chapter nineteen

Sweden: The history, development and current use of DRGs

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19.1 Hospital services and the role of DRGs in Sweden

19.1.1 The Swedish health care system

Sweden has a decentralized health care system. There are three political and administrative levels; central Government, county councils and local municipalities. All are involved in financing, providing and evaluating health care activities. The central Government has a legislative supervisory role and partially finances health care, while the county councils and municipalities are responsible for both financing and providing health services. The municipalities and county councils are also politically accountable through their directly elected assemblies. The 21 county councils/regions are responsible for most health care services, except long-term care of the elderly and disabled people (including mentally ill people), for whom the 290 municipalities are responsible.

The Swedish health care system is mainly financed by taxes. The county councils and municipalities are entitled to collect direct income tax revenues as their major financial source; council tax amounts to about 10 per cent of the residents' income. There is also a grant from the Government, which amounts to about 9 per cent of the counties' revenue. The individual patient's co-payment is low – fees account for about 2.5 per cent of the total county revenues. In total, Sweden spent about 9 per cent of its gross domestic product (GDP) on health care in 2009.

19.1.2 Hospital services in Sweden

In total there are 81 hospitals in Sweden (as of 2009). Of these hospitals, seven are university hospitals (with 7300 disposable beds) (for more details relating

Table 19.1 Hospital beds in acute care, psychiatric and long-term care, and beds per 1000 people, 2009

	2009
Acute care hospital beds	18 944
per 1000 people	2.0
Psychiatric hospital beds	4 449
per 1000 people	0.5
Long-term care beds	2 167
per 1000 people	0.2

Source: SALAR, 2010.

specifically to acute care hospitals, see Table 19.1). The vast majority of Swedish hospitals are publicly funded. There are only three private profit-making hospitals and some smaller private non-profit-making hospitals (SALAR, 2010).

Annually, there are about 1.5 million inpatient care cases and 10 million visits by physicians for specialized outpatient care carried out at Swedish hospitals. In addition, there are 3 million private specialist visits, outside of the hospitals. Acute cases account for 75 per cent of inpatient care and elective care for 25 per cent. Outpatient care is distributed as 25 per cent acute care and 75 per cent elective care (Forsberg et al., 2009).

The hospital services encompass inpatient care, day surgery, day medicine and specialized outpatient care. Inpatient care is divided into specialized care, psychiatry, rehabilitation and geriatrics. Rehabilitation care is mostly carried out as a hospital treatment, but there are also units that offer rehabilitation services as care delivered outside of hospitals. GPs in ambulatory care refer patients to specialists at hospitals. All elective patients at hospitals are referred from GPs in their role as gatekeepers.

Each of the 21 counties/regions decides independently how their health care should be organized and reimbursed.

19.1.3 Purpose of the DRG system

In the early 1990s, the Swedish health care system needed save money. There was also a strong movement towards a more patient-oriented system. This signalled the emergence of incentives to start using diagnosis-related groups (DRGs); the main motive for introducing DRG-based payment schemes was to increase productivity and thereby to save (or make better use of) the money used for health care. Long waiting lists for elective surgery were another reason for this change. A third important reason for introducing DRG-based payment systems was to allow the patient freedom of choice to select a hospital for treatment. The idea was that, by giving freedom of choice to the patients – and if the money follows the patient – a degree of competition could be introduced among the hospitals. By providing good services and thereby attracting patients, the hospitals would secure higher revenues. There was also a need for higher quality information and greater transparency in health care. The global budget

encouraged neither productivity nor patient-oriented care, so the move to a DRG-based funding system was initiated. However, the need for cost control was also important, and budget ceilings were introduced to prevent oversupply and overuse.

In accordance with the counties' right to self-determination in health care activities, use of the Nordic patient classification system (NordDRG) in Sweden is voluntary. The counties decide for themselves independently how to use DRGs within their own payment systems and what complementary rules should be applied (such as reimbursement of outliers, cost ceilings, and so on). The counties are also responsible for the follow-up of fraudulent activity and any other misuse of the system. The availability of health care represents another issue for the county councils. The most common method used for controlling the supply of health care activities has been to limit availability.

