)
- Controls which compare the value of a key with a (maximum) number, such as the total number of full-time equivalent (FTE) staff in key M.101
- Correspondence between two tables, for example gross salaries in Table 2 and Table 13 for all staff categories.

4.2 A comparison of the distribution of costs between hospitals

The Finhosta database for 2019 contains data for 104 hospitals. This dataset includes both non-university and university hospitals. This dataset is complete and includes all hospitals. In addition to the checks that are performed by the FPS Public Health, a number of checks were carried out to identify outlier hospitals. Also the consistency between Finhosta variables within and between tables was examined (see section 4.3). In all figures and tables in this report and in the Supplement with the appendices, the license number of the hospitals was removed for confidentiality reasons and it has been ensured that individual hospitals are not identifiable.

The analyses in this section and in section 4.3 are based on costs recorded in cost accounts 6000 to 6695 (see Appendix 1).

Appendix 5 and appendix 6 provide a detailed analysis of the Finhosta cost accounting data for 2019. Different types of checks were made on the reliability of the data and the comparability of application of the Finhosta

rules by hospitals. The checks of the original and allocated cost data that are described in the following sections are all based on the classification of cost centres into temporary and final cost centres as defined in Finhosta (following Appendix 2 in the RD of 14 August 1987).¹²

4.2.1 General overview of costs in Finhosta 2019

In Table 2, a general overview is given of accounting costs in Finhosta for the year 2019. A distinction is made between direct, indirect and excluded costs, and between original data and allocated data (after application of the cascade method). Costs of pharmaceuticals and implants⁹ are listed separately because they are excluded for the calculation of the indirect cost mark-up percentage (base results); they are included in some sensitivity analyses. Also costs related to non-hospital activities are shown.

There are no large differences between the original and allocated data. The only reason a cost can change type in the allocation process, is when a direct or indirect cost is allocated to a cost centre related to non-hospital activities. In the allocated data, excluded costs and excluded cost centres represent 25.04% of total costs. If we also exclude costs of pharmaceuticals, excluded costs/cost centres increase to 40.42% of total costs.

⁹ For ease of writing, we use the term pharmaceuticals to refer to pharmaceuticals and implants in the remainder of the report.

**Table 2 – Overview of hospital accounting costs in Finhosta, 2019**

All hospitals (N=104)	Original data	Allocated data
Total costs	€ 22 922 721 586	€ 22 922 721 586
Cost centres 000 to 840		
Indirect costs	€ 6 157 101 924	€ 6 083 596 403
Direct costs	€ 7 574 274 224	€ 7 574 013 127
Pharmaceutical costs	€ 3 525 952 482	€ 3 525 822 872
Excluded costs	€ 5 109 713 362	€ 5 107 663 664
Excluded cost centres 900 to 990*		
Costs in cost centres related to non-hospital activities	€ 555 679 594	€ 631 625 520

* Throughout the report and the Supplement to this report, we use the Finhosta codes for the cost centres (which may differ from the codes mentioned in the RD of 14 August 1987).

4.2.2 Outlier analysis: distribution of costs across cost centres and cost accounts

The distribution of costs was investigated for different cost accounts and cost centres, at different levels of aggregation (see Appendix 5). Where relevant, costs were analysed before and after application of the cascade method. In addition to the actual costs recorded by the hospitals, also standardised costs were analysed to ease comparison of hospitals of different size or activity level. Costs were standardised by dividing them by the number of inpatient and day-care stays per hospital in 2019, available in the Minimal Hospital Data (MZG – RHM). Although the number of stays is the best standardisation key available, it is less relevant for ambulatory activity. Because the share of ambulatory activity and the share of costs of ambulatory care that is registered in the hospital accounts differs between hospitals, the standardised results for some cost accounts and cost centres should be interpreted with caution. More information on the method to analyse the distribution of costs (outlier analysis) can be found in Textbox 1.



Textbox 1 – Outlier analysis

The following definitions were used to define outliers:

- Tukey outlier: a value outside the following range, with Q_1 equal to the first quartile and Q_3 equal to the third quartile

$$[Q_1 - 1.5x(Q_3 - Q_1), Q_3 + 1.5x(Q_3 - Q_1)]$$

- Tukey extreme value: a value outside the following range

$$[Q_1 - 3x(Q_3 - Q_1), Q_3 + 3x(Q_3 - Q_1)]$$

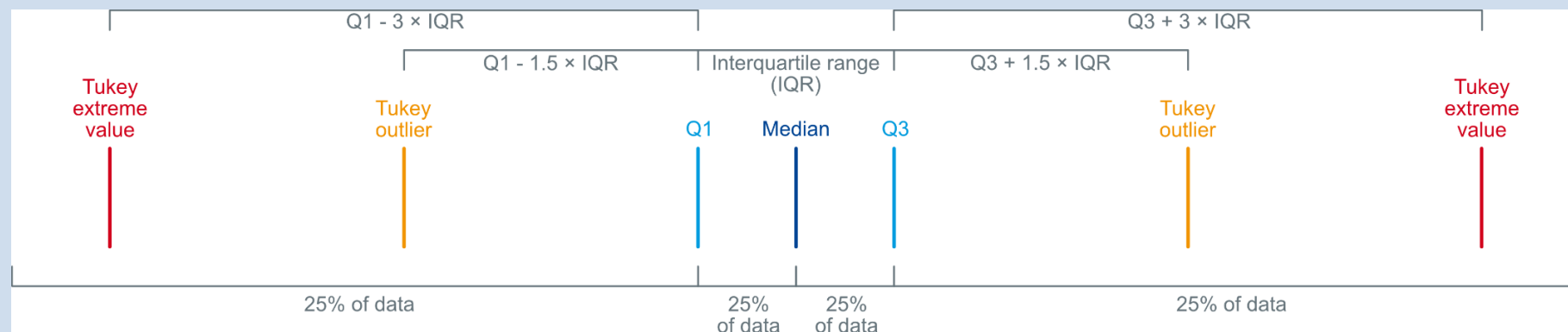
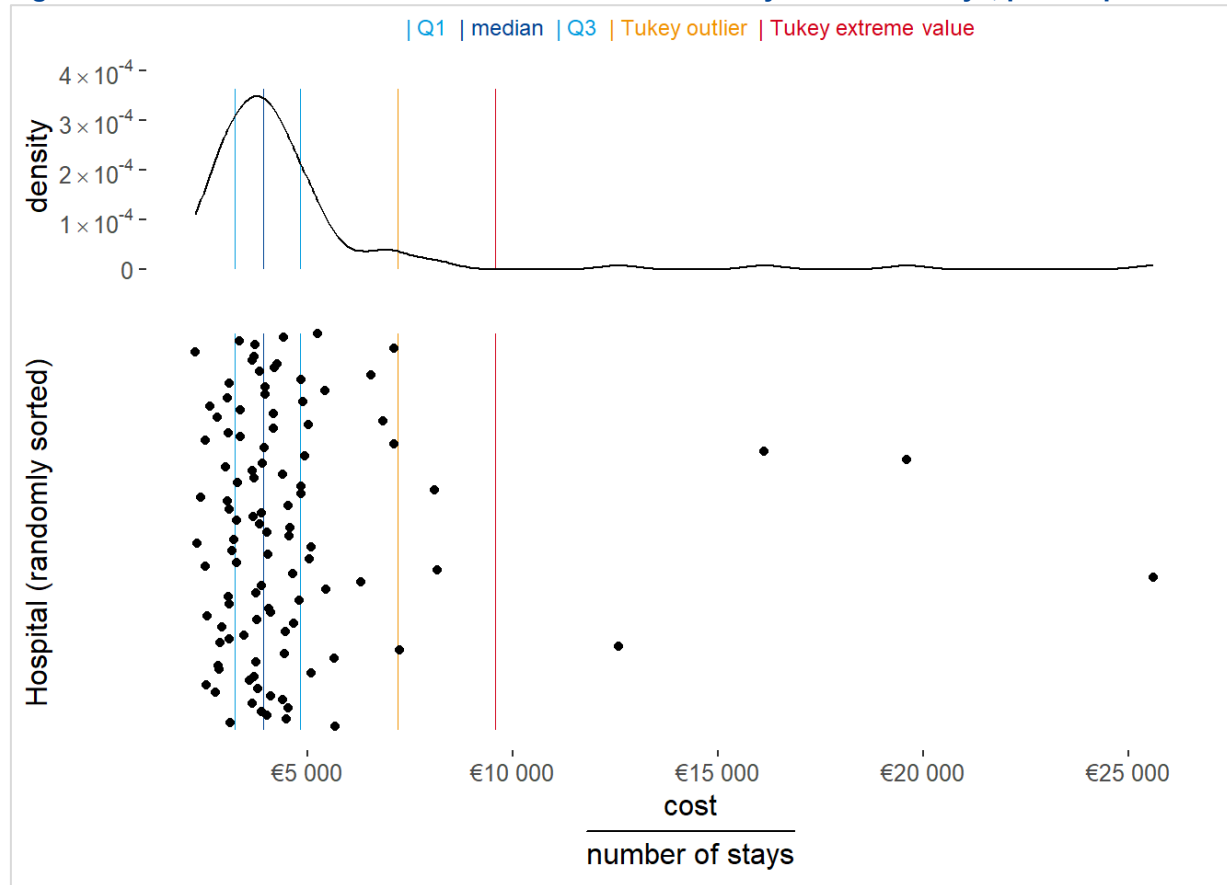


Figure 3 shows the results when costs in all cost centres and cost accounts are taken together. Four hospitals have an (extreme) outlier value. These hospitals primarily offer rehabilitation or geriatric services (categorical hospitals in Brussels and Wallonia). As such, they have relatively few stays but these stays are most likely longer in duration, increasing the costs per stay.

Next, when all cost centres are taken together, and cost accounts are grouped per subclass (60-66), except for subclass 60 which is subdivided in three parts (600-601; 604, 60940 and 60941; other 60), the same four hospitals show an (extreme) outlier value.



Figure 3 – Sum of all costs before allocation standardised by number of stays, per hospital in 2019





Finally, an outlier analysis was conducted for the same groups of cost accounts, but now separately for temporary and final cost centres and their subdivisions as defined in Finhosta. This outlier analysis was a first step to check the data for deviating values. The data checks described in Appendix 6 further build on this outlier analysis.

Of course, not all combinations of groups of cost accounts and subdivisions of temporary and final cost centres are relevant. Moreover, some combinations show large outliers (a value larger than the Tukey extreme value) but the amount of costs is very low or only a limited number of hospitals has recorded costs.

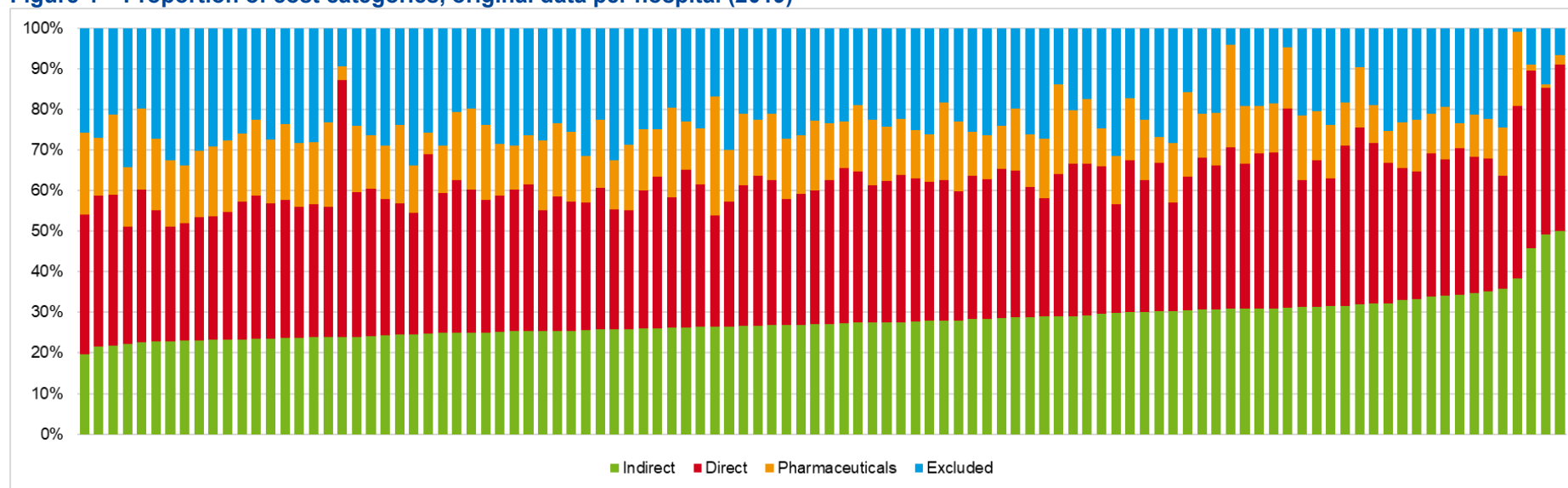
The number of outlier values is larger in medical-technical services than in nursing departments. A partial explanation might be the way costs were standardised, i.e. by dividing them by the number of inpatient and day-care stays. Since activity and hence costs in nursing departments are more closely related to the number of stays than activity and costs in medical-technical services, the standardisation possibly insufficiently captures difference in the size and activity.

The outlier hospitals with large costs in cost accounts 62 (remuneration and social charges) are hospitals with salaried medical specialists.

4.2.3 *Classification into direct, indirect, excluded and pharmaceutical costs*

No large differences between hospitals in the share of direct, indirect and excluded costs

In Figure 4, **total costs** per hospital (before application of the cascade method) are classified into direct, indirect, excluded and pharmaceutical costs. Hospitals are ranked by share of indirect costs. Costs in cost centres related to non-hospital activities are not presented. A limited number of hospitals (including the four categorical hospitals mentioned in section 4.2.2) have a lower share of excluded costs, most of which are physician payments. Differences in the share of excluded costs related to physicians can be due to the way physician fees are collected and hence the extent to which physician costs appear in the cost data of the hospital (collection via the hospital versus collection via the medical council – see section 3.1).

