chapter twenty three

The Netherlands: The Diagnose Behandeling Combinaties

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23.1 Hospital services and the role of Diagnose Behandeling Combinaties in the Netherlands

23.1.1 The Dutch health care system

The Dutch health care system is mostly health insurance based and is divided into three compartments (Stolk & Rutten, 2005; Schäfer et al., 2010; Enthoven & van de Ven, 2007). The first compartment consists of a compulsory social health insurance scheme, which provides continuous long-term care for those with chronic conditions and short-term home nursing care for acute conditions. This social health insurance scheme is regulated in the Exceptional Medical Expenses Act (*Algemene Wet Bijzondere Ziektekosten*, AWBZ). The AWBZ is mainly financed through income-dependent contributions. Care is provided after needs assessment has taken place, and is subject to a complicated system of cost-sharing.

The second compartment consists of a social health insurance scheme covering the whole population for 'basic health insurance'. Since January 2006, previously existing public sickness funds and private health insurance schemes have been integrated into one compulsory scheme, which is regulated by the Health Insurance Act (*Zorgverzekeringswet*, ZVW) (Schut & Hassink, 2002). Health insurers must offer a standard benefits package including most curative medical care (general practitioners (GPs), medical specialists, short-term hospital care). All Dutch citizens contribute to this scheme in two ways. First, they pay a flat-rate premium directly to the health insurer of their choice. Second, an income-dependent employer contribution is deducted through

their payroll and transferred to the Health Insurance Fund. The resources from this Fund are then allocated among the health insurers according to a risk-adjustment system. A 'health care allowance' should partly compensate lower-income individuals for their health insurance costs.

The third compartment consists of complementary voluntary health insurance (VHI), which may cover health services that are not covered under the AWBZ and the ZVW. Prevention and social support are not part of the compulsory social health insurance or VHI, but are mainly financed through general taxation.

Three independent institutions under the Ministry of Health, Welfare and Sport (*Volksgezondheid, Welzijn en Sport*, VWS) are central actors in terms of supervision and regulation of the Dutch health care system. The first is the Healthcare Inspectorate (*Inspectie voor de Gezondheidszorg*; IGZ), which monitors and controls the quality of health care services, prevention measures and medical products. The second is the Dutch Healthcare Authority (*Nederlandse Zorg autoriteit*; NZa), which determines the financial framework, budgets and tariffs, as well as advising the VWS on setting the conditions for regulated competition. The third institution is the Healthcare Insurance Board (*College Voor Zorgverzekeringen*; CVZ), which advises the VWS on benefits package issues and monitors compliance with the AWBZ and the ZVW.

In 2005, total health care expenditure amounted to about €68 billion, which is equal to about 12 per cent of the country's gross domestic product (GDP). The Dutch health care system is predominantly financed by the AWBZ (about 27 per cent) and the ZVW (41 per cent). Only 4 per cent is financed by VHI. Other sources of financing include out-of-pocket expenses (10 per cent), the VWS (13 per cent) and health care-related profit-making and non-profit-making organizations (5 per cent).

In general, the Dutch health care delivery system is divided into 11 sectors. The hospital sector is the most significant sector in terms of expenditure (26 per cent in 2005). Other important sectors include elderly care institutions (19 per cent), social service institutions (12 per cent) and suppliers of pharmaceuticals and medical aids (12 per cent). The 'other health care providers' sector (3.4 per cent) comprises, amongst others, Independent Treatment Centres (*Zelfstandige Behandel Centra*; ZBCs) and private clinics (Poos et al., 2008).

23.1.2 Hospital services in the Netherlands

Inpatient care and day care are only provided by hospitals. In 2009, there were 8 university hospitals, 85 general hospitals, 32 specialized hospitals and 23 rehabilitation centres in the Netherlands. The specialized hospitals comprised 1 abortion clinic, 4 audiology centres, 3 dialysis centres, 2 epilepsy centres, 10 integral cancer centres, 4 radiotherapy centres, 3 asthma centres and 5 other specialized hospitals. All hospitals work on a non-profit basis but may provide services excluded from the standard benefits package, which are reimbursed by VHI.

Table 23.1 presents some key figures for university and general hospitals in 2009 (Kiwa Prismant, 2010). The number of inpatient days in 2009 amounted

Table 23.1 Key figures for university and general hospitals in 2009

	University hospitals	*General hospitals*
Number of hospitals	8	85
< 200 beds	0	9
200–300 beds	0	15
300–400 beds	0	22
400–600 beds	0	18
> 600 beds	8	21
Inpatient admissions * 1000	235	1 653
Inpatient days * 1000	1 709	9 125
Inpatient stay duration	7.3	5.5
Day-care admissions * 1000	226	1 627
Outpatient visits * 1000	3 142	24 257

Source: Kiwa Prismant, 2010.

to 1 709 000 at university hospitals and 9 125 000 at general hospitals, with average length of stay (ALOS) durations of 7.3 and 5.5 days, respectively. The number of hospital admissions increased while the ALOS has decreased in recent years. This is largely due to an increase in the number of day-care admissions (38 per cent between 2005 and 2009). The number of first outpatient visits increased by 10 per cent between 2005 and 2009.