Today, aside from their application as a payment mechanism, DRGs are used for managerial purposes, benchmarking, health statistics, measuring hospital performance and calculating productivity (and efficiency) at all levels of health care. The National Board of Health and Welfare has started working to find a method for calculating efficiency in Swedish health care. In order to do so, DRGs were used to describe performance, as well as process costs.

19.2 Development and updates of the DRG system

19.2.1 The current DRG system at a glance

The NordDRG system is currently the only DRG system in Sweden. Thus far there are only two different licensed software suppliers for NordDRGs. Each of them provides groupers, either available as interactive single cases, or as a 'batch' grouper.

The Full version of NordDRG 2009 embraces a total of 983 DRGs (see Table 19.2). Of these groups there are 216 outpatient groups designed for day surgery, day medicine and endoscopies. There are also 190 groups for specialized

Table 19.2 Number of NordDRG codes in different settings in 2009

Setting	*Number*
Inpatient care	577
– Specialized care	514
– Psychiatry	30
– Rehabilitation	33
Day surgery	162
Day medicine	34
Endoscopy	20
Outpatient specialized care	190
Total	**983**

Source: Nordic Centre for Classifications in Health Care, 2009.

outpatient care visits. The groups for other day-treatment visits and outpatient care carry an 'O' or a 'P' at the end of the DRG code. Day surgery is allocated the same number as the corresponding inpatient group, but with an 'O' in the DRG-code (Nordic Casemix Centre, 2011).

The counties in Sweden can be divided into three categories with regard to their usage of DRGs. The first category uses DRGs for reimbursement to hospitals for a large range of care (both in- and outpatient care, to some extent). The eight counties/regions in this category represent more than half of the Swedish health care system (calculated by health care expenditure). Psychiatry is included in the payment system of one of the counties. The second category of counties use DRGs only as a tool for analysis, to calculate casemix, for hospital budgeting or for reimbursement of patients across county borders. The third category of counties uses DRGs as a component in the reimbursement system for a smaller component of health care; for example, for patients across county borders, or for a single hospital.

In total, about 90 per cent of inpatients are grouped into DRGs, and 65 per cent are financed by DRGs. In outpatient care, 80 per cent are grouped into DRGs, and 30 per cent are financed by them.

19.2.2 Development of the DRG system

The National Board of Health and Welfare is responsible for developing and maintaining the Swedish version of the NordDRG system. In validating the resource homogeneity process in DRGs, the Board cooperates with the Swedish Association of Local Authorities and Regions (*Sveriges Kommuner och Landsting*, SALAR) which is responsible for the Swedish National Case Costing Database. All cost data in use with respect to DRG maintenance are calculated using a 'bottom-up' approach.

The Swedish NordDRG version has been developed to comprise both in- and outpatient care, as well as psychiatry and rehabilitation (see Table 19.3). The NordDRG system can be implemented in any type of hospital. In 2011, the 15th version of NordDRG was introduced.

Between 2003 and 2009, two versions of NordDRG were operating in Sweden; a Full version, which handled both inpatient care and day surgery (including intraluminal endoscopies), along with outpatient specialized care, and a Classic version for inpatient care only. Since 2010, just one version of NordDRG is in effect for handling all in- and outpatient care using the same logic.

19.2.3 Data used for development and updates of the DRG system

Test data from the National Patient Register (NPR) (except the personal identification number) are used to inform the update process. The National Case Costing Database is used to validate the resource homogeneity in the DRGs.

Table 19.3 Various NordDRG versions in Sweden, 1995–2008 (selected years)