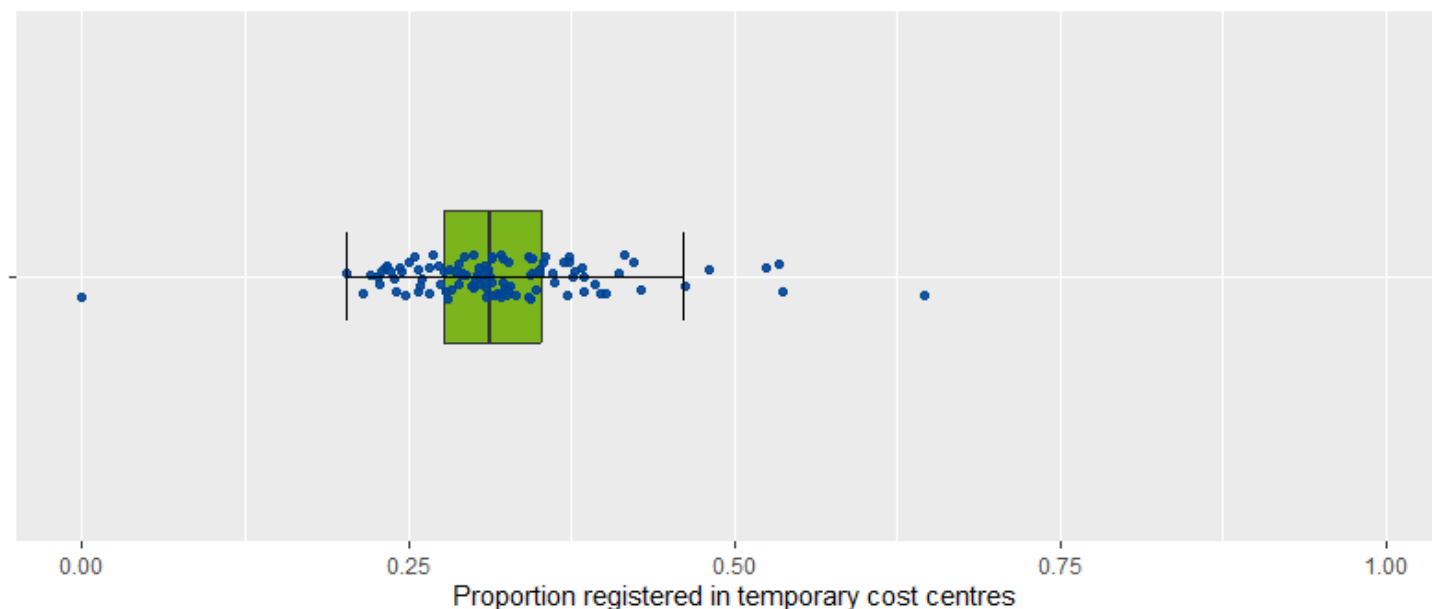
**Figure 4 – Proportion of cost categories, original data per hospital (2019)****Different share of costs recorded in temporary cost centres limits comparability between hospitals in costs per group of cost centres**

The same classification of costs can be applied to different types of temporary and final cost centres. The share of temporary costs in total costs ranges from 0% (a categorical hospital) to 64.6%, with a mean share of 32.0% (see Figure 5). Four hospitals (not the categorical hospitals) register more than 50% of total costs in temporary cost centres. Although the Finhosta rules allow hospitals to record costs first in temporary cost centres

instead of directly in final cost centres, it is highly doubtful that the costs per final cost centre would have been the same if hospitals recorded (more) costs directly in the consuming cost centres. The cascade process transfers costs from temporary to final cost centres on the basis of allocation keys (m², nursing days, etc.). It was mentioned before that these allocation keys are criticised because they insufficiently reflect reality and there is not always a clear link between the allocated temporary cost centre (for example, social services as part of the cost centre administration) and the final cost centre (for example, laboratories) (see section 2.1).



Figure 5 – Proportion of costs registered in temporary cost centres, original data per hospital (2019)



Mainly indirect costs recorded in temporary cost centres

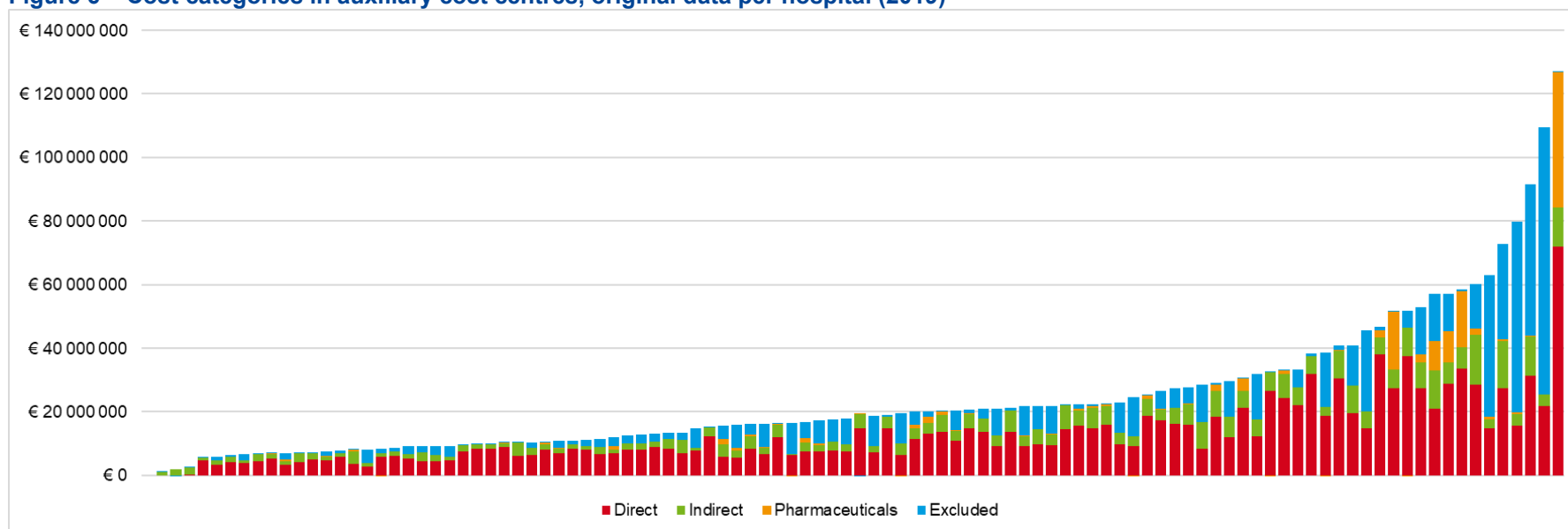
In Appendix 6.3.2, cost categories for three groups of temporary cost centres (awaiting a destination; common; and auxiliary) are shown. The results for cost centres **awaiting a destination** are generally in line with what was expected. Most costs registered in hospitals (mainly depreciation and financial expenses) are indirect, but there are a few exceptions. One hospital registers a large amount of pharmaceutical costs in these cost centres. Hence, also these pharmaceutical costs are allocated to final cost centres using the allocation key m².

Also in **common cost centres** (general costs, laundry, catering, heating, maintenance, etc.) indirect costs represent a large part of recorded costs.

For the third type of temporary cost centres, **auxiliary cost centres**, it was decided to define costs of nursing and caring staff, allied healthcare and other staff, and other scientific staff in cost centres 150-181 as direct costs because a significant number of medical acts are provided in these cost centres. For other temporary cost centres, these costs are considered indirect costs. Therefore, the large share of direct costs in these cost centres found in most hospitals is the result of this decision (see Figure 6; hospital are ranked by costs in auxiliary cost centres). Some hospitals show a large share of excluded costs (mainly physician fees in cost account 6190 and in cost centre 140 (medical secretariat)). A few hospitals also record pharmaceutical costs in auxiliary cost centres (see further). The mean share of direct, indirect, excluded and pharmaceutical costs is 55.8%, 20.6%, 20.8% and 2.8% respectively.



Figure 6 – Cost categories in auxiliary cost centres, original data per hospital (2019)



Note: negative amounts are not shown.

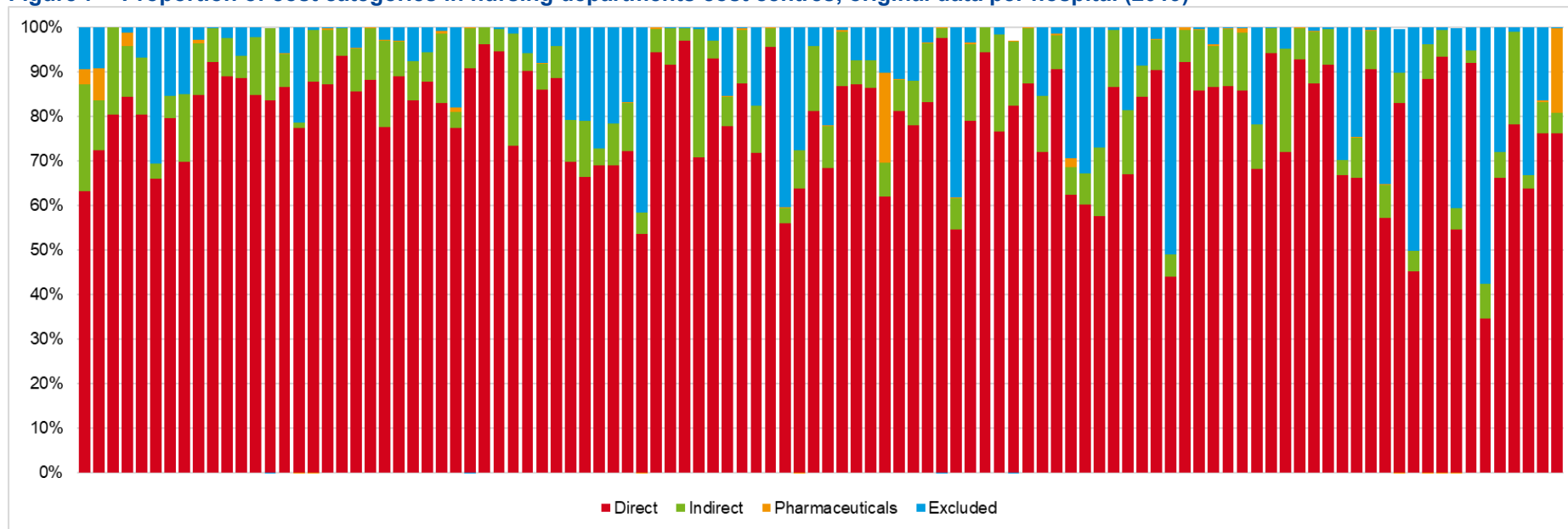
Costs in temporary cost centres are allocated mainly to nursing departments and less to medical-technical services

The final cost centres were divided into four groups: nursing departments (cost centres 200-490); medical-technical services (cost centres 500-710); pharmacy (cost centre 830) and consultations (cost centre 840). In Appendix 6, (the share of) cost categories for the four groups of cost centres are shown for the original and allocated data.

While for cost centres related to **nursing departments** there is a large share of direct costs in the original data for most hospitals (see Figure 7; hospitals are ranked by costs in cost centres related to nursing departments), the share of indirect costs increases substantially after application of the

cascade method (see Figure 8). Also excluded costs and pharmaceutical costs are allocated to the nursing department cost centres. A number of hospitals with a large share of pharmaceutical costs recorded in cost centres awaiting destination or in auxiliary cost centres (see Figure 6), have a larger share of pharmaceutical costs in cost centres related to nursing departments in the allocated data.

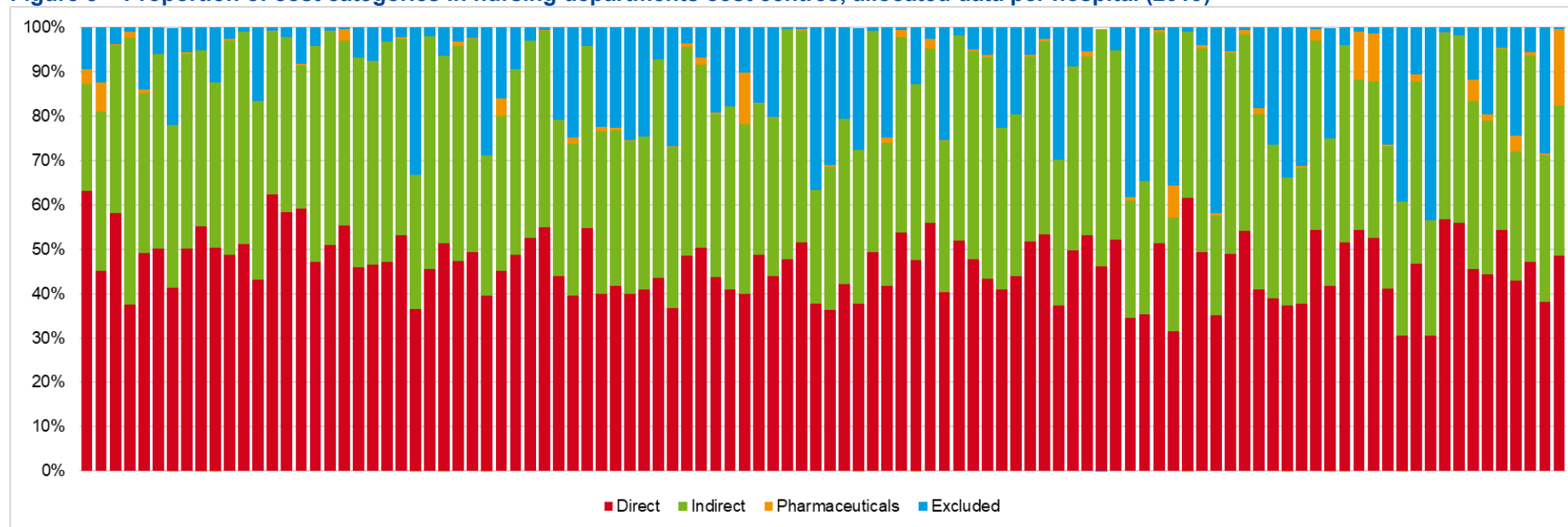
The mean share of direct, indirect, excluded and pharmaceutical costs is 79.1%, 9.5%, 10.7% and 0.6% respectively for the original data. In the allocated data, the shares are 46.6%, 39.3%, 13.0% and 1.1%, respectively. Mainly indirect staff costs are allocated to the nursing departments.

**Figure 7 – Proportion of cost categories in nursing departments cost centres, original data per hospital (2019)**

Note: negative amounts are presented by a white bar.



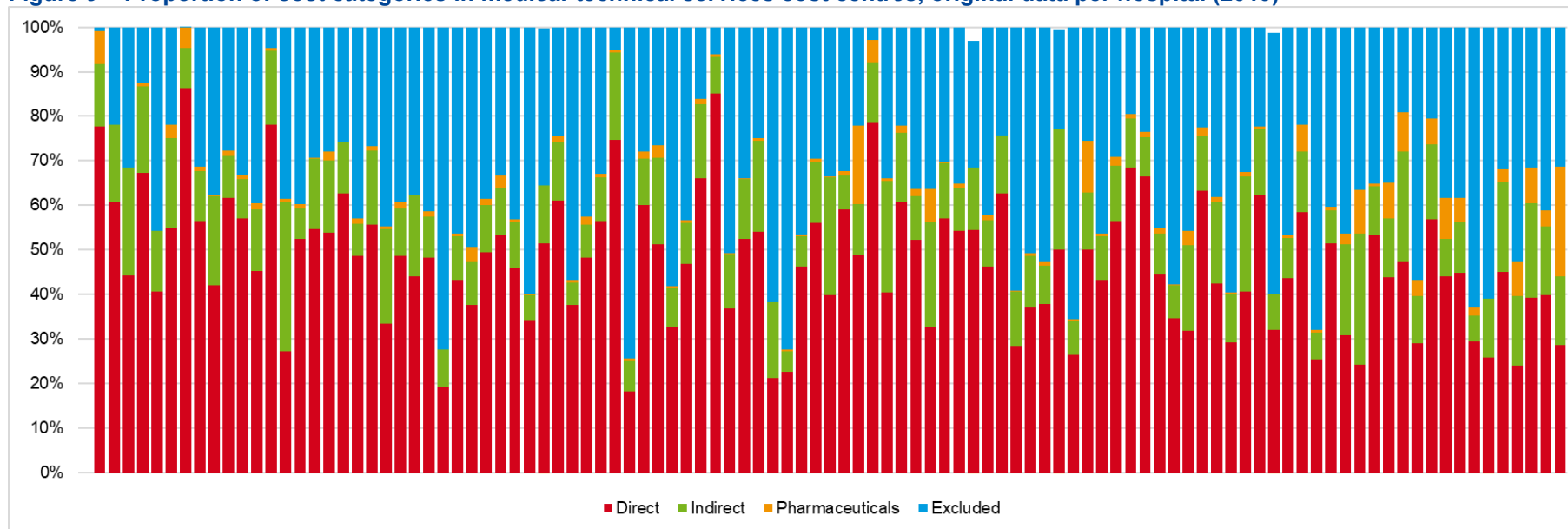
Figure 8 – Proportion of cost categories in nursing departments cost centres, allocated data per hospital (2019)