Although day care and outpatient visits were traditionally only provided by hospitals, competition between health care providers is now encouraged by allowing ZBCs free access to the hospital care market. Figure 23.1 depicts the role of hospitals and ZBCs in the delivery of hospital services. Whereas hospitals

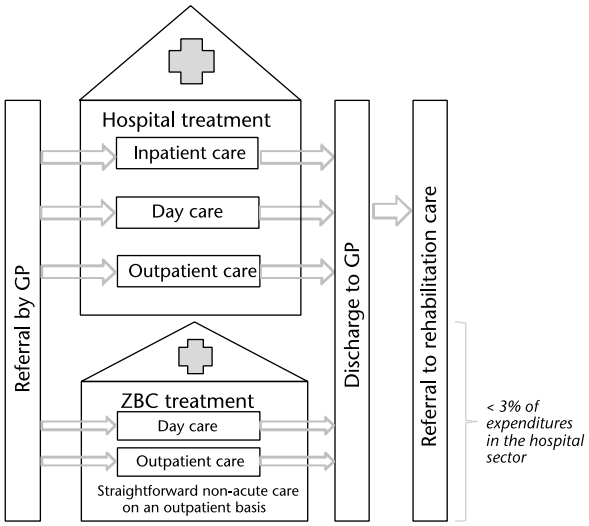

Figure 23.1 Role of hospitals and ZBCs in the delivery of hospital services

provide the whole spectrum of day care and outpatient care, ZBCs usually only provide straightforward non-acute day care and outpatient care, which requires cooperation between at least two medical specialists working on a non-profit-making basis. ZBCs deliver care included in the basic health insurance (ZVW), but also engage in services covered by VHI. In order to remain competitive over the years, many hospitals have established ZBCs. These treatment centres only account for less than 3 per cent of expenditure in the hospital sector, but the number of ZBCs has rapidly increased from 79 in 2005 to 195 in 2009 (Kiwa Prismant, 2010). Private clinics provide private medical specialist care, which is not covered by the social health insurance scheme. They are not included in the scope of this chapter.

Structural reforms of the health care sector in recent years have entailed substantial changes in the financing and budgeting of health care providers. Hospitals in the Netherlands are independent and are contracted by health insurers through either collective or selective contracts. Before 2005, budgeting and financing systems were mainly targeted towards controlling health care expenditure. Incentives to increase production or to produce health services more efficiently were mainly absent (Oostenbrink & Rutten, 2006). In order to provide stronger incentives for efficiency and quality, a new system for the payment of hospitals and ZBCs was introduced in February 2005. The new system relies on a self-developed system of diagnosis–treatment combinations (*Diagnose Behandeling Combinaties*; DBCs) as the basis of payment for care provided by medical specialists and hospitals.

23.1.3 Purpose of the DBC system

The main purpose of the introduction of the DBC system was to reform hospital payment to facilitate negotiations (in particular on quality) between purchasers and providers by defining the products of hospitals (that is, DBCs) (van Ineveld et al., 2006; van de Ven & Schut, 2009). DBCs were believed to provide a concise definition of hospital products as the basis for selective contracts. However, only a small selection of DBCs (list B DBCs) were freely negotiable when the new system was introduced. For the majority of DBCs (list A DBCs), hospitals received a fixed amount per treated case within the framework of a collective contract. In the future, the Government aims to gradually increase the share of list B DBCs to about 70 per cent, as it wishes to increase the share of hospital services for which hospitals and providers can negotiate regarding quality.

Since the introduction of DBCs in the Netherlands, benchmarking has become increasingly important. Average resource-use profiles are calculated for list A DBCs on the basis of resource-use and cost-accounting data collected in Dutch hospitals. These resource-use profiles have become an important external benchmark for individual hospitals. In addition, other benchmarking tools have been developed; for example, the Association of Dutch Health Insurers annually publishes a guide containing hospital performance indicators relating to list B DBCs, to support its members.

23.2 Developing and updating the DBC system

23.2.1 The DBC system at a glance

There is only one national DBC system in the Netherlands, which is centrally regulated and monitored by 'DBC onderhoud' (DBC-O), a governmental institution specifically set up for that task. The system is used to enable DRG-type payment of all hospitals and ZBCs in the country, including payment of psychiatric care services since 2008 and rehabilitation care at hospitals and rehabilitation centres since 2009.

In contrast to DRGs in other countries, most DBCs stretch from the first contact with a medical specialist to treatment completion (Steinbusch et al., 2007). These DBCs, referred to as '*regular care*' DBCs, could include one or more inpatient admissions in addition to several outpatient visits and post-discharge follow-up care during the same year.

Next to '*regular care*' DBCs, two other important types of DBC exist (Figure 23.2). The first type, referred to as '*continuation of regular care*' DBCs, is opened to replace a '*regular care*' DBC when treatment exceeds 365 days. The second type, referred to as '*inpatient without days*' DBCs, is opened in addition to a '*regular care*' DBC when a patient requires treatment which is medically not related to the '*regular care*' DBC for which they are initially admitted. For example, a patient admitted for chronic non-specific lung disease could require an appendectomy. In this case, a '*regular care*' DBC is opened for lung disease and an '*inpatient without days*' DBC for appendectomy. '*Inpatient without days*' DBCs narrowly define specific hospital stays similar to those defined by other DRG systems.

DBCs belong to one of two lists: currently, about 67 per cent of DBCs belong to list A and 33 per cent to list B. List B DBCs are supposed to comprise high-incidence cases with sufficiently homogeneous resource-consumption patterns, such as hip and knee replacement, diabetes mellitus, cataract and inguinal hernia repair. Hospital payment is different for list A DBCs and list B DBCs (see subsection 23.5.2).