	1st DRG version	*6th DRG version*	*8th DRG version*	*10th DRG version*	*11th DRG version*	*12th DRG version*
Date of introduction	*1995*	*2001*	*2003*	*2005*	*2006*	*2008*
(Main) Purpose	Reimbursement, and to describe performance	Reimbursement, and to describe performance	Reimbursement, and to describe performance	Reimbursement, and to describe performance	Reimbursement, and to describe performance Benchmarking Productivity Measurement	Reimbursement, and to describe performance Benchmarking Productivity Measurement
DRG system	NordDRG	NordDRG	NordDRG	NordDRG	NordDRG	NordDRG
Data used for development	Cost weights, USA	National Cost Database, NPR	National Cost Database, NPR	National Cost database, NPR	National Cost Database, NPR	National Cost Database, NPR
Number of DRGs	500	498	722	740	929	976
Applied to	All hospitals, only inpatients	All hospitals, only inpatients including children/ neonatology	All hospitals, inpatients and day surgery	All hospitals, inpatients, plus psychiatry and day surgery	All hospitals, inpatients and all outpatients	All hospitals, in- and outpatients, including rehabilitation

Source: Designed for this report by Lisbeth Serdén at the National Board of Health and Welfare[2] in 2011.

This database contains bottom-up cost data collected directly from hospitals. The hospitals join the database on a voluntary basis. National cost data have been available since 1997 and the quality of the data has improved significantly over time (see section 19.4) (Ludvigsson et al., 2011).

The tradition of collecting data at the individual patient level is strong in Sweden; the NPR has been in use since the 1960s and contains all individual inpatient records in Sweden. All data can be linked to the individual patient by the personal identification number that is given to all citizens at birth. The register has traditionally been used mainly for research purposes. The use of the register for measuring productivity and various types of follow-ups in health care is gradually increasing over time.

19.2.4 Regularity and method of system updates

The NordDRG system is updated yearly. The original development work carried out in advance of major changes is normally conducted in each country that uses the system. Some major changes can be implemented as joint projects between the countries concerned.

Changes in DRGs may be initiated by problems with either cost heterogeneity or clinical relevance, according to the basic concept that applies to all DRG systems: patient cases are to be assigned to clinically relevant groups with the least possible variance in cost.

For all types of changes (splitting DRGs, merging DRGs, partial or total reassignment), there are specified statistical criteria that must be evaluated with cost-per-case data from at least one of the Nordic countries. Changes can sometimes be made even if not all criteria are met, but in those cases a clear rationale must be put forward (Lindqvist, 2008).

19.3 The current patient classification system

19.3.1 Information used to classify patients

The Nordic countries have a long tradition of collaborating on classification systems – as manifested in the Nordic Centre for Classifications in Health Care (which is a WHO collaborating centre). The Nordic countries collaborate concerning the basic classifications, but are also obligated to maintain national versions of the classifications in their national languages.

For coding diagnosis, the Nordic countries use a national version of the International Classification of Diseases 10th revision (ICD-10) and, for surgery procedures, the common Nordic classification of surgery is used (NOMESCO Classification of Surgical Procedures, NCSP). In Sweden, a new national classification system for non-surgical procedures was introduced in 2006 (KMÅ). Combined, the classification of surgery and non-surgical procedures is called KVÅ. The surgical procedures in KVÅ are in general the same as the procedures in the NCSP, but the medical procedures are national in scope.

19.3.2 Grouping algorithm

NordDRG is a system for classifying inpatient cases and outpatient visits into categories with similar resource use (see Figure 19.1). The grouping is based on diagnoses, procedures performed, age, birth weight, gender and status at discharge. The history, design and classification rules of the DRG system – as well as its application in terms of patient discharge data and updating procedures – are presented in the *DRG Definitions Manual* (Nordic Casemix Centre, 2011).

19.3.3 Data quality and plausibility checks

The NPR – managed by the National Board of Health and Welfare – is quality checked on an annual basis. For each record reported to the NPR, a data control is performed to check that compulsory variables are reported, such as the patient's personal identification number, the hospital and the main diagnosis. Codes for different variables and dates are also checked. Some obviously incorrect data are corrected in the quality controls, while other data are sent back to the hospital for correction. In the same way, the cost data in the National Case Costing Database are checked annually by the SALAR.

Many performance indicators can be deducted from Swedish national health data registers; for example, registers have been used for analysing the differences in case fatality within 28 days after acute myocardial infarction or stroke. Significant efforts are now being made, at both the national and local levels, to find valid and accepted quality indicators for following up health care performance, and also for productivity/efficiency measurements. Some counties already have models in use for the follow-up of performance indicators. Since 2006, Sweden has used national performance indicators to measure performance at county level on an annual basis. (National Board of Health and Welfare, 2010). For the year 2010, 134 quality indicators were published. The National Board of Health and Welfare also publishes reports on coding activity and quality on a yearly basis.