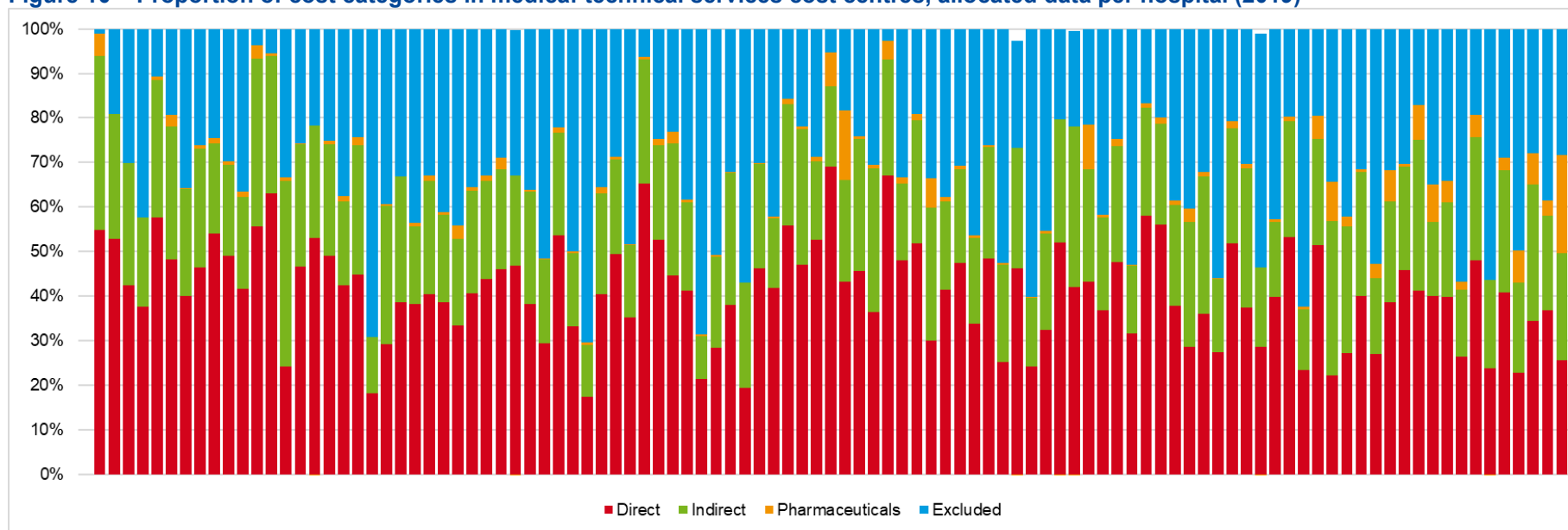
Note: negative amounts are presented by a white bar.

Cost centres related to **medical-technical services** show a different picture (see Figure 9 and Figure 10; hospitals are ranked by costs in cost centres related to medical-technical services). Just like cost centres related to nursing departments, the original data have a large share of direct costs. However, compared to nursing departments, cost centres related to medical-technical services have a much larger share of excluded costs, most of which are physician payments. A comparison of shares of cost categories (direct, indirect, etc.) between original and allocated data reveals an increased share of indirect costs.

The mean share of direct, indirect, excluded and pharmaceutical costs is 47.5%, 13.6%, 38.6% and 2.2% respectively for the original data. In the allocated data, the shares are 41.1%, 23.8%, 33.1% and 2.0%, respectively.

**Figure 9 – Proportion of cost categories in medical-technical services cost centres, original data per hospital (2019)**

Note: negative amounts are presented by a white bar.

**Figure 10 – Proportion of cost categories in medical-technical services cost centres, allocated data per hospital (2019)**

Note: negative amounts are presented by a white bar.

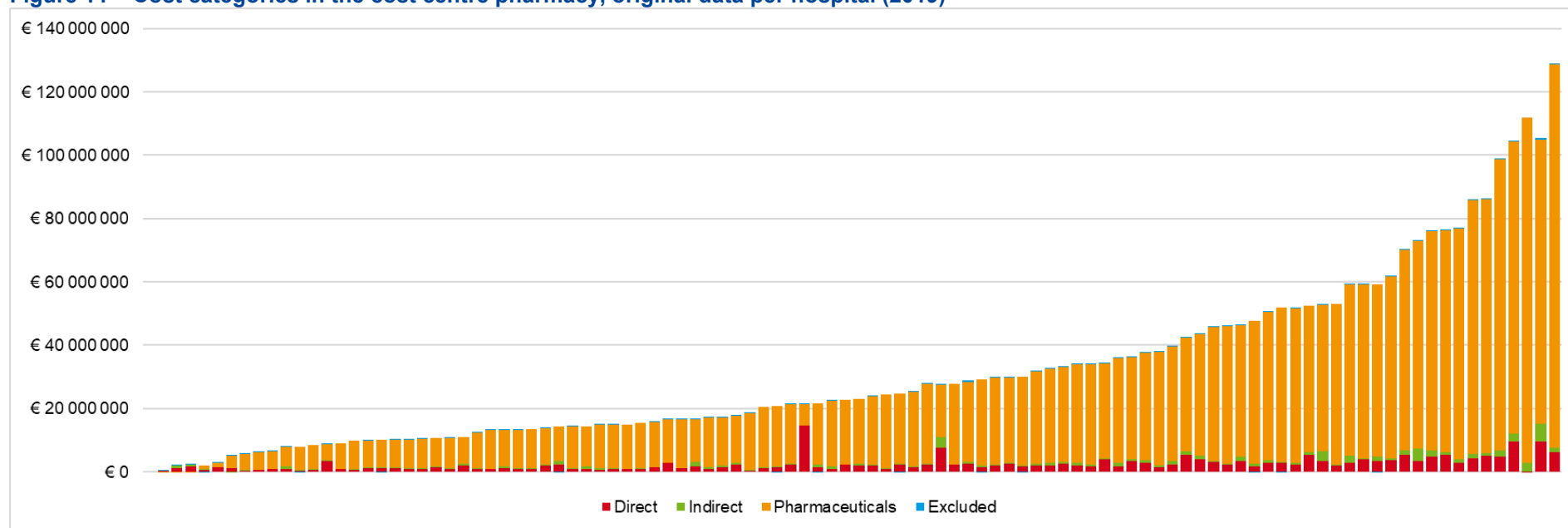
Different share of pharmaceutical costs in the cost centre pharmacy reflects accounting differences between hospitals

The cost centre **pharmacy** looks more or less the same for all hospitals, with a few exceptions (see Figure 11; hospitals are ranked by costs in the cost centre pharmacy). While most hospitals mainly record pharmaceutical costs in this cost centre, the four categorical hospitals record (low amounts of) direct costs, which can be related to their specific activity. At least three other hospitals show a relatively low amount of costs of pharmaceuticals registered in the cost centre pharmacy. They record pharmaceutical costs in cost centres awaiting destination or in auxiliary cost centres (further allocated to nursing departments), or directly in cost centres related to

nursing departments (see Figure 7) or to medical-technical services (see Figure 9).

In section 3.1 we mentioned that no distinction could be made between discounts for pharmaceuticals (excluded costs) and discounts for other products (should be considered as indirect costs) in cost account 608. Costs are registered by 67 hospitals in this account. For 62 of them, at least part of the discounts are recorded in cost centre 830 (pharmacy). A total of – € 76 717 286 is recorded in cost account 608, of which – € 56 709 933 (73.9%) is recorded in cost centre 830.

The mean share of direct, indirect, excluded and pharmaceutical costs is 11.9%, 3.3%, 0.3% and 84.5% respectively for the original data. In the allocated data, the shares are 10.4%, 6.4%, 0.2% and 83.0%, respectively.

**Figure 11 – Cost categories in the cost centre pharmacy, original data per hospital (2019)**

Note: negative amounts are not shown.

Costs recorded in the cost centre consultations only partially reflect total costs of consultations

The cost centre **consultations** (840) shows some striking results. There is a large variability in the share of total costs that are recorded in the cost centre consultations (ranging from 0% to 26.8% in the original data and from 0% to 30.7% in the allocated data) as well as in the distribution between direct, indirect, excluded and pharmaceutical costs (see Figure 12; hospitals are ranked by costs in the cost centre consultations). Several factors can explain the variability in the share of total costs. First, during contacts with individual experts as well as in the expert meeting with representatives from

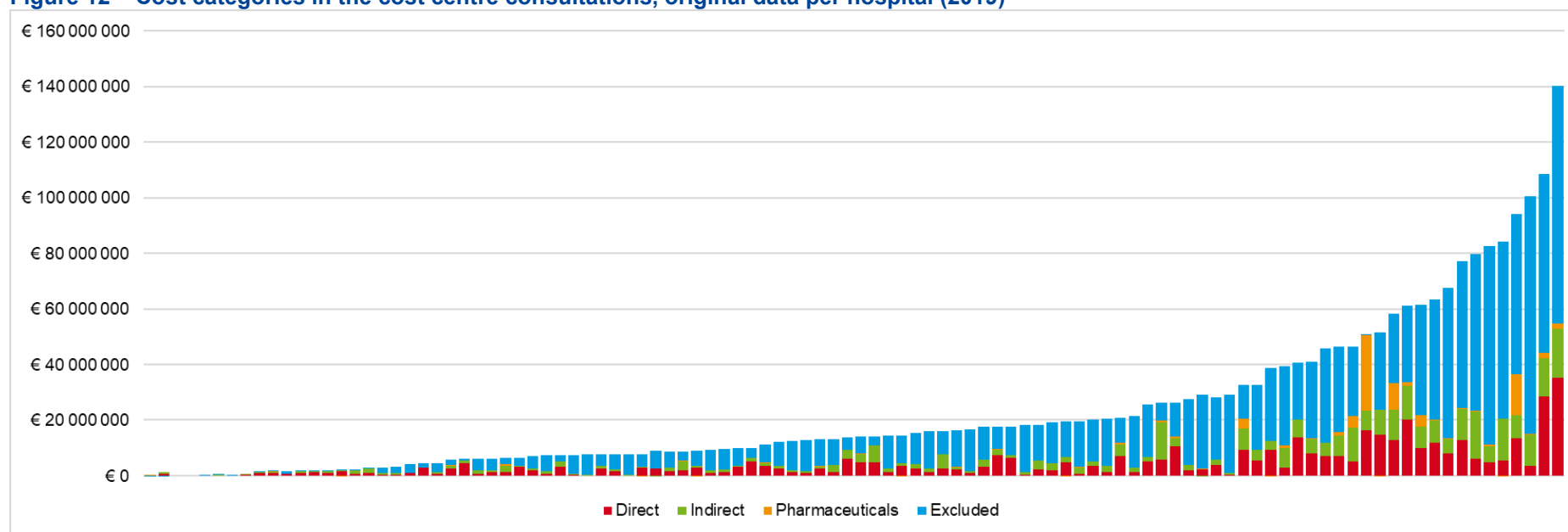
the hospital umbrella organisations and experts from the financial department of hospitals, it was emphasized that in some hospitals some or all of the costs related to consultations, are borne by medical specialists. Consequently, these costs are not recorded in the hospital accounts. Second, costs related to consultations are sometimes recorded in the cost centres where these consultations are provided (such as nursing departments or medical-technical services). Third, bilateral contacts with selected hospitals with no or a very low share of costs recorded in the consultations cost centre, have revealed that they record these costs in cost centres 580 or 710 (both called other medical-technical services). This may be related to the way consultation activities are organised in hospitals.



Sometimes consultations and medical-technical services can be performed on the same floors. Finhosta does not require to disentangle the costs of the true consultations and these medical-technical services provided during or alongside consultations. Section 6.3.2 in Appendix 6 further details the varying application of the Finhosta rules concerning consultations.

The mean share of direct, indirect, excluded and pharmaceutical costs is 22.1%, 12.6%, 63.6% and 1.7% respectively for the original data. In the allocated data, the shares are 22.1%, 35.3%, 40.8% and 1.7%, respectively.

Figure 12 – Cost categories in the cost centre consultations, original data per hospital (2019)



Note: negative amounts are not shown.



4.2.4 *Distribution of costs related to medical material, medical equipment and staff across cost categories*

Costs related to **medical material** (identified by cost accounts 60002, 6002-6004, 6008, 601, 6063, 609002, 60902-60904, 60908, 6091 and 60963) are considered direct costs in this study. In the original data, these costs are mainly recorded in medical-technical and auxiliary cost centres. Costs of medical material originally recorded in temporary cost centres are mainly allocated to nursing departments.

Costs related to **medical equipment** (identified by cost accounts 6103, 6135, 6303 and 63051) are also considered direct costs. The way hospitals record costs related to medical equipment is similar to how they record costs related to medical material: before allocation mainly in medical-technical and auxiliary cost centres and after allocation in medical-technical services and nursing departments.

Costs related to **non-medical staff** (identified by cost accounts 6171-6175, 618, 6192-6193, 6201-6205, 6211-6215, 6221-6225, 6231-6235, 6241-6245, 62501-62505 and 62511-62515) can be direct or indirect costs. Before allocation, they are mainly recorded in common cost centres and in nursing departments. After allocation, they are mainly recorded in nursing departments.

Excluded costs related to **medical staff** (identified by cost accounts 6170, 6190, 6191, 6200, 6210, 6220, 6230, 6240, 62500 and 62510) are mainly registered in cost centres related to medical-technical services and consultations and after allocation also in cost centres related to nursing departments. A limited number of hospitals mainly record these costs in common or auxiliary cost centres. Some hospitals have almost no costs related to medical staff: this concerns the four categorical hospitals of Brussels and Wallonia as well as three other hospitals. Probably, the way physician fees are collected plays a role in this deviating pattern of recording costs.

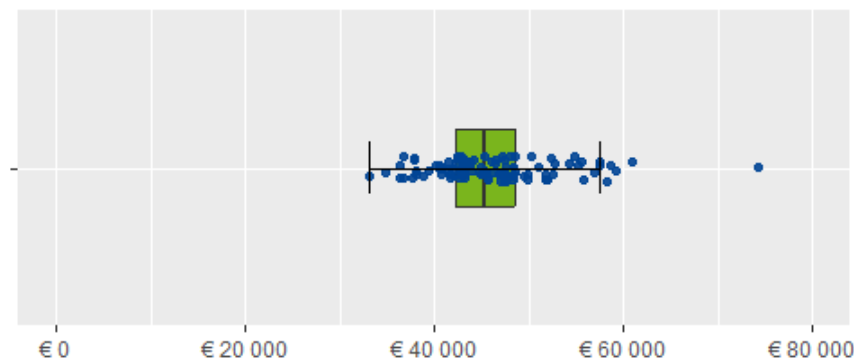
4.3 Consistency between Finhosta variables

Some variables, which should have the same value, are available in more than one table. Other variables are included in only one table, but also should have the same value. To assess the consistency between variables, several checks were performed. Some of the checks that were performed, have no direct impact on the results in Chapter 5. They were, however, carried out to calculate the amount of indirect costs per m² or per FTE which gives us further insight in the (quality of) the data and/or organisational choices of hospitals.

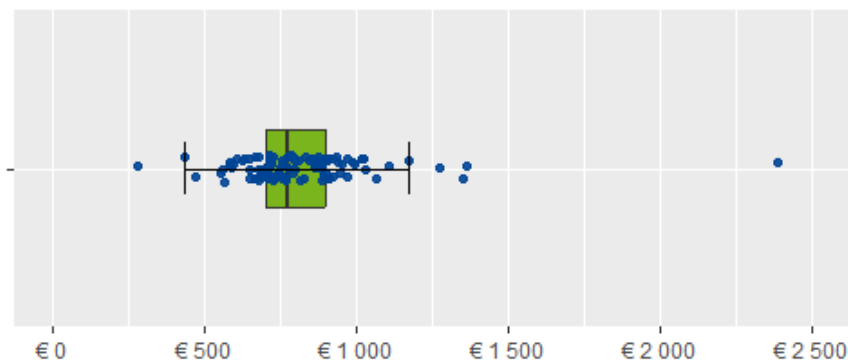
Consistency between indirect costs and size of a hospital

In section 6.6 of Appendix 6 the correlation between staff-related costs and staff numbers is analysed for different staff types. For the majority of hospitals, (the size of) both variables match.