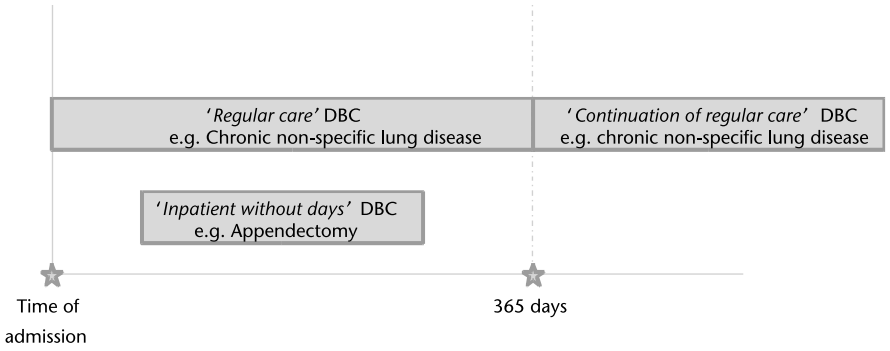

Figure 23.2 Fictional overview of types of DBCs

Table 23.2 Traditional DRGs versus DBCs

Difference	*Typical DRG systems*	*DBC system until 2010*
Defined hospital product	One hospital admission or outpatient contact	One diagnosis–treatment combination (may include several hospital admissions or outpatient contacts)
Number of DRGs/DBCs per patient	One per patient (but exceptions exist)	Several per patient
Level of detail/precision of the system	Aggregated system < 3000 DRGs	Detailed system > 30 000 DBCs
Selection of DRG/DBC	Assigned by computerized grouping algorithm after hospital discharge	Medical specialist opens DBC upon first diagnosis

Table 23.2 presents some of the main differences between typical DRG systems and the DBC system. While DRG systems generally define different types of hospital admissions or outpatient contacts, the DBC system defines different types of diagnosis–treatment combinations. Consequently, all hospital services related to this diagnosis–treatment combination during one year are included in only one DBC. While DRG systems typically assign one DRG per patient according to the most important diagnosis or procedure, the DBC system uses several DBCs per patient if several diagnoses require treatment. As opposed to DRG-based systems, which often consist of between 600 and 2000 DRGs, the DBC system currently comprises about 30 000 DBCs.

In addition, the current DBC system does not entail a computerized grouping algorithm. The medical specialist decides which DBC is applicable and manually opens this DBC upon first diagnosis. It is possible to change the DBC registration during the treatment process. However, a new generation of DBCs is forthcoming in which some aspects of traditional DRG systems are covered (see subsection 23.8).

23.2.2 Development of the DBC system

In the late 1990s, a simplified version of the All Patient (AP)-DRG system was tested at six pilot hospitals in the Netherlands to examine the extent to which the system was able to reflect Dutch medical specialist and hospital care patterns. Given the growing importance of outpatient care in the Dutch health care system, the inability of the AP-DRG system to adequately account for outpatient cases was seen as a major deficit of the system. Furthermore, since patients were grouped by administrative staff members after hospital discharge, rather than by medical specialists, interpretational differences and mistakes were perceived to be problematic (Custers et al., 2007; Zuurbier & Krabbe-Alkemade, 2007). Therefore, health insurers and hospitals initiated the development of DBCs. Medical specialists' associations defined DBCs for each medical specialty. A representative sample of 23 'frontrunner' hospitals registered detailed resource-use and cost data for all inpatient and outpatient hospital services according to the DBC system.

DBC tariffs comprise two separate components (Beersen et al., 2005; Zuurbier & Krabbe-Alkemade, 2007): (1) the *honorarium component* for the payment of specialists; and (2) the *hospital cost component* for the payment of all relevant hospital services. For the calculation of the honorarium component, the 'norm-time' was determined for each DBC. The 'norm-time' is supposed to reflect the time requirements of medical specialists to perform all relevant tasks related to a DBC. The time was estimated from hospitals' administrative databases and validated by expert opinion. The 'norm-time' was then multiplied with a fixed fee per hour of €135.50 to calculate the honorarium component (Folpmers & de Bruijn, 2004). With respect to list A DBCs, the hospital cost component was determined based on the resource-use and cost data of the hospital services at the 23 'frontrunner' hospitals; average resource-use profiles were multiplied with national unit costs (see subsection 23.4.2). Hospital services were categorized into 15 resource-use categories, as presented in Table 23.3. National unit costs for these hospital services included wages, equipment, overheads and – since 2009 – capital costs (see subsection 23.4.2). With respect to list B DBCs, the hospital cost component results from negotiations between health insurers and hospitals (see subsection 23.5.2).

Since February 2005, the DBC system has been continuously updated through revisions and additions that are implemented without the definition of new versions of the system. Table 23.4 shows some main facts relating to the DBC system upon first introduction (2005) and the current version (2010). At the introduction of the DBC system, each diagnosis and treatment combination was appointed one DBC for the first outpatient visit only, and one DBC for all related hospital services with the exception of the first outpatient visit. The number of DBCs amounted to about 100 000, of which about 90 per cent were list A DBCs. List A DBC tariffs excluded capital costs.

In the current version of the DBC system, the classification of patients has been simplified. The number of DBCs has been substantially reduced from about 100 000 to 30 000, of which about 67 per cent relate to list A DBCs. Each

Table 23.3 Hospital services resource-use categories

Inpatient days
Intensive care days
Day-care hours
Outpatient and emergency room visits
Laboratory services
Medical imaging services
Medical devices
Surgical procedures
Diagnostic activities
Microbiological and parasitological services
Pathological services
Blood products
Paramedical and supportive services
Rehabilitation services
Other services

Source: DBC-O, 2011.

Table 23.4 The main facts relating to the DBC versions, at its introduction (2005) and the current version

	1st DBC version	*Present DBC version*
Date of introduction	2005	2010
(Main) Purpose	Hospital payment	Hospital payment, benchmarking
Source	Self-developed	Self-developed
Data used for development	Resource use and unit costs of 23 'frontrunner' hospitals	Resource use of *all* hospitals; unit costs of 15–25 'frontrunner' hospitals
Services included	Whole spectrum of inpatient and outpatient care, *excluding* psychiatric and rehabilitation care	Whole spectrum of inpatient and outpatient care, *including* psychiatric and rehabilitation care
Cost categories included	Recurrent costs, *excluding* costs of education, teaching, research and commercial exploitation	Recurrent costs and capital costs, *excluding* costs of education, teaching, research and commercial exploitation
Number of DBCs	± 100 000; list A: 90%; list B: 10%	± 30 000; list A: 67%; list B: 33%
Applied to	All hospitals and ZBCs	All hospitals and ZBCs

diagnosis and treatment combination is now appointed one single DBC covering all related hospital services, including the first outpatient visit. In addition, DBCs were rearranged, for example, by reducing the number of categories to describe the 'type of care' and 'treatment' dimensions (see subsection 23.3.2). The hospital cost component for list A DBC tariffs is currently determined from detailed resource-use profiles of *all* hospitals and cost data derived from 15–25 'frontrunner' hospitals. In addition, the hospital cost component now includes capital costs.