The county councils are responsible for checking the quality of DRG-grouped data by means case record audits. Some of the county councils carry out audits of case records on a regular basis in order to identify incorrect coding. The process in place in the event that fraud is identified in the records differs from county to county. In most cases the hospital or private clinic will be obligated to pay back the discrepancy. Coding quality has improved and continues to improve in Sweden. As such, there are attempts to introduce more time for coding issues in physicians' education programmes, and many county councils are educating their medical secretaries in coding and encouraging them to play a larger role in this field.

19.3.4 Incentives for up- or wrong-coding

Very few cases of up-coding occur because of the small number of private hospitals in Sweden. However, a problem still exists in terms of 'down-coding'

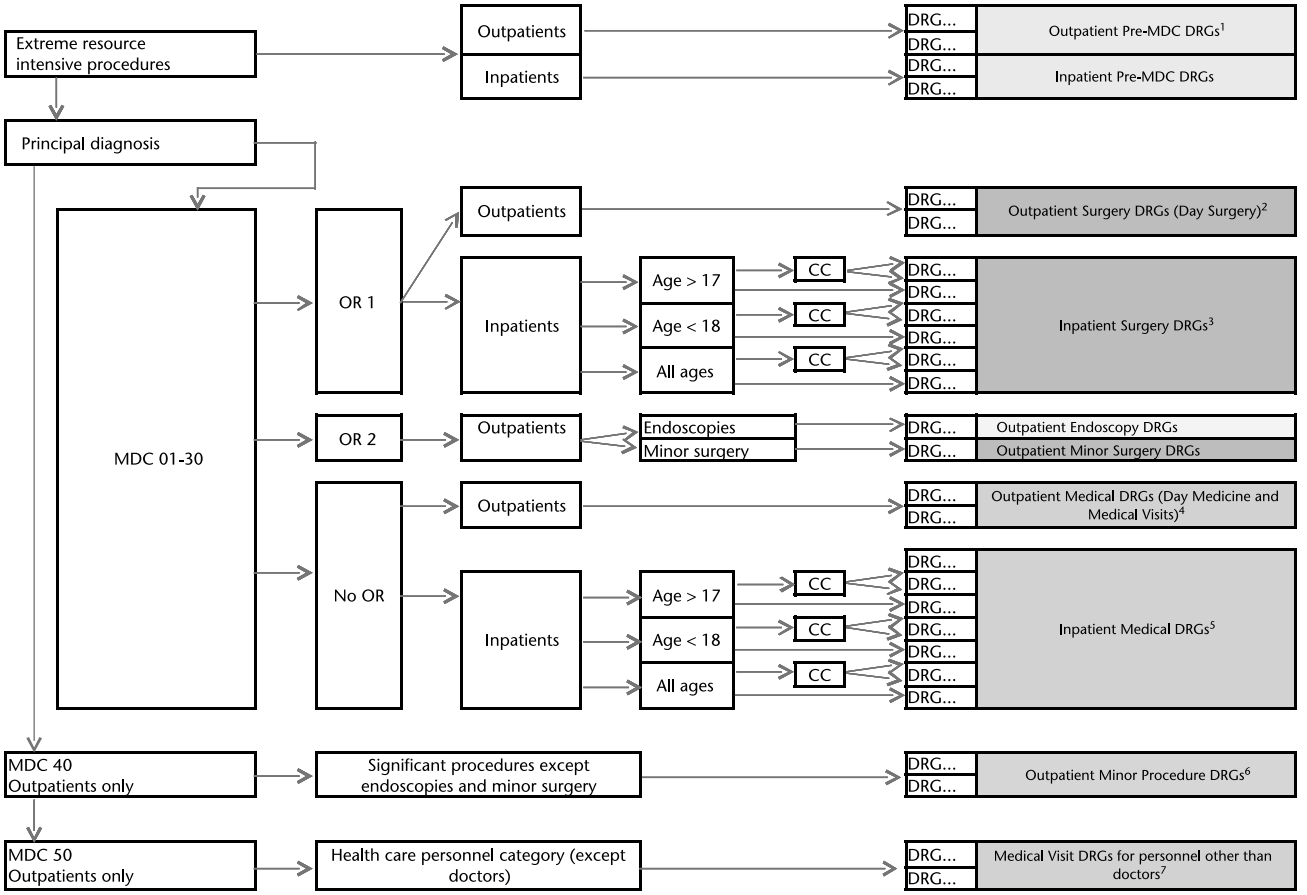
Extreme resource intensive procedures
Outpatients
Inpatients
DRG...
DRG...
Outpatient Pre-MDC DRGs[1]
DRG...
DRG...
Inpatient Pre-MDC DRGs
Principal diagnosis
MDC 01-30
OR 1
Outpatients
DRG...
DRG...
Outpatient Surgery DRGs (Day Surgery)[2]
Inpatients
Age > 17
Age < 18
All ages
CC
CC
CC
DRG...
DRG...
DRG...
DRG...
DRG...
DRG...
Inpatient Surgery DRGs[3]
OR 2
Outpatients
Endoscopies
Minor surgery
DRG...
DRG...
Outpatient Endoscopy DRGs
Outpatient Minor Surgery DRGs
No OR
Outpatients
DRG...
DRG...
Outpatient Medical DRGs (Day Medicine and Medical Visits)[4]
Inpatients
Age > 17
Age < 18
All ages
CC
CC
CC
DRG...
DRG...
DRG...
DRG...
DRG...
DRG...
DRG...
Inpatient Medical DRGs[5]
MDC 40
Outpatients only
Significant procedures except endoscopies and minor surgery
DRG...
DRG...
Outpatient Minor Procedure DRGs[6]
MDC 50
Outpatients only
Health care personnel category (except doctors)
DRG...
DRG...
Medical Visit DRGs for personnel other than doctors[7]