Figure 13 shows the total amount of indirect costs per FTE and Figure 14 per m², both per hospital. The median indirect cost per FTE is € 45 400 (mean = € 46 143 and IQR = € 6 367). The median indirect cost per m² is € 772 (mean = € 815 and IQR = € 194).

**Figure 13 – Indirect costs per full-time equivalent, per hospital**

Boxes are drawn from first quartile to third quartile with the median as inside line, whiskers are drawn from the box to the most extreme point that is less than or equal to 1.5 times the IQR, and dots represent hospitals. The four categorical hospitals in Brussels and Wallonia are not included. The number of FTE is the total number of FTEs registered in Finhosta Table 13.

Figure 14 – Indirect costs per m², per hospital

Boxes are drawn from first quartile to third quartile with the median as inside line, whiskers are drawn from the box to the most extreme point that is less than or equal to 1.5 times the IQR, and dots represent hospitals. The four categorical hospitals in Brussels and Wallonia are not included. The number of m² is retrieved from key M2.012.

4.4 Conclusion of the data checks

Given the atypical nature and hence cost structure of the four categorical hospitals in Brussels and Wallonia, it was decided not to include these hospitals when calculating indirect cost mark-up percentages in Chapter 5.

However, also other hospitals show divergent results for specific cost centres or cost accounts. Therefore, a number of sensitivity analyses were conducted in Chapter 5 to assess the impact on the indirect cost mark-up percentage.



5 INDIRECT COSTS AS A MARK-UP PERCENTAGE ON DIRECT COSTS

In KCE Report 178 only a global mark-up percentage for indirect costs was calculated. In the following sections, a global percentage as well as differentiated indirect cost mark-up percentages for selected groups of services (cost centres) are calculated. We make a distinction between two selections of hospital services. In the first selection (section 5.1) only services in scope of the direct practice cost studies are included. In the second selection (section 1.1) the remaining hospital services are included. In both selections the adapted cascade method (changing some temporary cost centres to final cost centres) is taken into account (see section 3.2.1).

In sections 5.1 and 5.2 no distinction is made according to who pays for the services (federal or federated authorities). The Finhosta data do not allow to make a distinction between costs financed by the federal versus the federated authorities. For example, in cost account 6302 (depreciation on buildings), the payer depends on the year of construction of the building.

All results are based on the costs recorded by 100 hospitals (all hospitals in the Finhosta data for 2019 without the four categorial hospitals in Brussels and Wallonia) except otherwise mentioned. The amount of direct and indirect costs per cost centre, as well as the indirect cost mark-up percentage per cost centre are given in Appendix 7. We noted that in some cases, mark-up percentages of hospitals can be quite extreme: from near zero to over 400%. This is often caused by either very low direct costs compared to indirect costs or vice versa. These extreme mark-up percentages can strongly influence the indirect cost mark-up percentage per cost centre. To mitigate these effects, in the following sections, an outlier analysis was applied to the indirect cost mark-up percentages and the **base results** per cost centre or per group of cost centres are based on direct and indirect costs of **inlier hospitals**, defined as hospitals with a mark-up percentage within $[Q1 - 1.5 \cdot IQR ; Q3 + 1.5 \cdot IQR]$. The results in Appendix 7 are without such outlier correction. In Appendix 8, the first and third quartile is given for the base results.

5.1 Technical medical-surgical and automated and associated medical-technical acts

Although there is no one-to-one correspondence between the nomenclature codes covered by the research teams analysing direct practice costs and specific cost centres, the selected nomenclature codes mainly occur in the following cost centres (see Table 3):

- 150-181; 261; 500-503; 580 and 700-710 for the technical medical-surgical acts (KU Leuven and ULB)
- 510-520 and 570 for the automated and associated medical-technical acts (Möbius).

**Table 3 – Selected cost centres for technical medical-surgical and automated and associated medical-technical acts**

Cost centres for technical medical-surgical acts		Cost centres for automated and associated medical-technical acts	
150	Emergency department	510	Laboratory for chemistry
151	On-duty unit	511	Laboratory for haematology
152	Mobile emergency group	512	Laboratory for coagulation and haemostasis
153	Paramedical intervention team	513	Laboratory for immuno-haematology
160	Central sterile services department	514	Laboratory for serology
170	Anaesthesia unit	515	Laboratory for microbiology
180	Operating theatre	516	Laboratory for hormonology
181	Plaster room	517	Laboratory for anatomic-pathology
261	Delivery room	518	Laboratory for in vitro radioisotopes
500	Radiology	519	Laboratory
501	Nuclear magnetic resonance	520	Other laboratories
502	Scanner	570	Radiotherapy
503	Other services for medical imaging		
560	Haemodialysis		
580	Other medical-technical services		
700	In vivo nuclear medicine		
701	PET scan		
702	In vivo nuclear medicine		
710	Other medical-technical services		



The costs of pharmaceuticals and implants are out of scope because these costs are not covered by physician fees and because no distinction can be made between pharmaceuticals in the current lump sum system and pharmaceuticals reimbursed per product. Hence, also in sections 5.1.1 to 5.1.4 these costs are not taken into account (see section 3.1 for the relevant cost accounts). In section 5.1.5 the costs of pharmaceuticals and implants are included.

5.1.1 A global indirect cost mark-up percentage for all selected services

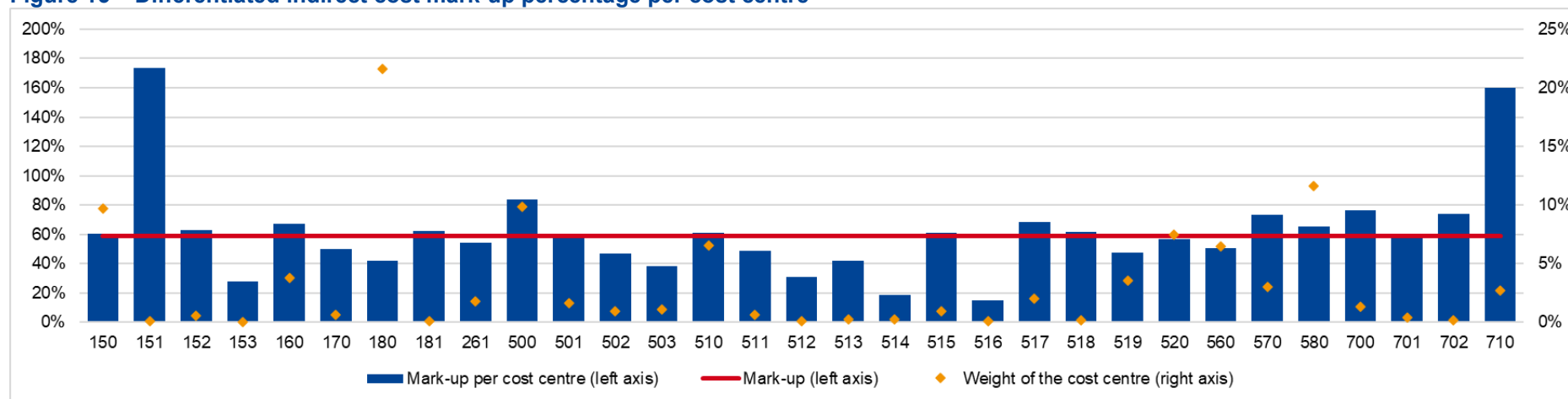
When taking all of the above cost centres and included cost accounts into account, as well as the adapted cascade method, the global indirect cost mark-up percentage equals 58.83% (no outlier analysis was applied). This means that when a direct cost of € 100 is raised by an indirect cost mark-up percentage of 58.83%, total practice cost is equal to € 158.83.

The indirect cost mark-up percentage for the technical medical-surgical acts equals 59.01%, for the automated and associated medical-technical acts the percentage is equal to 58.29%.

The main advantage of having one global mark-up percentage, is that differences between hospitals in the way they record costs play a smaller role than when a mark-up percentage is calculated for one or a limited number of cost centres. The main disadvantage is that the ratio of indirect to direct costs of the largest cost centre(s) gets a larger weight and is applied to all cost centres. Moreover, no distinction can be made between hospitals with and without specific services, such as for example hospitals with and without costs in the cost centre radiotherapy.

5.1.2 An indirect cost mark-up percentage per cost centre

The advantages of one global indirect cost mark-up percentage are the disadvantages of differentiated percentages, and vice versa. Figure 15 shows the mark-up percentage for each selected cost centre separately (no outlier analysis was applied). The red line gives the overall percentage for the included cost centres (58.83%). The percentages range from 15.16% for cost centre 516 (laboratory for hormonology) to 173.63% for cost centre 151 (on-duty unit) (vertical axis at the left side of the figure). However, there is a large difference in weight between the cost centres (vertical axis at the right side of the figure). Cost centres with the largest weight, calculated as the share of total costs (= direct + indirect costs) of a cost centre in total costs for all cost centres shown in Figure 15, are cost centres 180 (operating theatre; 21.6%), 580 (other medical-technical services; 11.6%), 500 (radiology; 9.9%) and 150 (emergency department; 9.7%).

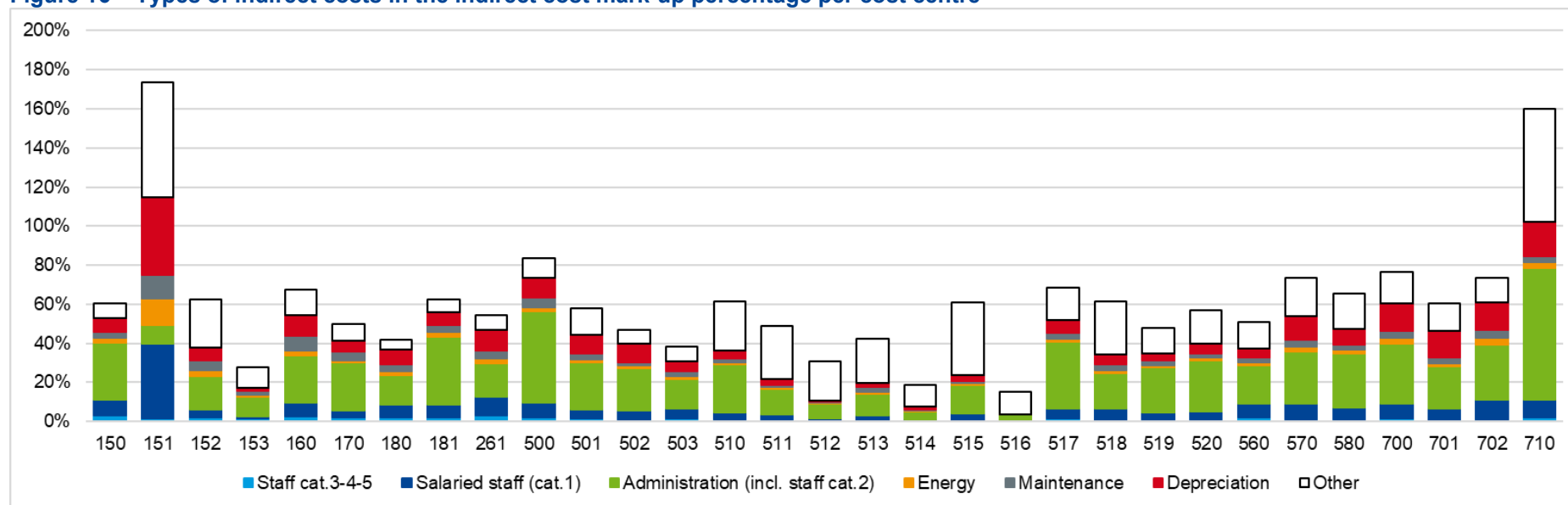
**Figure 15 – Differentiated indirect cost mark-up percentage per cost centre****Indirect costs mainly consist of administration costs**

The indirect costs in the indirect cost mark-up percentage per cost centre can be broken into the following components: staff, administration, energy, maintenance, depreciation and other indirect costs. Staff costs are further classified into five categories: salaried staff, administrative staff (part of administration) and staff category 3 (nursing and caring staff), category 4 (allied healthcare and other staff) and category 5 (other scientific staff) (see Figure 16). The largest component in most cost centres is administration, followed by depreciation.

The share of energy costs should be interpreted considering the following points. First, the 2019 data do not reflect the large increase in energy costs since 2021. Second, in the cascade process energy costs are allocated to direct cost centres on the basis of the m² of the receiving (final) cost centre. However, two cost centres with the same surface may face substantially different energy needs, which is not reflected in Figure 16.



Figure 16 – Types of indirect costs in the indirect cost mark-up percentage per cost centre



Staff cat. 3-4-5 = cost accounts 6173-6175; 6203-6205; 6213-6215; 6223-6225; 6233-6235; 6243-6245; 62503-62505; 62513-62515 recorded in temporary cost centres

Salaried staff (cat.1) = cost accounts 6171; 6201; 6211; 6221; 6231; 6241; 62501; 62511

Administration (including staff cat.2) = cost accounts 6172; 6202; 6212; 6222; 6232; 6242; 62502; 62512 + cost accounts 6115 and 615 + if recorded in cost centres 050, 051, 052 and 140, all cost accounts except those concerning staff cat. 1 and staff cat. 3-4-5

Energy = cost accounts 604 and 6094 + if recorded in cost centres 040-041, all cost accounts except 6115, 615, 63 and those concerning staff cat. 1-2-3-4-5

Maintenance = cost accounts 603; 6113 and 613 (except 6135) + if recorded in cost centres 030-031, all cost accounts except 6115, 615, 63, 604, 6094 and 6135 a and those concerning staff cat. 1-2-3-4-5

Depreciation = cost account 63 (except 6303 and 63051) + if recorded in cost centres 000-004, all cost accounts except 6115, 615, 604, 6094 and those concerning staff cat. 1-2-3-4-5



5.1.3 *Grouping of automated and associated medical-technical acts*

Groups of cost centres relevant for the direct cost study of Möbius are:

- 510-516; 518-520 (clinical biology, including genetics)
- 517 (pathological anatomy)
- 570 (radiotherapy)

As we mentioned in the introduction to this chapter, an outlier analysis was applied to the indirect cost mark-up percentages, removing outlier values outside $[Q1 - 1.5I * QR ; Q3 + 1.5I * QR]$. Some hospitals have a very low or high mark-up percentage because direct costs are very low or high compared to indirect costs. Other hospitals only recorded direct or indirect costs, so the mark-up percentage could not be calculated. Therefore, the costs of these outlier hospitals were not included in the calculation of the respective mark-up percentages. The results for the inlier hospitals are considered the base results, to which we apply sensitivity analysis.

The indirect cost mark-up percentage for clinical biology (including genetics), pathological anatomy and radiotherapy equals 44.79%, 60.02% and 72.32%, respectively (see Table 4). It should be noted that not all hospitals provide all services. Only 76 out of 100 hospitals record costs of pathological anatomy and only 44 hospitals record costs of radiotherapy (see further for the radiotherapy department).