An increasing share of DBCs is progressively being moved from list A to list B, which is in line with the original purpose of the DBC system (see subsection 23.1.3). There are six main criteria which must be met by a list A DBC in order for it to be transferred (DBC-O, 2009). The DBC must: (1) be is characterized by sufficiently homogeneous levels of resource consumption; (2) have a sufficiently high volume of cases; (3) be sufficiently spread amongst health care providers; (4) involve predictable non-acute care. In addition, (5) the transfer must be supported by medical specialists and hospitals; and (6) all list A DBCs defined on the basis of the same diagnosis must meet these criteria.

23.2.3 Data used for development and updates of the DBC system

Regarding the aforementioned honorarium component, the 'norm time' is updated based on time studies and validated by expert opinion (Oostenbrink & Rutten, 2006). The fixed fee per hour is set by the NZa.

The hospital cost component of list A DBCs is determined and updated by

DBC-O on the basis of a database that is maintained by a subdivision of DBC-O, called the 'DBC information system' (DBC-DIS). The database contains two datasets: (1) resource-use information from the minimum basic datasets (MBDS) collected by all hospitals; and (2) unit cost information from a varying number of 15–25 'frontrunner' hospitals (see subsection 23.4.2). Figure 23.3 depicts the data-collection process from medical specialists to the national database at the DBC-DIS. From the opening of a DBC by a medical specialist, resource use per DBC and per treated case is collected and integrated into one hospital database. The registration system also records the DBC for which a hospital service is performed. After integration of the data at DBC-DIS, technical feedback is provided to medical specialists to assure high-quality data.

23.2.4 Regularity and method of system updates

Regularity and method of updating the DBC classification system

Medical specialists' associations notify DBC-O when problems arise in classifying DBCs, as DBC-O is responsible for the irregular but continuous updating of the DBC classification system. DBC-O is also the gatekeeper for innovation in the DBC system (see section 23.6). DBCs may be merged, split or created. Examples include the recent reduction in the number of DBCs (see subsection 23.2.2) and the introduction of a new generation of DBCs (see section 23.8). Updating is based on feedback from medical specialists' associations and information from the national DBC-DIS database.

Regularity and method of updating tariffs

As already mentioned, the norm-time relating to the honorarium component is updated at irregular intervals. The fixed fee per hour is re-examined annually and updated when necessary. The hospital cost component of list A DBCs is recalculated annually, or as necessary, by multiplying the average resource-use profile and national unit costs. An example of a fictional resource-use profile for a specific DBC ('surgery/ regular care// arthrosis knee/ surgery with clinical episode') is provided in Table 23.5. The calculation of unit costs per service is described in section 23.4.

There is always a time-lag of at least two years between the year of the data and the year of application of tariffs in hospitals. For example, hospital resource-use and cost data from the year 2009 will be analysed during the years 2010 and 2011 in order to define the DBC hospital cost component that will be used for hospital payment in 2012.

23.3 The current patient classification system

23.3.1 Information used to classify patients

A medical specialist is consulted to decide which DBC is applicable and (s)he manually opens the DBC upon first diagnosis by specifying five types of

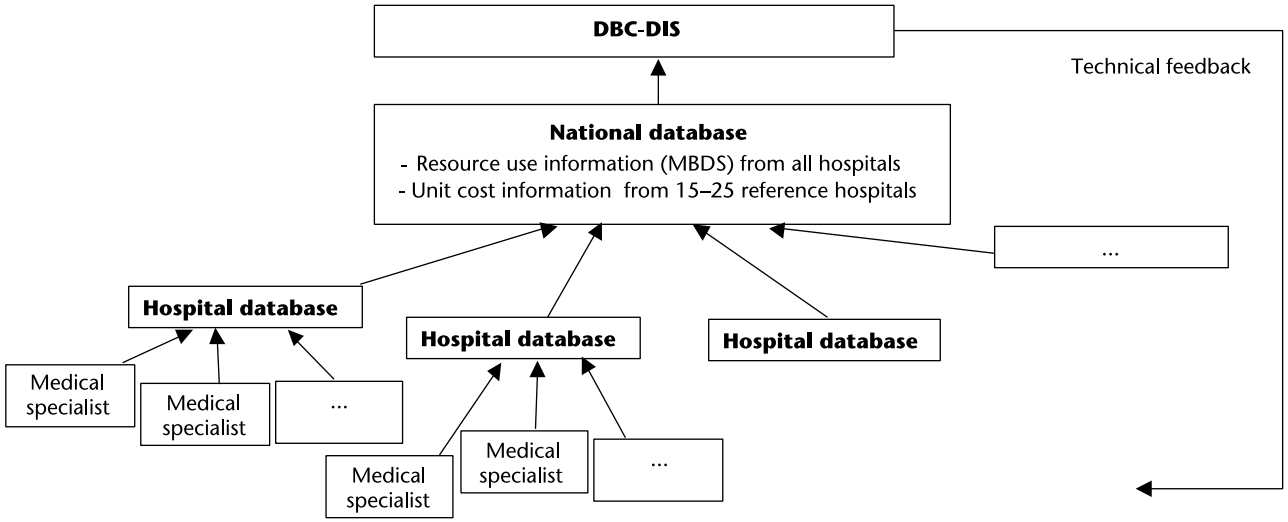

Figure 23.3 Data-collection process for the national database

Table 23.5 Fictional average resource-use profile for the DBC 'surgery regular care/ arthrosis knee surgery with clinical episode'

Hospital services	*% of patients receiving this hospital service*	*Average resource-use for patients receiving this hospital service*	*Average resource-use for all patients*
Inpatient days	100	6.0	6.0
Outpatient visits	100	8.0	8.0
Laboratory services	100	1.0	1.0
Medical imaging services			
X-ray thorax	50	1.0	0.5
X-ray knee/lower leg	100	2.0	2.0
X-ray hip joint	50	1.0	0.5
MRI hip/lower leg	10	1.0	0.1
Surgical procedures			
Surgery dislocation	100	1.0	1.0
Paramedical and supportive services			
Physiotherapy	100	2.0	2.0

Source: Zorgverzekeraars Nederland, 2004.

Notes: For instance, 50 per cent of the patients received X-ray thorax examinations; the average number of X-ray thorax examinations for these patients was 1.0; the average number of X-ray thorax examinations for all patients was 0.5.

information called 'dimensions' of a DBC (van Beek et al., 2005): (1) medical specialty; (2) type of care; (3) demand for care; (4) diagnosis; (5) treatment axis (setting and nature).

Thus, the information used to classify patients includes clinical and resource-use data. The DBC system does not distinguish between principal and secondary diagnoses. If a patient has a second diagnosis that requires treatment, this second diagnosis will be classified into a separate DBC (see subsection 23.2.1).

23.3.2 Classification algorithm

Classification of patients follows the order of the five dimensions: (1) the medical specialty is specified through a four-digit code; (2) a two-digit code for the type of care is added to the first four digits; (3) the demand for care is indicated for certain medical specialties; (4) the diagnosis is specified by adding another three-digit code; and (5) the treatment axis is defined by the last three digits of the DBC. An illustrative example of the patient classification for patients with appendicitis treated in a surgery department is provided in Table 23.6.

Medical specialty

Patients can be classified into one of 27 medical specialties (codes 0301 to 1900). For patients with appendicitis treated in a surgery department, the 'medical specialty' code would be 0303//// (surgery////).

Table 23.6 The patient classification system logic: Surgery example

Medical specialty	*Type of care*	*Demand for care*	*Diagnosis*	*Treatment axis*
0303 Surgery	11 Regular care 21 Continuation of regular care	*Not applicable*	113 Appendicitis	201 Open-surgery outpatient 202 Open-surgery in day care 203 Open-surgery with clinical episode(s) 204 Single outpatient with procedure 206 *Inpatient without days* Open-surgery with clinical episode(s) 301 Endo-surgery outpatient 302 Endo-surgery in day care 303 Endo-surgery with clinical episode(s) 306 *Inpatient without days* Endo-surgery with clinical episode(s)

Type of care

Currently, two categories are used to describe the 'type of care' dimension: 'regular care' (code 11) and 'continuation of regular care' (code 21). For patients with appendicitis, the code would be 0303/11/// (surgery/ regular care///).

Demand for care

The 'demand for care' dimension is only used for a limited number of medical specialties (namely, plastic surgery, urology, gastroenterology and radiotherapy). The dimension specifies demand for care which is expected to result in higher than average resource consumption. For the medical specialty 'plastic surgery', the 'demand for care' dimension distinguishes '≥ two procedures in the same surgical area', 'extensive crush injury within the surgical area', 'congenital impediments within the surgical area', 'requirement of a second surgeon' and 'children ≤ 10 years of age'.

Diagnosis

The 'diagnosis' dimension describes the diagnosis of the patient in medical terms. The classification of diagnoses is based on the International Classification of Diseases 10th revision (ICD-10) coding, even though the ICD-10 codes are not used in the codification of DBCs. For patients with appendicitis, the 'diagnosis' code would be 0303/11//113/ (surgery/ regular care// appendicitis/).

Treatment axis

The 'treatment axis' dimension expresses the 'treatment setting' and 'treatment nature'. The 'treatment setting' is either 'outpatient', 'in day care' or 'with clinical episode(s)'. The subdivision of 'treatment nature' varies by medical specialty and may, for instance, specify whether treatment concerns an 'open-surgery' or a laparoscopic procedure. The number of treatment axes varies from 6 for the medical specialties 'gastroenterology' and 'paediatrics' to over 60 for the medical specialty 'internal medicine'. For patients presenting with appendicitis, the 'treatment axis' code could, for example, be:

0303/11//113/201 (surgery/ regular care// appendicitis/ open-surgery outpatient); 0303/11//113/202 (surgery/ regular care// appendicitis/ open-surgery in day care); or 0303/11//113/203 (surgery/ regular care// appendicitis/ open-surgery with clinical episode(s)).

23.3.3 Data quality and plausibility checks

The DBC-DIS performs data quality and plausibility checks relating to developing and updating the DBC system. These annual checks take place at the national level and comprise the technical validation of the information from the MBDS in the national database (technical correctness, comprehensiveness and functional correctness). There is no system of external data audits.

23.3.4 Incentives for up- or wrong-coding

Although up-coding has been described as a potential threat to the DBC system, the Dutch system seems to be less sensitive to up-coding compared to DRG systems in the United States and Australia (Steinbusch, 2007). The relative strength of the Dutch system is related to the use of classification criteria that are aligned with clinical practice, the fact that DBCs are opened upon diagnosis, and the fact that hospitals generally operate as non-profit-making institutions.

23.4 Cost accounting within hospitals

23.4.1 Regulations

Cost accounting is not mandatory for the majority of Dutch hospitals, which only provide their MBDS to the DBC-DIS. However, the 15–25 'frontrunner' hospitals must follow a uniform product costing model, which was developed during the DBC system's introductory period (Zuurbier & Krabbe-Alkemade, 2007).