The cost centres of clinical biology also contain the costs of genetics. Eight genetic centres are licensed in Belgium, one in each of the seven university hospitals (included in our analysis) and one in a private laboratory (not included in our analysis). Contrary to the study of Möbius, the Finhosta data do not allow to make a distinction between costs of clinical biology and costs of genetics. To isolate the costs of genetics in an indirect way, the indirect cost mark-up percentage was calculated separately for university (44.17%; 6 inlier hospitals) and non-university hospitals (45.01%) (see Table 4). The difference in percentage between both types of hospitals is small. Of course, the difference may also (partly) be due to another structure of direct and/or indirect costs of clinical biology in university hospitals instead of being related to the cost of genetics.

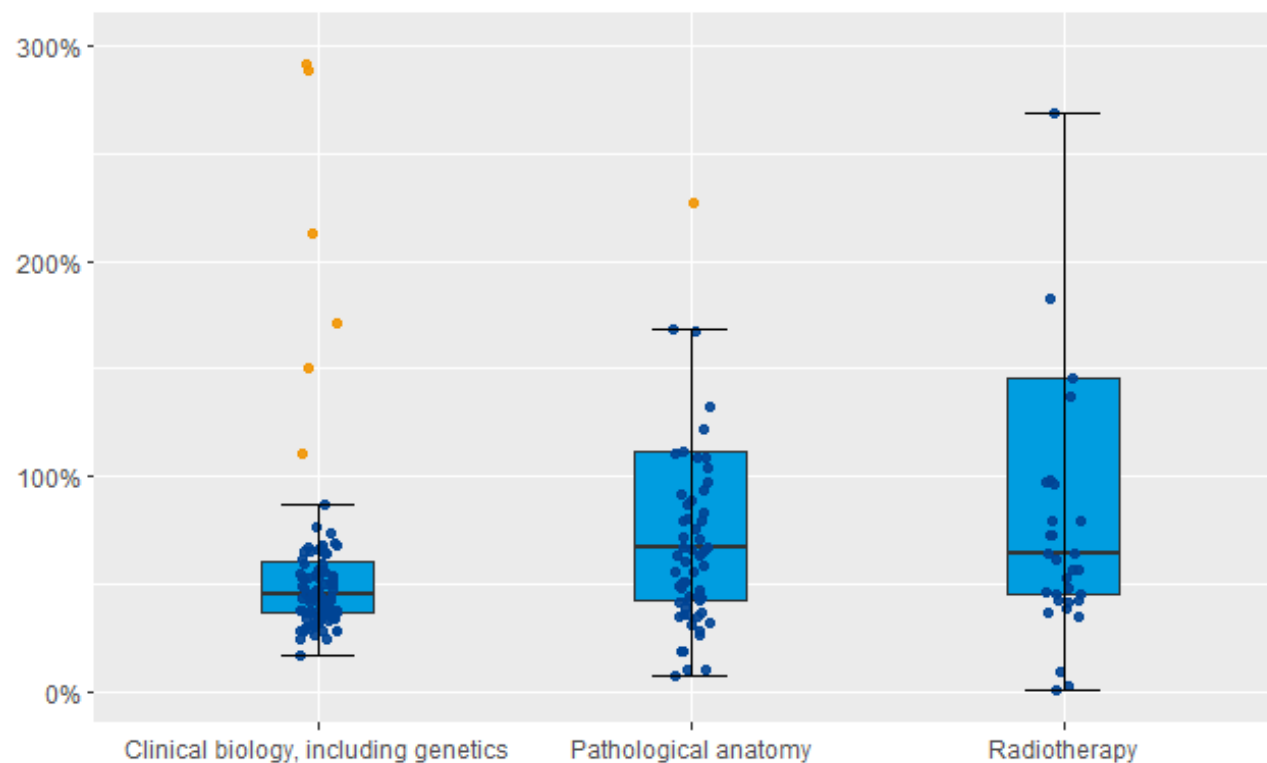
Variability between hospitals differs between groups of cost centres

The indirect cost mark-up percentage per group of cost centres is not uniform across hospitals. For the majority of hospitals, the mark-up percentage for the three groups of cost centres is within the IQR (interquartile range, difference between the 3rd and 1st quartile) (see Figure 17). Outliers are depicted in orange and are removed from further analyses.

The spread (IQR) is lowest for cost centres related to clinical biology, followed by the cost centres related to pathological anatomy and radiotherapy.



Figure 17 – Indirect cost mark-up percentage for three groups of cost centres, per hospital (2019)



Boxes are drawn from first quartile to third quartile with the median as inside line, whiskers are drawn from the box to the most extreme point that is less than or equal to 1.5 times the IQR, and dots represent hospitals. Outliers are depicted in orange and outliers larger than 300% are not shown on the figure.



Sensitivity analysis: hospitals with a licensed radiotherapy department

In December 2019, 27 hospitals were licensed for radiotherapy. One hospital with a licence did not record any costs in cost centre 570. In Finhosta, 45 hospitals registered some costs in cost centre 570, 19 of them were not licensed for radiotherapy. Among them, 14 were outliers in the mark-up analysis (1 outlier is licensed for radiotherapy).

The indirect cost mark-up percentage for the 25 inlier hospitals that are licensed for radiotherapy equals 76.04% (see Table 4).

Sensitivity analysis: hospitals participating in the direct cost study

The research objective of the direct cost teams is to develop a relative value scale for the direct practice costs related to the provision of medical activities in the hospital. The analysis is based on direct costs of selected hospitals participating in the direct cost studies (15 hospitals for clinical biology, 2 for genetics, 10 for pathological anatomy and 10 for radiotherapy). Therefore, we also calculated indirect cost mark-up percentages for the (inlier) hospitals participating in the direct cost study of Möbius. The results for the sample of (inlier) participating hospitals are more in line with the results of all inlier hospitals for clinical biology and genetics than for pathological anatomy and radiotherapy, where we notice a difference of more than 10 percentage points.

Table 4 – Indirect cost mark-up percentage for selected groups of cost centres related to automated and associated medical-technical acts

Group	Direct costs	Indirect costs	Mark-up	Number of hospitals
Clinical biology, including genetics (n=100)*	€ 629 359 216	€ 281 890 871	44.79%	89
University hospitals	€ 162 943 460	€ 71 977 197	44.17%	6
Non-university hospitals	€ 466 415 757	€ 209 913 674	45.01%	83
Hospitals participating in direct cost study (clinical biology)	€ 196 611 291	€ 92 166 076	46.88%	15
Hospitals participating in direct cost study (genetics)	€ 63 080 243	€ 30 868 808	48.94%	2
Pathological anatomy (n=76)	€ 61 518 399	€ 36 926 152	60.02%	58
Hospitals participating in direct cost study	€ 16 520 735	€ 7 961 889	48.19%	9
Radiotherapy (n=44)	€ 89 315 180	€ 64 590 484	72.32%	30
Hospitals with licensed radiotherapy department	€ 80 519 474	€ 61 230 158	76.04%	25
Hospitals participating in direct cost study	€ 43 010 222	€ 26 481 143	61.57%	10

*Note: the outlier analysis was applied only to the base results (in bold); the sensitivity analysis was applied to the inlier hospitals of the base results. * For the base results, also the total number of hospitals (inlier and outlier) that recorded direct and/or indirect costs is given.*



5.1.4 *Grouping of technical medical-surgical acts*

Although there are some differences between the team of KU Leuven and the team of ULB in the selection of nomenclature codes and the way direct practice costs are allocated to a nomenclature code, in this section we selected those cost centres in which the nomenclature codes occur most frequently.

Groups of cost centres relevant for the direct cost study of KU Leuven and ULB are:

- 150-153 (emergency services)
- 160 (central sterile services department)
- 170+180 (operating theatre and anaesthesia)
- 181 (plaster room)
- 261 (delivery room)
- 500-503 (medical imaging)
- 560 (haemodialysis)
- 700+702 (in vivo nuclear medicine)
- 701 (PET scan)
- 580+710 (other medical-technical services)

The indirect cost mark-up percentages for the respective groups of cost centres are quite diverse, ranging from 42.30% for the cost centres operating theatre and anaesthesia, to 69.22% for the cost centre medical imaging (see Table 5). Also the number of hospitals that records costs in the respective cost centres is diverse, ranging from 25 for PET scan to 100 for the central sterile services department, operating theatre and anaesthesia, and medical imaging. Notable is the low number of hospitals that record direct and/or indirect costs for the plaster room.

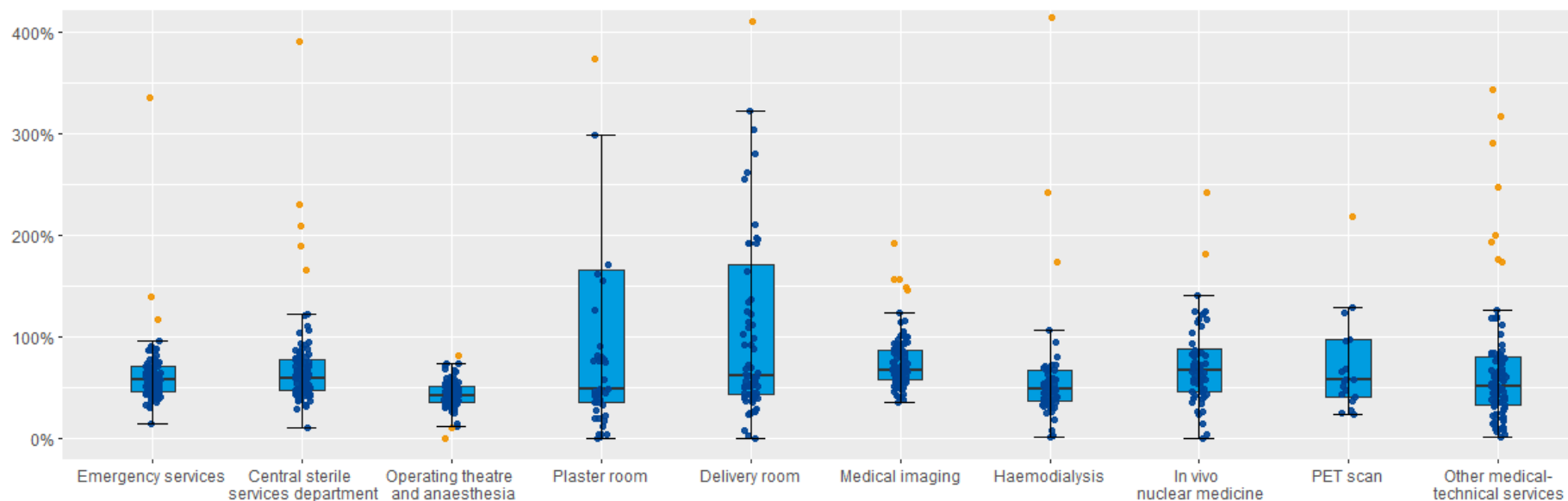
Largest variability between hospitals for plaster room and delivery room

The indirect cost mark-up percentage per group of cost centres shows the largest variability for the plaster room and the delivery room (see Figure 18). This is not surprising. The cost centre plaster room is a cost centre with a low weight (0.1%) with cost data for only 40 (inlier) hospitals. The total number of hospitals that recorded costs in this cost centre (inlier and outlier hospitals) is 57, suggesting that some hospitals record these costs in other cost centres.

In a large number of hospitals, it is difficult to isolate to cost of staff assigned to the cost centre 261 (delivery room) and 260 (maternity services – out of scope for the direct cost studies). The reason is that the same staff are deployed in both services.¹⁶ The same practice holds for the cost centres related to emergency services (150-153), but these cost centres are treated as one group. Since in the direct cost study (and hence in this study) only the delivery room is included, differences between hospitals in allocating costs to the delivery room and maternity services, can explain the varying mark-up percentage for the delivery room.



Figure 18 – Indirect cost mark-up percentage for ten group of cost centres, per hospital (2019)



Boxes are drawn from first quartile to third quartile with the median as inside line, whiskers are drawn from the box to the most extreme point that is less than or equal to 1.5 times the IQR, and dots represent hospitals. Outliers are depicted in orange and outliers larger than 400% and negative outliers are not shown on the figure.

**Sensitivity analysis: hospitals with a licensed mobile emergency group**

In December 2019, 67 hospitals had at least one site with a mobile emergency group (MUG – SMUR). The indirect mark-up percentage hardly changes when selecting the 65 inlier hospitals with a MUG – SMUR.

Sensitivity analysis: hospitals with a licensed magnetic resonance imaging (MRI) scanner

On 1 January 2019, 83 hospitals had at least one licensed MRI-scanner (compulsory register of the FPS Public Health: <https://www.health.belgium.be/nl/publicaties-medische-beeldvorming>). Selecting the 79 inlier hospitals with a license for at least one MRI-scanner instead of all hospitals with costs recorded for one of the cost centres related to medical imaging, does not change the indirect cost mark-up percentage (see Table 5).

Sensitivity analysis: hospitals with a licensed PET-scanner

On 1 January 2019, 22 hospitals had at least one licensed PET-scanner (compulsory register of the FPS Public Health: <https://www.health.belgium.be/nl/publicaties-medische-beeldvorming>).

No costs were recorded in cost centre 701 by two of these 22 hospitals. The mark-up percentage for the 16 inlier hospitals with a licensed PET-scanner is equal to 55.97%, which is only slightly lower than the percentage without selection of licensed hospitals.

Sensitivity analysis: hospitals participating in the direct cost study

Eleven (Flemish) hospitals participate in the direct cost study of KU Leuven, and 14^h (French-speaking) hospitals in the study of ULB.

From Table 5, we can make some observations. For most cost centres, the results of combining the sample of hospitals of KU Leuven and ULB are more in line with the base results than when considering both samples separately. The difference is, however, large for some cost centres: the plaster room, PET scan and other medical-technical services (see also section 5.2.3). Also for most cost centres, the indirect cost mark-up percentage is higher for the hospitals in the sample of KU Leuven than in the sample of ULB. Exceptions are the cost centres operating theatre and anaesthesia, emergency services, medical imaging, PET scan and plaster room (based on a very small sample).

^h Two participating hospital sites belong to the same hospital (license number).


Table 5 – Indirect cost mark-up percentage for selected groups of cost centres related to technical medical-surgical acts

Group	Direct costs	Indirect costs	Mark-up	Number of hospitals
Emergency services (n=99)*	€ 326 123 056	€ 192 576 454	59.05%	96
Hospitals with licensed mobile emergency group	€ 229 812 100	€ 138 807 565	60.40%	65
Hospitals participating in direct cost study KU Leuven	€ 49 501 511	€ 24 612 092	49.72%	10
Hospitals participating in direct cost study ULB	€ 47 080 027	€ 30 852 216	65.53%	14
Hospitals participating in direct cost study KU Leuven + ULB	€ 96 581 538	€ 55 464 307	57.43%	24
Central sterile services department (n=100)	€ 114 355 780	€ 72 382 719	63.30%	94
Hospitals participating in direct cost study KU Leuven	€ 18 565 445	€ 11 320 476	60.98%	10
Hospitals participating in direct cost study ULB	€ 17 709 885	€ 10 744 315	60.67%	13
Hospitals participating in direct cost study KU Leuven + ULB	€ 36 275 330	€ 22 064 791	60.83%	23
Operating theatre and anaesthesia (n=100)	€ 774 373 395	€ 327 553 641	42.30%	96
Hospitals participating in direct cost study KU Leuven	€ 170 946 794	€ 62 439 382	36.53%	11
Hospitals participating in direct cost study ULB	€ 111 190 274	€ 47 609 847	42.82%	14
Hospitals participating in direct cost study KU Leuven + ULB	€ 282 137 068	€ 110 049 229	39.01%	25
Plaster room (n=57)	€ 4 654 091	€ 2 707 805	58.18%	40
Hospitals participating in direct cost study KU Leuven	€ 773 870	€ 242 380	31.32%	7
Hospitals participating in direct cost study ULB	€ 459 287	€ 352 791	76.81%	1
Hospitals participating in direct cost study KU Leuven + ULB	€ 1 233 157	€ 595 170	48.26%	8
Delivery room (n=78)	€ 60 283 710	€ 31 623 934	52.46%	68
Hospitals participating in direct cost study KU Leuven	€ 11 339 775	€ 7 208 782	63.57%	10
Hospitals participating in direct cost study ULB	€ 12 828 130	€ 4 937 043	38.49%	10
Hospitals participating in direct cost study KU Leuven + ULB	€ 24 167 905	€ 12 145 825	50.26%	20
Medical imaging (n=100)	€ 386 645 890	€ 267 619 240	69.22%	95
Hospitals with licensed magnetic resonance imaging scanner	€ 359 288 875	€ 245 577 315	68.35%	79
Hospitals participating in direct cost study KU Leuven	€ 79 997 159	€ 49 509 103	61.89%	11
Hospitals participating in direct cost study ULB	€ 55 501 152	€ 38 376 426	69.15%	13
Hospitals participating in direct cost study KU Leuven + ULB	€ 135 498 311	€ 87 885 528	64.86%	24
Haemodialysis (n=73)	€ 216 037 932	€ 103 671 122	47.99%	62
Hospitals participating in direct cost study KU Leuven	€ 40 823 020	€ 19 819 565	48.55%	9



Hospitals participating in direct cost study ULB	€ 33 584 527	€ 13 707 895	40.82%	10
Hospitals participating in direct cost study KU Leuven + ULB	€ 74 407 547	€ 33 527 459	45.06%	19
In vivo nuclear medicine (n=65)	€ 42 926 962	€ 28 152 411	65.58%	59
Hospitals participating in direct cost study KU Leuven	€ 8 588 861	€ 5 943 543	69.20%	7
Hospitals participating in direct cost study ULB	€ 8 446 964	€ 5 040 337	59.67%	10
Hospitals participating in direct cost study KU Leuven + ULB	€ 17 035 825	€ 10 983 880	64.48%	17
PET scan (n=25)	€ 13 101 156	€ 7 789 704	59.46%	18
Hospitals with licensed PET-scanner	€ 12 131 149	€ 6 789 946	55.97%	16
Hospitals participating in direct cost study KU Leuven	€ 3 890 832	€ 1 753 842	45.08%	4
Hospitals participating in direct cost study ULB	€ 1 871 014	€ 990 141	52.92%	2
Hospitals participating in direct cost study KU Leuven + ULB	€ 5 761 846	€ 2 743 983	47.62%	6
Other medical-technical services (n=99)	€ 371 208 647	€ 216 081 325	58.21%	89
Hospitals participating in direct cost study KU Leuven	€ 31 312 504	€ 24 778 308	79.13%	8
Hospitals participating in direct cost study ULB	€ 80 018 488	€ 62 830 474	78.52%	14
Hospitals participating in direct cost study KU Leuven + ULB	€ 111 330 992	€ 87 608 781	78.69%	22

*Note: the outlier analysis was applied only to the base results; the sensitivity analysis was applied to the inlier hospitals of the base results. * For the base results, also the total number of hospitals (inlier and outlier) that recorded direct and/or indirect costs is given.*

5.1.5 Indirect mark-up percentages with pharmaceuticals included as direct costs

In the previous sections, the costs of pharmaceuticals and implants were not included. Two arguments were given for that decision: the costs of pharmaceuticals are currently not financed by physician fees and they include pharmaceuticals in the pathology-related lump sum reimbursement system and those reimbursed per product. It is not to be expected that the costs of pharmaceuticals in the pathology-related lump sum reimbursement system will ever be included in an all-in DRG-based lump sum per case. However, to show the impact of pharmaceuticals on the indirect cost mark-up percentages (base results), we included them as direct costs (see Table 6).

Lower indirect cost mark-up percentages for operating theatre, medical imaging, nuclear medicine, PET scan and other medical-technical services

A new outlier analysis was applied in Table 6. For the automated and associated medical-technical acts, the mark-up percentage as well as the number of inlier hospitals hardly differs. Also for the technical medical-surgical acts, the number of inlier hospitals only differs by up to one hospital. There is, however, a larger difference in indirect cost mark-up percentage for some cost centres (operating theatre: from 42.30% to 35.66%; medical imaging: from 69.22% to 60.03%; in vivo nuclear medicine: from 65.58% to 46.98%; PET scan: from 59.46% to 40.14% and other medical-technical services: from 58.21% to 52.09%). Pharmaceuticals and implants play a larger role and/or are recorded more in these cost centres than in the other cost centres.



Table 6 – Indirect cost mark-up percentage for selected groups of cost centres related to automated and associated medical-technical and technical medical-surgical acts – pharmaceuticals included as direct costs

Group	Direct costs	Indirect costs	Mark-up	Number of hospitals
Automated and associated medical-technical acts				
Clinical biology, including genetics (n=100)	€ 631 256 715	€ 281 890 871	44.66%	89
Pathological anatomy (n=76)	€ 61 550 019	€ 36 926 152	59.99%	58
Radiotherapy (n=45)	€ 90 335 332	€ 64 597 034	71.51%	31
Technical medical-surgical acts				
Emergency services (n=99)	€ 328 628 042	€ 192 576 454	58.60%	96
Central sterile services department (n=100)	€ 114 365 208	€ 72 382 719	63.29%	94
Operating theatre and anaesthesia (n=100)	€ 925 141 326	€ 329 861 113	35.66%	97
Plaster room (n=57)	€ 4 689 478	€ 2 711 347	57.82%	41
Delivery room (n=78)	€ 60 769 250	€ 31 623 934	52.04%	68
Medical imaging (n=100)	€ 445 795 641	€ 267 619 240	60.03%	95
Haemodialysis (n=74)	€ 221 414 532	€ 103 809 249	46.88%	63
In vivo nuclear medicine (n=65)	€ 59 536 368	€ 27 971 843	46.98%	60
PET scan (n=25)	€ 18 710 279	€ 7 510 915	40.14%	17
Other medical-technical services (n=99)	€ 415 683 581	€ 216 528 291	52.09%	90



5.2 An indirect cost mark-up percentage for nursing units, pharmacy and consultations

In this section we extend the analysis in section 5.1 to nursing units, pharmacy and consultations. Also for these cost centres the cost of pharmaceuticals (including pharmaceuticals and implants, see footnote g) is not included in the base results. In section 5.2.4, however, the costs of pharmaceuticals are included as direct costs.

The cost centres for which we calculate an indirect cost mark-up percentage in this section, are out of scope of the reform of physician fees. However, as explained in the introduction to this report (see section 1.1.2), the calculation of an indirect cost mark-up percentage could also be an input for the reform of the hospital payment system towards a DRG-based tariff per case. In response to the recent MAHA-reportⁱ¹⁷, minister of Public Health Vandenbroucke re-emphasised the cornerstones of this reform. Relevant for this study are the introduction of an all-in lump sum per pathology for justified care-related costs and a professional fee for physicians for their cognitive work but not for funding the practice costs of hospitals.¹⁸ However, the definition of “justified care-related costs” is out of scope of this study and is mainly a policy decision. Moreover, the Finhosta data do not allow to link the cost data to (medically relevant) cost objects such as DRGs (see introduction to Chapter 3).

5.2.1 A global indirect cost mark-up percentage for nursing units, pharmacy and consultations

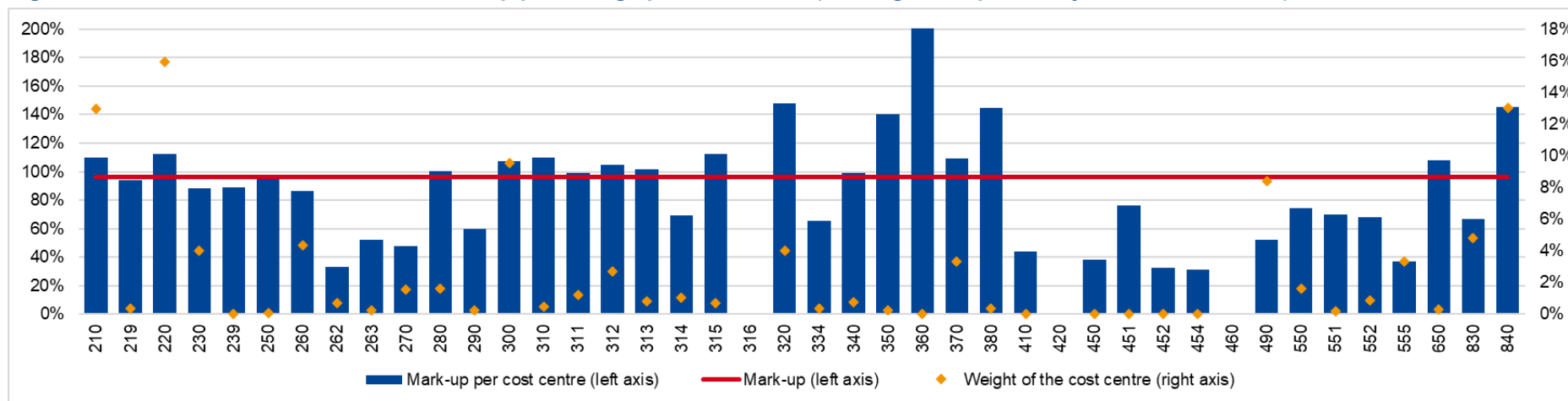
When taking all final cost centres (150-181 and 210-840) and included cost accounts into account, as well as the adapted cascade method, the global indirect cost mark-up percentage equals 80.03%. The percentage for the cost centres related to nursing units, pharmacy and consultations equals 96.09%.

5.2.2 An indirect cost mark-up percentage per cost centre

Figure 19 shows the mark-up percentage for each final cost centre related to nursing units, pharmacy and consultations separately (no outlier analysis was applied). The red line gives the overall percentage for all cost centres (96.09%). In some cost centres, no direct and/or indirect costs were recorded; for example, the cost centre 420 (day care in T-service) is only available in a psychiatric hospital. The lowest mark-up percentage (31.41%) is found in cost centre 454 (forensic-psychiatric or For K projects).

As in Figure 15, also the weight of each cost centre is shown on the figure (vertical axis at the right side). The largest weight calculated as the share of total costs (= direct + indirect costs) of a cost centre in total costs for all cost centres of Figure 19 is found for the cost centre 220 (internal medicine unit; 15.9%).

ⁱ The MAHA study (Model for Automatic Hospital Analyses) is a financial analysis of general hospitals in Belgium and is carried out annually by Belfius.

**Figure 19 – Differentiated indirect cost mark-up percentage per cost centre (nursing units, pharmacy and consultations)**

The indirect cost mark-up percentage for cost centre 360 is truncated to 200% on the figure.

5.2.3 Grouping of cost centres

We define the following groups for the cost centres related to nursing departments, pharmacy and consultations:

- 210-260; 262-263; 280; 300; 320 (nursing units and surgical day care)
- 270; 290; 490 (intensive care and severe burns)
- 334; 550; 552 (day care)
- 830 (pharmacy)
- 840 (consultations)
- 310-316; 340-460; 555; 650 (other cost centres).

An outlier analysis was applied to the indirect cost mark-up percentages, removing outlier values outside $[Q1-1.5I*QR ; Q3+1.5I*QR]$ and hospitals

that only recorded direct or indirect costs. The results for the inlier hospitals are shown in Table 7.

Very large differences emphasise the importance of differentiated indirect cost mark-up percentages

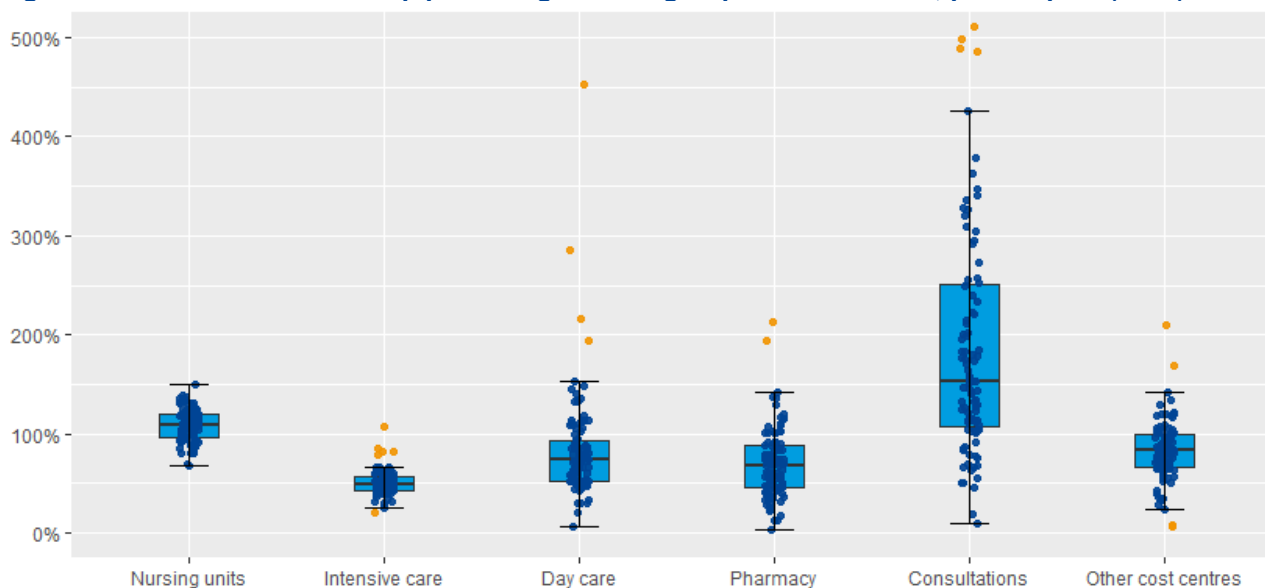
The large majority of hospitals record costs in cost centres related to nursing departments, pharmacy and consultations. The grouping of these cost centres is arbitrary, other classifications are possible. The current classification highlights large differences in the indirect cost mark-up percentages between the groups of cost centres, ranging from 49.40% for the cost centre intensive care to 106.39% for the cost centres related to nursing units and 136.06% for the cost centre consultations. These large differences illustrate the relevance of applying different indirect cost mark-up percentages to different (groups of) cost centres. Of course, the larger the number of cost centres for which a separate mark-up percentage is calculated, the more important a uniform cost accounting of hospitals.



Indirect cost mark-up percentages for nursing units, intensive care and pharmacy are similar between hospitals

The indirect cost mark-up percentage for nursing units, intensive care and pharmacy are comparable between hospitals. For nursing units, there are no outlier values (see also Table 7, where the number of all hospitals and the number of inlier hospitals is the same). The spread (IQR) is larger for the cost centre pharmacy and especially for consultations (see further).

Figure 20 – Indirect cost mark-up percentage for six group of cost centres, per hospital (2019)



Boxes are drawn from first quartile to third quartile with the median as inside line, whiskers are drawn from the box to the most extreme point that is less than or equal to 1.5 times the IQR, and dots represent hospitals. Outliers are depicted in orange and outliers larger than 500% and negative outliers are not shown on the figure.

**Sensitivity analysis: grouping costs of consultations recorded in cost centres 580, 710 and 840**

As we mentioned before (see section 4.2.3), some hospitals record the costs of consultations in cost centres 580 or 710 (both called other medical-technical services). Therefore, we grouped the costs recorded in the three cost centres. The indirect cost mark-up percentage decreases from 136.06% to 106.50%.