23.4.2 Main characteristics of the cost-accounting system

All frontrunner hospitals have to allocate all relevant hospital costs to individual hospital services. Relevant hospital costs include wages, equipment, overheads

and capital costs (see subsection 23.2.2). Hospital costs relating to education, teaching, research and commercial exploitation are not considered relevant because they are not financed by the DBC system.

Allocating relevant hospital costs from support cost centres to final cost centres

Hospital departments producing hospital services are called 'final cost centres'. These include, among others: inpatient and outpatient clinics, laboratories, operating rooms (ORs) and radiology departments. Departments not providing patient care are called 'support cost centres'. These include, among others: departments for administration, personnel, billing, communications, finance, security and availability in case of emergencies. Costs of support cost centres may also be referred to as overheads.

In the first step, relevant hospital costs are allocated from support cost centres to final cost centres. Hospitals are free to choose the allocation method for the assignment of hospital costs from support cost centres to final cost centres. As the allocation method was found to have only a minor impact on individual patient's costs (Zuurbier & Krabbe-Alkemade, 2007), hospitals commonly use simple direct allocation, in which the costs of support cost centres are assigned to the final cost centres without interaction between support cost centres (Finkler et al., 2007; Horngren et al., 2005). The product costing model contains specifications regarding the allocation base to be used for each cost centre; for example, the area (m^2) to allocate costs of accommodation, or the number of full-time equivalents to allocate the costs of administration.

Allocating relevant hospital costs from final cost centres to hospital services

Once the costs of support cost centres are assigned to final cost centres, the total costs of each final cost centre can be assigned to individual hospital services, such as inpatient days, intensive care days, laboratory services, medical imaging services and surgical procedures (see Table 23.3). Weighting statistics are used to assign relevant hospital costs from final cost centres to hospital services. They differ between final cost centres according to the type of service they produce. An example of such a weighting statistic is the average time of surgical interventions to distribute the cost of the final 'OR' cost centre to these interventions. The NZa determines the national unit costs of about 4500 hospital services from the weighted average across the 15–25 'frontrunner' hospitals. National unit costs are determined with a lag-time of at least two years. The tariffs for 2012 will be based on the national unit costs of 2009.

23.5 DBCs for hospital payment

23.5.1 Range of services and costs included in DBC-type hospital payment

Inpatient and outpatient hospital care of all hospitals and ZBCs (including psychiatric and rehabilitation care) is fully financed according to the DBC system logic. One exception concerns some very expensive and orphan drugs

for which the NZa provides hospitals with additional funding (80 per cent of the purchase price for expensive drugs and 100 per cent of the purchase price for orphan drugs) (Rodenburg-van Dieten, 2005). Other relevant sources of financing for hospitals exist but do not relate to hospital care, such as education, teaching, research and commercial exploitation. These sources accounted for 15.9 per cent of total hospital revenues in 2009 (Kiwa Prismant, 2010).

23.5.2 Calculation of DBC tariffs

DBC tariffs consist of two parts: (1) the *honorarium component* and (2) the *hospital cost component*. The honorarium component is calculated on the basis of a 'norm-time' and a fixed fee per hour both for list A and for list B DBCs (see subsections 23.2.2 to 23.2.4). For list A DBCs, the hospital cost component is calculated on the basis of average resource-use profiles from all hospitals and unit costs calculated through the product costing model described in subsection 23.4.2. A fictional example to illustrate the cost calculation of the hospital cost component for the DBC 'surgery/ regular care// appendicitis/ surgery with clinical episode' is provided in Table 23.7.

The tariff for the hospital cost component of list B DBCs is negotiated between hospitals and insurers. Insurers are not obliged to contract all hospitals for list B DBCs, and may employ different DBC prices for different hospitals. Likewise, hospitals may negotiate different prices for the same DBC with different insurers. Health insurers and hospitals determine the frequency and terms of agreements. Current practice suggests that negotiations take place annually, but that either party can reopen negotiations if required by the circumstances (van Ineveld et al., 2006). Examples of such circumstances include long waiting lists, increased public attention to a specific health problem or the introduction of very expensive/orphan drugs or medical devices.

23.5.3 DBCs in actual hospital payment

All hospitals in the Netherlands receive a nationally uniform payment per list A DBC and a negotiated hospital-specific payment for list B DBCs. In order to receive payments under the DBC system, hospitals classify all patients into the appropriate DBCs. After treatment is completed, a bill is sent to the patients' health insurer indicating all relevant DBCs. Subsequently, the insurer pays hospitals on the basis of the fixed list A DBC tariffs or the negotiated list B DBC tariffs.

For list A DBCs, prospective budgets determine the total financial volume which hospitals can earn through the provision of DBCs. Budgets are established annually by the NZa based on fixed and variable costs and a variety of parameters, including the hospital's adherent population, the type of facilities, the number of beds and production parameters (such as the number of inpatient days and outpatient visits) (Nederlandse Zorgautoriteit, 2009). Hospitals are fully compensated for the difference between the prospective budget and DBC payments (yield). Consequently, higher production may result in higher costs without additional yield, while lower production results in lower costs but not in lower yield.

Table 23.7 Fictional cost calculation of the hospital cost component

Hospital services	*Total resource use for all patients*	*National unit costs (€)*	*Total costs (€)*	*Average costs per patient (€)*[a]
Inpatient days	1 250	296	370 083	1 341
Outpatient visits	864	43	37 147	135
Day-care hours	1 029	34	35 002	127
Laboratory services				
Urine screening	560	2	1 121	4
Ureum	836	1	836	3
Creatinine	974	2	1 949	7
Leucocytes	781	1	781	3
Medical imaging services				
X-ray thorax	615	52	32 005	116
X-ray abdomen	781	52	40 616	147
CT abdomen	144	228	32 723	119
Echo abdomen	281	83	23 320	84
Surgical procedures				
Appendectomy	276	548	151 248	548
Colon resection	8	1 595	13 207	48
Small intestinal resection	11	1 056	11 658	42
Resection appendicular abscess	6	761	4 201	15
Diagnostic activities				
Diagnostic laparoscopy	41	484	20 038	73
Diagnostic duodenoscopy	14	408	5 630	20
Cysto-/urethrography	6	479	2 644	10
Microbiological and parasitological services	856	33	28 235	102
Paramedical and supportive services				
Physiotherapy	500	31	15 486	56
TOTAL			827 929	3 000

Source: Zuurbier & Krabbe-Alkemade, 2007.