Table 7 – Indirect cost mark-up percentage for groups of cost centres (nursing units, pharmacy and consultations)

Group	Direct costs	Indirect costs	Mark-up	Number of hospitals
Nursing units (n=100)*	€ 2 178 741 747	€ 2 317 867 759	106.39%	100
Intensive care (n=100)	€ 525 604 065	€ 259 655 250	49.40%	94
Day care (n=100)	€ 143 958 662	€ 99 877 108	69.38%	95
Pharmacy (n=100)	€ 241 466 142	€ 152 388 153	63.11%	97
Consultations (n=99)	€ 435 586 711	€ 592 666 509	136.06%	90
Grouping of cost centres 580, 710 and 840 (n=100)**	€ 825 716 963	€ 879 403 695	106.50%	93
Other cost centres (n=99)	€ 662 696 001	€ 548 593 326	82.78%	93

* For the base results, also the total number of hospitals (inlier and outlier) that recorded direct and/or indirect costs is given. ** Based on an outlier analysis for the three cost centres.



5.2.4 Indirect mark-up percentages with pharmaceuticals included as direct costs

Table 8 shows the mark-up percentages for cost centres related to nursing units, pharmacy and consultations with the costs of pharmaceuticals included, as direct costs. The number of inlier hospitals stays the same as in Table 7, except for the cost centre consultations (-1) and pharmacy (-5).

Large reduction in mark-up percentage for cost centres day care, pharmacy and consultations

The indirect cost mark-up percentages are substantially lower for cost centres day care (from 69.38% to 37.82%), pharmacy (from 63.11% to 4.52%) and consultations (from 136.06% to 113.58%) when the costs of pharmaceuticals are included as direct costs. In these cost centres the majority of costs of pharmaceuticals are recorded.

Sensitivity analysis: shifting all costs of pharmaceuticals to cost centre 830 (pharmacy)

In Figure 11 we demonstrated that a limited number of hospitals record most costs of pharmaceuticals in cost centres awaiting destination or in auxiliary cost centres (further allocated to nursing departments), or directly in cost centres related to nursing departments or to medical technical services. To make the results for the costs of pharmaceuticals more comparable between hospitals, we shifted all costs of pharmaceuticals from the final cost centres where they are recorded (or allocated by means of the cascade method) to cost centre 830 (pharmacy). The indirect cost mark-up percentage of the cost centre pharmacy decreases from 4.52% to 4.13%. This shift also has an impact on costs and the mark-up percentages for other cost centres in which costs of pharmaceuticals were recorded (results not shown).

Table 8 – Indirect cost mark-up percentage for cost centres related to nursing units, pharmacy and consultations – pharmaceuticals included as direct costs

Group	Direct costs	Indirect costs	Mark-up	Number of hospitals
Nursing units (n=100)	€ 2 227 872 386	€ 2 317 867 759	104.04%	100
Intensive care (n=100)	€ 535 561 597	€ 259 655 250	48.48%	94
Day care (n=100)	€ 264 052 712	€ 99 877 108	37.82%	95
Pharmacy (n=100)	€ 3 118 167 352	€ 140 785 866	4.52%	92
Consultations (n=99)	€ 524 621 246	€ 595 885 505	113.58%	91
Other cost centres (n=99)	€ 675 399 187	€ 548 593 326	81.23%	93



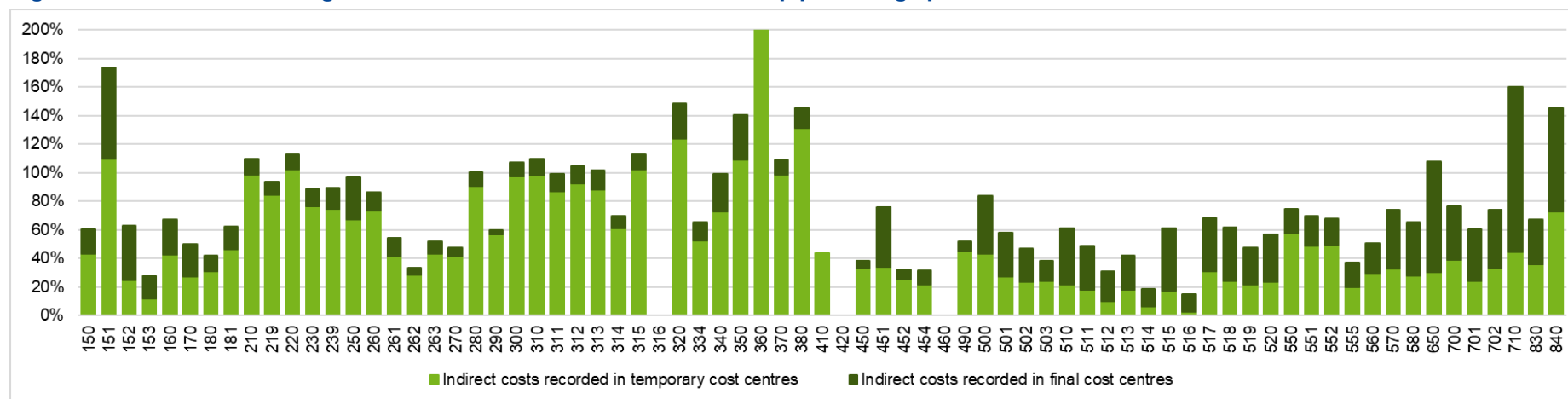
5.3 Overhead costs of the hospital versus overhead costs of the cost centres

In section 3.2.2 we referred to the difference between indirect costs and indirect direct costs. We can define indirect costs as overhead costs of the hospital and indirect direct costs as overhead costs of the cost centres. Overhead costs of the hospital are indirect costs recorded in temporary cost centres and overhead costs of the cost centres are indirect costs recorded in the respective final cost centres.

We make this distinction between two types of indirect costs for the following reason. The team of Möbius includes the indirect direct costs in the scope of the calculation of direct practice costs for clinical biology and genetics, pathological anatomy and radiotherapy. Therefore, the indirect cost mark-up percentage should only be based on overhead costs of the hospital and not on overhead costs of the cost centres. There is, however, a difference between the definition of indirect direct costs in this study and in the direct cost study of Möbius. They define indirect costs as all costs recorded in temporary cost centres (regardless of whether the costs are recorded in direct or indirect cost accounts) and indirect direct costs are indirect costs which are immediately recorded in final cost centres. This means that they set all costs in temporary costs centres equal to indirect costs. The difference between both approaches is, however, limited as only 2.2% of costs recorded in temporary cost centres are, in the current study, direct costs. Also the research teams of KU Leuven and ULB can, in consultation with the participating hospitals, include indirect direct costs in the calculation of direct practice costs.

Larger share of overhead costs of the hospital in nursing departments than in medical-technical services

Figure 21 shows the share of indirect costs (overhead costs of the hospital) and indirect direct costs (overhead costs of the cost centre) in the indirect cost mark-up percentage per cost centre. The costs of pharmaceuticals are excluded and no outlier analysis was applied. For the cost centres related to nursing departments, the share of indirect costs recorded in final cost centres (or overhead costs of the cost centre) is much smaller than for the cost centres related to medical-technical services. We know from Figure 7 and Figure 8 that a large amount of indirect costs is allocated to cost centres related to nursing departments, which is reflected in the large share of indirect costs recorded in temporary cost centres (or overhead costs of the hospital).

**Figure 21 – Place of recording indirect costs in the indirect cost mark-up percentage per cost centre – alternative 1**

The indirect cost mark-up percentage for cost centre 360 is truncated to 200% on the figure.

The scope of the all-in DRG-based lump sum per case will determine the definition of indirect costs and the indirect cost mark-up percentages

The scope of the lump sum payment per pathology group is a policy choice yet to be made. The distinction between overhead costs of the hospital and overhead costs of the cost centres allows, for example, that the overhead costs of the hospital are not included in the lump sum per case. The distinction between both types of costs can, however, be made in different

ways. In Figure 21, all indirect costs recorded in a final cost centre were defined as indirect direct costs. An alternative would be to define indirect direct costs as indirect personnel costs recorded in a final cost centre. All other indirect costs, recorded in temporary and final cost centres, are considered overhead costs of the hospital (see Figure 22). For most cost centres, the majority of indirect costs recorded in final cost centres are staff costs.

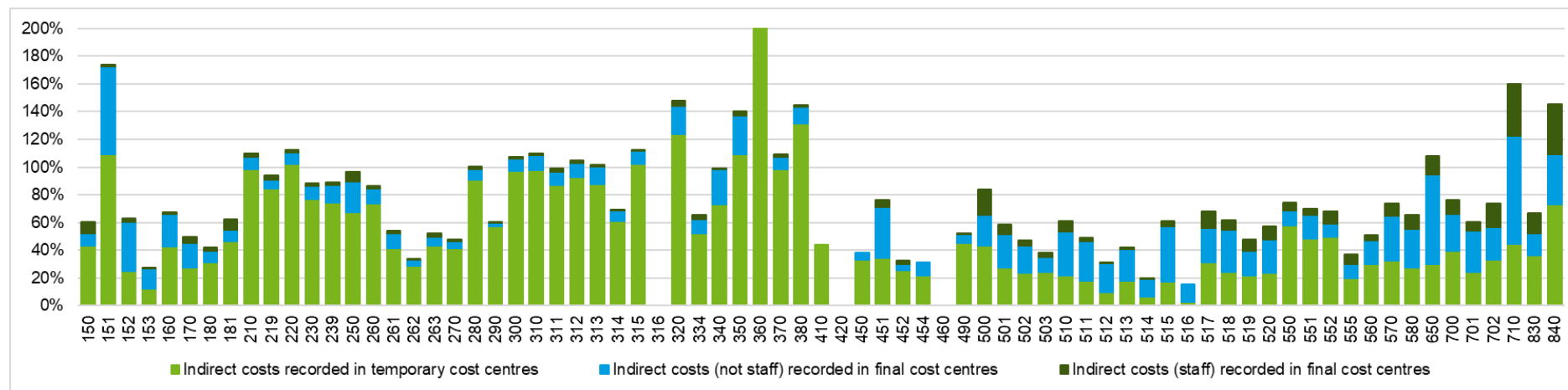
**Figure 22 – Place of recording indirect costs in the indirect cost mark-up percentage per cost centre – alternative 2**

Table 9 and Table 10 show the indirect cost mark-up percentage for the two definitions of overhead costs of the hospital versus overhead costs of the cost centres (with outlier analysis). Other definitions are of course also possible. An outlier analysis was applied to each line in the tables. The costs of pharmaceuticals are excluded.

Given that the numerator is smaller and the denominator is larger than in previous tables in Chapter 5, the indirect cost mark-up percentages are substantially lower. The number of inlier hospitals per group of cost centres decreases only slightly.

There are large differences between the mark-up percentages in Table 4, Table 5 and Table 7 compared to Table 9 but also to Table 10. The difference with Table 10, with overhead costs of the hospital defined as all indirect costs except indirect personnel costs recorded in final cost centres, is largest for pathological anatomy (60.02% versus 42.48%), radiotherapy (72.32% versus 48.47%), medical imaging (69.22% versus 47.55%), in vivo nuclear medicine (65.58% versus 49.63%), pharmacy (63.11% versus

42.76%) or consultations (136.06% versus 77.46%). This means that for these cost centres, a relatively large amount of indirect personnel costs are recorded in final cost centres.

Also between Table 9 and Table 10 the differences are substantial for some cost centres. In some cases, the percentage in Table 10 is more than double the percentage in Table 9. This is the case for clinical biology (34.91% versus 15.84%), pathological anatomy (42.48% versus 20.34%), radiotherapy (58.47% versus 22.98%), PET scan (44.89% versus 16.09%), other medical-technical services (43.40% versus 19.75%) and consultations (77.46% versus 37.47%). This means that mainly indirect costs other than indirect personnel costs are recorded in the final cost centres. The differences in percentages are smaller for nursing departments than for medical technical services.


Table 9 – Indirect cost mark-up percentage with overhead costs of the hospital defined as indirect costs recorded in temporary cost centres

Group	Direct costs and overhead costs of the cost centres	Overhead costs of the hospital	Mark-up	Number of hospitals
Clinical biology, including genetics (n=100)*	€ 837 936 996	€ 132 749 948	15.84%	86
Pathological anatomy (n=76)	€ 76 513 588	€ 15 566 202	20.34%	54
Radiotherapy (n=44)	€ 123 318 374	€ 28 334 819	22.98%	28
Emergency services (n=99)	€ 382 958 910	€ 134 115 155	35.02%	93
Central sterile services department (n=100)	€ 138 920 372	€ 45 263 390	32.58%	95
Operating theatre and anaesthesia (n=100)	€ 848 899 452	€ 225 345 251	26.55%	94
Plaster room (n=57)	€ 5 209 223	€ 2 051 195	39.38%	35
Delivery room (n=78)	€ 66 561 326	€ 24 143 758	36.27%	65
Medical imaging (n=100)	€ 504 145 779	€ 127 933 672	25.38%	93
Haemodialysis (n=73)	€ 261 880 712	€ 65 198 019	24.90%	61
In vivo nuclear medicine (n=65)	€ 57 636 245	€ 15 907 888	27.60%	57
PET scan (n=25)	€ 18 828 655	€ 3 028 990	16.09%	19
Other medical-technical services (n=99)	€ 604 450 042	€ 119 360 532	19.75%	91
Nursing units (n=100)	€ 2 406 986 500	€ 2 032 650 677	84.45%	99
Intensive care (n=100)	€ 561 442 451	€ 222 296 743	39.59%	93
Day care (n=100)	€ 167 940 558	€ 75 836 327	45.16%	95
Pharmacy (n=100)	€ 300 396 712	€ 75 681 298	25.19%	95
Consultations (n=99)	€ 741 410 954	€ 277 829 738	37.47%	89
Other cost centres (n=99)	€ 752 602 856	€ 443 453 069	58.92%	92

* For all groups of cost centres, the total number of hospitals (inlier and outlier) that recorded direct and/or indirect costs is given.



Table 10 – Indirect cost mark-up percentage with overhead costs of the hospital defined as all indirect costs except indirect personnel costs recorded in final cost centres

Group	Direct costs and overhead costs of the cost centres	Overhead costs of the hospital	Mark-up	Number of hospitals
Clinical biology, including genetics (n=100)*	€ 675 963 420	€ 235 975 388	34.91%	90
Pathological anatomy (n=76)	€ 69 099 795	€ 29 351 057	42.48%	59
Radiotherapy (n=44)	€ 97 564 570	€ 57 048 855	58.47%	31
Emergency services (n=99)	€ 349 582 459	€ 171 658 596	49.10%	95
Central sterile services department (n=100)	€ 114 706 950	€ 69 347 907	60.46%	94
Operating theatre and anaesthesia (n=100)	€ 770 817 608	€ 305 960 405	39.69%	93
Plaster room (n=57)	€ 5 038 922	€ 2 322 975	46.10%	40
Delivery room (n=78)	€ 61 248 441	€ 30 222 926	49.34%	67
Medical imaging (n=100)	€ 428 814 000	€ 203 905 731	47.55%	93
Haemodialysis (n=73)	€ 220 568 593	€ 92 500 065	41.94%	61
In vivo nuclear medicine (n=65)	€ 47 504 778	€ 23 574 595	49.63%	59
PET scan (n=25)	€ 13 258 540	€ 5 951 681	44.89%	16
Other medical-technical services (n=99)	€ 415 176 803	€ 180 186 126	43.40%	92
Nursing units (n=100)	€ 2 226 519 552	€ 2 270 089 955	101.96%	100
Intensive care (n=100)	€ 530 585 030	€ 254 674 285	48.00%	94
Day care (n=100)	€ 153 103 817	€ 91 606 107	59.83%	94
Pharmacy (n=100)	€ 271 727 797	€ 116 184 982	42.76%	97
Consultations (n=99)	€ 601 848 836	€ 466 169 144	77.46%	93
Other cost centres (n=99)	€ 686 592 470	€ 524 696 857	76.42%	93

* For all groups of cost centres, the total number of hospitals (inlier and outlier) that recorded direct and/or indirect costs is given.



6 DISCUSSION

The primary aim of the current KCE study was to estimate indirect costs as a mark-up percentage on direct costs for general hospitals. To achieve this aim, we made use of Finhosta data from 2019, provided by the FPS Public Health. At this moment, Finhosta data are the only available source for cost data of all Belgian hospitals. The previous chapters and the data checks in the Supplement to this report have identified a number of limitations of the Finhosta data to be considered when interpreting and applying the indirect cost mark-up percentages calculated in Chapter 5. We return to the main limitations of the Finhosta data in section 6.1. Only data checks within the scope of this study were performed.

In KCE Report 178 (2012) a global mark-up percentage for indirect costs was calculated, which was equal to 56.6%.² The results in Chapter 5 showed that different mark-up percentages per cost centre or group of cost centres are more appropriate, but different choices of grouping cost centres or of selecting the relevant hospitals within each group lead to different mark-up percentages. In section 6.2 we discuss the pros and cons of the base results and the results of the sensitivity analyses.

Several studies, aimed at identifying direct practice costs in Belgian general hospitals, are ongoing and are carried out by research teams of KU Leuven, ULB and Möbius. The end product of these studies is multiple: (1) a new catalogue of medical acts; (2) a relative value scale for the professional part of physician fees; and (3) a relative value scale for all medical acts based on direct practice costs. The conversion of both relative value scales into an amount in euros is not part of these ongoing studies. However, this final step in the reform of the nomenclature is necessary to apply the results of the current study. Also for the transition of a DRG-based hospital budget allocation towards a DRG-based tariff per case, further research is needed and several policy decisions have to be taken first before the findings of this study can be implemented (see section 6.3).

6.1 Limitations of the Finhosta data

Hospitals are legally obliged to report costs to the FPS Public Health according to the structure of Finhosta with a fixed set of cost accounts, cost centres and allocation keys. Yet, this Finhosta framework still leaves a lot of freedom to hospitals in how they record costs. In this section, we discuss some limitations of the Finhosta data and implications thereof.

Lack of uniformity in registration

As the definition of cost centres and cost accounts is not always clear, hospitals inevitably give it their own interpretation. Furthermore, the different way of recording costs in Finhosta between hospitals often mirrors different cost arrangements and collaboration models between hospitals and physicians and different organisational practices in hospitals. For example, if a certain service within a hospital has a separate administrative cell, it is more likely that administration costs will be directly recorded in the final cost centre of the service. If, in contrast, administration is centralised, then probably these administration costs will first be recorded in temporary cost centres after which they are allocated to the final cost centre of the services. Given the high variability in the organisation of hospitals and cost arrangements with physicians, it is important that the cost accounting template is flexible so that it is usable in many different situations and stays close to reality. Still, in many cases, clear instructions to ensure uniformity in registration and unambiguous interpretation of the data are lacking. To give some examples:

- For some cost centres it is not clear what they cover and no clear instructions are given to hospitals to use them in a consistent way. For example, cost centres 580 and 710 both cover “other medical-technical services” but it is unclear how hospitals define and use these cost centres. Some hospitals record the costs of consultations in these cost centres, instead of in cost centre 840. Moreover, the type and size of “other medical-technical services” may differ substantially between hospitals.



- The costs of medical management are registered as administrative staff by some hospitals and as medical staff by others. In the first case, these costs are included as indirect costs in our study. In the second case, the costs are excluded from the analysis.
- There is no uniformity as to how the costs of pharmaceutical products are registered. Most hospitals record these costs in cost centre 830 (pharmacy), others register them in the consuming cost centres.
- If material or equipment are used in the operating theatre but are covered by physician fees, they are not (necessarily) recorded in Finhosta, while the same costs are recorded if they are paid by the hospital.

Cost centres too aggregated for a cost analysis of medical acts

As we explained in the introduction to Chapter 3, ideally costs are linked to cost objects (such as a DRG or a medical act) and not to cost centres as is the case in the Finhosta cost accounting model. Using Finhosta data, a cost centre is the smallest unit for which an indirect cost mark-up percentage can be calculated. In the studies outsourced to KU Leuven, ULB and Möbius, the information is collected in voluntarily participating hospitals or laboratories, which allows to calculate direct practice costs at the level of a nomenclature code. They start from a broad selection of nomenclature codes within units where the medical acts take place. Cost data are collected at the level of the relevant units and consequently allocated to the medical acts that take place in it.

There is no one-to-one relationship between the units defined in the direct practice cost studies and the cost centres in Finhosta. For example, a unit that is analysed by the teams of KU Leuven and ULB is endoscopy. There is, however, not one cost centre corresponding to all activity taking place in this unit. Since the Finhosta reporting standards were mainly developed to support the data collection required for the funding of hospitals via the BFM, and the focus has never been on the costs of medical services (paid by fees), the lack of such one-to-one relationship is understandable.

It is also clear that the degree of granularity of cost centres for medical services in Finhosta is very limited: a substantial part of the medical activities

is reported under “other medical technical services”, due to a lack of more specific cost centres in Finhosta.

Cost accounts and cost centres too aggregated for a precise categorisation into direct, indirect and excluded costs

The combination of cost accounts and cost centres alone does not always allow to assign costs to the category direct, indirect or excluded in a precise way. Some examples are:

- In cost account “discounts for pharmaceuticals and other products”, it is not possible to distinguish between discounts on pharmaceuticals and other discounts. The former should be considered as excluded costs, the latter as indirect costs.
- All cost accounts related to physician fees are excluded in this study. Costs of nursing and caring staff and allied healthcare staff are considered direct costs if recorded in final cost centres and indirect costs otherwise. However, also physiotherapists, speech therapists, midwives, etc. can be self-employed and charge a fee. In this case, the costs recorded in for example cost accounts 6192 or 6193 (remuneration of self-employed nursing or allied healthcare staff) should also be excluded. Also salaried nursing, caring of allied healthcare staff can charge fees and their costs, recorded in for example cost accounts 6203 or 6204 (remuneration of salaried nursing or allied healthcare staff), should be excluded. The Finhosta data do not allow to distinguish between salaried staff providing services under the responsibility of physicians and salaried staff generating fees. Therefore, it was not possible to exclude these costs.
- In this study, no distinction is made according to the (current) funding source. Hence, whether costs are financed by the federal or the federated authorities plays no role in the selection of costs. However, this distinction will have to be made in the concrete application of the indirect cost mark-up percentages. The Finhosta data (combination of cost account and cost centre) do not allow to make a distinction between costs financed by the federal versus the federated authorities.



Allocation keys are not always the real cost drivers

The average share of costs recorded in temporary cost centres is 32%, with four hospitals recording more than 50% of costs in temporary cost centres. These costs are allocated to final cost centres on the basis of allocation keys. This poses a number of challenges for the quality of the data, and for the comparability between hospitals. A first question is whether the costs per final cost centre would have been the same if hospitals recorded (more) costs directly in the consuming cost centres. In principle, the more costs are directly recorded in final cost centres, the more precise their registration will be. This is especially the case for costs recorded in temporary cost centres but defined as direct costs in this study.

Moreover, the cascade process transfers costs from temporary to final cost centres on the basis of allocation keys (m², nursing days, etc.), many of which cannot be considered the real cost drivers. Ideally, costs in temporary cost centres should be allocated to final cost centres on bases that approximate the closest relationship between the cost and the service. Therefore, some of the current allocation should ideally be replaced by true cost drivers. Some examples are:

- Energy costs are allocated to final cost centres on the basis of the number of m² of the receiving final cost centres. In reality, energy costs not only depend on the surface of the final cost centre, but also – or even more – on the activity performed in the cost centre (such as the radiotherapy unit or the intensive care unit, for example). The current analyses are performed on 2019 data which do not reflect the large increase in energy costs since 2021.¹⁹
- Most costs for staff of category 3 (nursing and caring staff), category 4 (allied healthcare and other staff) and category 5 (other scientific staff) are recorded in final cost centres. These staff categories are expected to be directly involved in the care process. However, 10.0% of these costs are registered in temporary cost centres. Based on the Finhosta data, we cannot figure out where these staff members are employed. The external teams of KU Leuven, ULB and Möbius, however, can rely on more detailed information from the participating hospitals and hence, can allocate costs differently. For example, costs of the float pool are recorded as indirect costs in the temporary cost centre 090 (medical

costs). Based on information provided by the participating hospitals, these costs can be allocated to the appropriate cost centres and consequently, can be treated as direct costs. This means that the costs of the float pool risk to be double counted: as direct costs in the direct cost studies of KU Leuven, ULB and Möbius, and as indirect costs in this study. When applying a mark-up percentage for indirect costs to the direct costs of the external teams, they are included both in the base amount (direct costs) and in the mark-up (indirect costs).

6.2 Differentiated indirect cost mark-up percentages to reflect distribution of indirect costs across cost centres

An indirect cost mark-up percentage on direct costs assumes variable indirect costs

We estimate indirect costs as a mark-up percentage on direct costs. By doing so, we assume that all overhead costs vary by a mark-up percentage on direct costs, and hence that all overhead costs are variable and fluctuate proportionally to the direct costs. In practice, not all overhead costs are variable; some are fixed or semi-fixed. Fixed costs are costs that do not change with the volume of activity, variable costs can change fully according to the volume and semi-fixed costs can change within certain limits because there is some degree of indivisibility. They remain constant at a certain production level but change when production reaches a certain threshold. We refer to Table 119 in KCE Report 289 for some examples (applied to a maternity service) of the three types of costs.²⁰ Therefore, calculating an indirect cost mark-up percentage on direct costs can be considered a pragmatic approach to compute and estimate these indirect costs.



One size does not fit all: the importance of differentiated mark-up percentages

In Chapter 5, different types of indirect cost mark-up percentages were calculated: one for all selected cost centres (for example, for technical medical-surgical and automated and associated medical-technical acts), one per cost centre, a differentiated percentage per relevant cost centre or group of cost centres and sensitivity analyses applied to the differentiated percentages. The percentages are not completely comparable because for the third and fourth type (differentiated percentages) an outlier analysis was applied, removing hospitals with a very low or high mark-up percentage because direct costs are very low or high compared to indirect costs or removing hospitals without direct or indirect costs. Only results for the inlier hospitals are given. For the global percentage and the percentages per cost centre, the results for the inlier hospitals are not shown.

The sometimes large differences in mark-up percentage between (groups of) cost centres, emphasise the importance of not applying one global mark-up percentage to all services. Moreover, one global percentage does not allow to make a distinction between hospitals with and without specific services, such as for example hospitals with and without costs in the cost centre radiotherapy. It should, however, be noted that other groupings of cost centres are possible. It is notable that, in general, the base results and results of different sensitivity analyses are more stable when the indirect cost mark-up percentage is calculated for more than one cost centre. Moreover, the sometimes widely divergent results for the hospitals participating in the KU Leuven study on the one hand and the hospitals participating in the ULB study on the other should be interpreted with caution. In this study, the general approach, based on Finhosta data for all inlier hospitals, was applied to the hospitals participating in both external studies. It was emphasised before that the external teams have much more accurate data than we do, provided by the participating hospitals, which can lead to different results for the classification into direct and indirect costs. Finally, the difference between the indirect cost mark-up percentages for overhead costs of the hospital only (excluding overhead costs of the cost centre) and the percentages including all indirect costs, illustrate the importance of defining the cost object to which direct and indirect costs are linked (such as a DRG or a medical act).

6.3 Turning reform plans into reality

Before the results of this study can be implemented, both further research and policy measures are needed. Although the two reforms – reform of the nomenclature and of the hospital payment system – are strongly intertwined and have a common purpose (improvement of the way physicians and hospitals are financed), we make a distinction between both reforms as for further necessary steps.

Reform of the nomenclature: conversion of the relative value scale into an amount in euros and a professional fee for the cognitive work

The conversion of the relative value scale for direct costs into an amount in euros is not part of the ongoing studies carried out by the teams of KU Leuven, ULB and Möbius. Nevertheless, this is a necessary step before the results of this study can be used because a concrete amount for the direct practice cost per nomenclature code is the basis for the calculation of the indirect cost mark-up percentage. Throughout this report we mentioned the different approach of this study and the direct practice cost studies. The direct costs calculated in this study are not immediately comparable to those calculated in the direct practice cost studies. For example, the unit level is more aggregated (cost centre versus nomenclature code) and in some cases also the classification into direct, indirect and excluded costs differs resulting in some double counting. Alignment between the studies was actively pursued but the development of a method to align results using additional data collection in hospitals was, however, not part of the scope of this study.

In the announcement of his reform plans,⁹ as well as in response to the financial results of the hospitals presented in the MAHA-report of November 2023,¹⁸ minister Vandenbroucke advocates a professional fee for physicians, with exclusion of direct and indirect costs related to the provision of medical services. Hence, in such reformed nomenclature, the reimbursement of these costs, which are (partially) funded by deductions on physician fees in the current system, will be shifted to the hospital budget.

**Reform of the hospital payment system: scope of the DRG-based tariff per case**

If the physician's fee indeed becomes a professional fee, excluding all costs directly or indirectly linked to the provision of their services, these costs will have to be covered by the hospital budget. However, many policy decisions still have to be taken to operationalise the shift from a DRG-based budget allocation to a DRG-based tariff per case. In several KCE Reports, the transition towards a hospital payment system based on a tariff per DRG and concrete choices about the design features of such system, have been described.^{1, 7, 8, 21} One such design feature is the scope of DRG-based payments: which costs, patient groups, products and services, etc. are included and which are excluded. In none of the countries with a tariff per DRG, all services and costs are included in the DRG-payment. The choice of the scope of the DRG-based payments inevitably determines how indirect costs are financed: as part of the tariff or via separate payment methods. The large differences in mark-up percentage between Table 5 and Table 7 compared to Table 9 and Table 10 illustrate the importance of defining which costs are included for the calculation of the all-in DRG-based lump sum per case.

A new cost template for a sample of hospitals

What is the added value of the results of this report? At this moment, the only available information for policymakers is the global indirect cost mark-up percentage calculated in KCE Report 178 (2012). The results of the current report clearly demonstrate the importance of calculating different mark-up percentages for different (groups of) cost centres. Although the percentages cannot be implemented without further analysis (for example, further alignment of direct costs in this study and in the studies of KU Leuven, ULB and Möbius), they provide a clearer view of the cost structure of hospitals.

However, the report has also illustrated the limitations of the Finhosta cost accounting data to be used for a reliable and between-hospital comparable linking of indirect costs to direct costs at a detailed level. Costing methods should be transparent and not manipulable and cost data should be reported in a disaggregated, well-tabulated form. For example, an important step in determining the DRG tariff is to attach a monetary value to the resources that were used for treating a patient. As a basis for these DRG tariffs, costs are preferred to reimbursement rates since the latter also reflect the historical bargaining power of providers or specific political choices. In most countries, average costs derived from a (sometime rotating) sample of hospitals, determine the basic price or relative resource weight per DRG.^{8, 22} There seems to be a trade-off between ensuring high-quality cost data, the number of hospitals collecting the cost data (the sample size) and the uniformity of cost accounting rules across hospitals. Therefore, a (new) cost template should be developed and be completed by a sufficiently large and representative sample of hospitals because hospitals differ in many respects, not least in the organisation of care processes. This template is also useful for regular updates of the nomenclature, DRG tariffs or other cost studies. The current study is based on data from 2019. Costs have evolved in recent years, for example due to geopolitical crises. To assess whether inflation and other changes had a disproportionate impact on direct and indirect costs, the use of more recent data is indicated.



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