Notes: For the list A DBC: 'surgery/ regular care// appendicitis/ open-surgery with clinical episode'; [a]The average costs per patient add up to the DBC tariff '*~ number of closed DBCs: 276*'.

For list B DBCs, insurers may limit the maximum volume of list B DBCs that a hospital is allowed to produce. That aside, insurers and hospitals may agree upon a lower or higher DBC price if production exceeds a predetermined figure. The hospital's and medical specialists' yield only depends on DBC payments. Consequently, higher production may result in higher costs and additional yield, while a lower level of production directly results in lower costs and lower yield.

The DBC system also applies to 'non-contracted care'; that is, care provided to foreign patients, uninsured patients or patients whose health insurer does not have a contract with the hospital. In these situations, the foreign insurer or the patient must pay the DBC tariff. The tariffs for the honorarium component of list A and B DBCs and for the hospital cost component of list A DBCs are the same both for non-contracted and contracted care. The tariffs for the hospital cost component of list B are determined by the hospital and may differ between contracted and non-contracted care. Hospitals do not have

to publish tariffs for contracted care, whereas they are obliged to publish tariffs for non-contracted care.

23.5.4 Quality-related adjustments

For list A DBCs, no quality related adjustments exist. The tariff is the same for all hospitals, regardless of quality. Although the negotiations on list B DBCs were intended to be based on the quality of delivered care, insurers and hospitals currently predominantly negotiate on price and/or production volume (see subsection 23.7).

23.5.5 Main incentives for hospitals

Hospitals are incentivized to keep their costs below the national unit costs for any specific list A DBC. For list B DBCs, hospitals are incentivized to keep costs below negotiated prices. The DBC system therefore offers hospitals an incentive to improve those quality aspects that lead to lower resource consumption. For example, it encourages quality improvements that would lead to fewer unnecessary diagnostic services and to a reduction in the ALOS (Custers et al., 2007).

Quality improvement aimed at reducing complication rates – such as post-operative infections and/or readmission rates – are not stimulated by the DBC system, because the occurrence of complications might lead to a new DBC (Custers et al., 2007). Hospitals could even be incentivized to accept a price below the costs of production for a specific list B DBC, in order to gain a contract with an insurer, and could then try to compensate for the losses by providing profitable list A DBCs to these patients.

23.6 New/innovative technologies

23.6.1 Steps required prior to usage in hospitals

DBC-O is the gatekeeper for innovation in the DBC system. Current regulations require a process of seven steps following an application (for example, from a hospital) before a new technology can be included in the DBC system (VWS, 2009), as detailed here.

1. DBC-O assesses the admissibility, completeness, nature, size and complexity of the application.
2. The CVZ performs a systematic literature review to examine the extent and level of evidence supporting the specific technology.
3. DBC-O assesses the costs, effectiveness, ethical aspects, patient preferences and system consequences of the application.
4. Based on the information acquired from steps 2 and 3, DBC-O decides upon the implementation of the technology in the DBC system.

5. The positive decision by DBC-O is approved by the NZa.
6. The CVZ advises the VWS whether the new technology should be made part of the insurance benefits package.
7. Finally, DBC-O incorporates the new technology into the DBC system.

The seven steps should take no longer than six months from registration of the new treatments (VWS, 2009). At first introduction of the new technology in the DBC system, average resource-use profiles are not yet available and DBC tariffs are based on expert opinion. For the DBC system until 2010, 24 new technologies have been assessed by DBC-O, the NZa and the CVZ. Seven led to new DBCs, four have been merged with existing DBCs, and five were not approved. Eight are still under consideration.

23.6.2 Funding

Currently, new or innovative treatments are introduced into the DBC system twice a year. Until the new technology is incorporated in the DBC system, additional payments exist only for innovative drugs. Since 2006, an innovative drug can be provisionally included on the 'list of expensive drugs' or 'list of orphan drugs' for four years, on the conditions that: (1) added therapeutic value is demonstrated; (2) its expenses account for over 0.5 per cent ('expensive drugs') or 5.0 per cent ('orphan drugs') of the annual hospital drugs budget; and (3) a plan for the assessment of cost–effectiveness in daily clinical practice is approved by the pharmaceutical advisory committee.

23.7 Evaluation of the DBC system in the Netherlands

The main purpose of introducing DBCs was to enable price and quality negotiations between insurers and providers. Although these negotiations were intended to be based on the quality of delivered care, insurers and hospitals currently predominantly negotiate on price and/or production volume. Since 2006, prices for list B DBCs have increased at a lower rate than those for list A DBCs and the health insurers increasingly apply pressure to hospitals to charge even lower prices (van de Ven & Schut, 2009). Table 23.8 depicts the negotiated tariffs in 2007 compared to those in 2004 for seven list B DBCs at four health insurers. List B DBC prices had increased by about 8 per cent in 2007, compared to 2004 tariffs. In general, major price deviations only occurred for a minority of DBCs. More complex and chronic DBCs seem to be less sensitive to market competition. Evidence from recent years suggests that hospitals negotiate on the total budget of the total B segment, rather than on the individual DBC level (van Ineveld et al., 2006).

Insurers have been reluctant to selectively contract with hospitals and to offer preferred hospital contracts to their customers. Aside from the problems of having the right mix of criteria to determine quality, obtaining accurate data, and doing so in a timely manner, there are several limitations for Dutch health insurers that limit their interest in negotiating on quality and to selectively

Table 23.8 Negotiated tariffs in 2007 compared to those of 2004

	N	*2004 tariff (€)*	*Average 2007 tariff (€)*	*Relative price increase (%)*	*Minimum 2007 price*	*Maximum 2007 price*
Inguinal hernia repair	407	2 163	2 254	4.2	1 529	3 088
Diabetes	410	409	483	18.1	385	1 027
Tonsillectomy	409	740	800	8.1	433	1 498
Cataract	407	1 317	1 381	4.8	1 044	1 599
Hip replacement	409	8 561	9 097	6.3	7 603	11 370
Knee replacement	404	10 228	10 746	5.1	9 097	13 000
Spinal disc herniation	354	3 046	3 308	8.6	2 413	5 778

Source: Nederlandse Zorgautoriteit, 2005.

Note: Example of seven list B DBCs at four health insurers.

contract with higher quality hospitals (Custers et al., 2007; van de Ven & Schut, 2009).

- Health insurers are afraid of acquiring a bad reputation if they restrict consumer choice to a limited network of preferred hospitals.
- Patients assume that the quality of care in terms of effectiveness and safety is equal among all hospitals. As a result, insurers have no incentive to negotiate for higher quality (and to pay higher prices) if patients do not appreciate higher quality in contracted hospitals.
- Furthermore, a 'free-rider' problem exists: hospitals have contracts with several insurers. If one single insurer motivates a particular hospital to improve quality, all of this hospital's patients will benefit from the quality improvement, including patients who are insured through other insurers.
- Finally, if an insurer acquires recognition for providing high-quality care, it is likely to enrol a disproportionate share of patients with chronic medical problems.

Unfortunately, information necessary to evaluate the DBC system is not easily accessible. A lot of information is available in the national DBC-DIS database but, at present, only a limited number of actors have access to the database.

23.8 Outlook: Future developments and reform

A new generation of DBCs – the so-called 'DBCs towards transparency' ('*DBCs Op weg naar Transparantie*') – is forthcoming. In the new system, patients will be classified according to a computerized grouping algorithm (see Figure 23.4). The number of DBCs will be substantially reduced from about 30 000 to 4000 by discarding the 'medical specialty' dimension. In addition, expensive/orphan drugs, intensive care and *other products* are to be accounted for by means of treatment related 'add-ons', each with their own tariff. Other products

may concern transmural/shared care; namely, hospital services provided in cooperation with medical professionals outside of the hospital (for example, the GP).

Another important feature of the future grouping algorithm is the possibility to consider care intensity for the classification of patients. For example, separate DBCs could be defined for an inpatient stay of up to five days and for over five days. The grouping algorithm is currently being tested, but it is not yet clear when it will be implemented nationwide.

Another future development concerns the transition to a situation in which prospective budgets are solely determined based on production parameters, such as first outpatient visits, first admissions, the number of inpatient days and day-care hours. The transition phase started early 2010 and is expected to last at least three years (Nederlandse Zorgautoriteit, 2009).

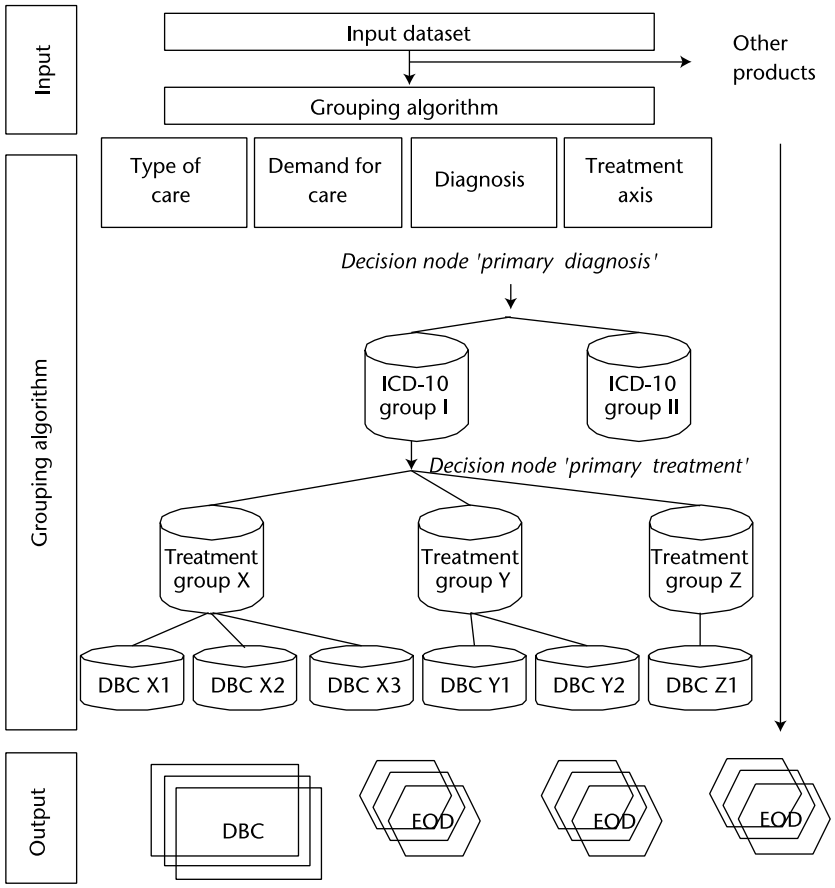

Figure 23.4 The grouping algorithm for the new generation of DBCs

Notes: EOD: 'add-on' expensive/orphan drugs.

It is too early to predict the potential effects of the future developments of the DBC system. Most significantly, the importance of negotiations between hospitals and insurers is bound to increase.

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