Figure 19.1 Grouping algorithm in the Swedish version of NordDRG system

Source: Designed for this publication by Mats Fernström at the National Board of Health and Welfare in 2011.

Notes:

1 **Outpatient Pre-MDC DRGs**: extremely resource-intensive procedures are seldom performed on outpatients, so there are few cases in these DRGs.
2 **Outpatient Surgery DRGs (Day Surgery)**: these DRGs are also called Day Surgery and they have a grouping logic very similar to the Inpatient Surgery DRGs, but there is no age split or CC split.
3 **Inpatient Surgery DRGs**: about 50 per cent of these DRGs are split based on age and/or CC. The age split is less than 18 years, but for MDC 15 the patient must be less than 1 year old.
4 **Outpatient Medical DRGs**: some of these DRGs are for longer visits (for example for some hours of observation) and are called Day Medicine.
5 **Inpatient Medical DRGs**: like the Inpatient Surgery DRGs, about 50 per cent of the groups are split based on age and/or CC. The common age split is identical to the split for Inpatient Surgery DRGs but the DRGs for Diabetes are divided into > 35 or < 35 years of age.
6 **Outpatient Minor Procedure DRGs**: these DRGs are for minor procedures, except endoscopies and minor surgery. These procedures are often performed by personnel other than doctors and therefore a principal diagnosis is not mandatory.
7 **Medical Visit DRGs for personnel other than doctors**: according to Swedish law, only doctors are obliged to report diagnoses, so the grouping logic for these DRGs is based on profession and the type of visit (single, team or group).

(due not to failings of the financial system, but rather the tradition of entering only few codes into the system). At national level, the authorities encourage hospitals to operate better coding practices, which has often led to a greater number of registered secondary diagnoses per case. Systematic selection of patients for financial reasons (cherry-picking or cream-skimming) has not occurred in public hospitals, but has occurred to some degree among private providers in Stockholm.

Several record audits in Sweden (2300 medical records altogether) show that abuse of secondary diagnosis coding can create an increase, but also (at the same time) a decrease in DRG weights compared with accurate coding. Audits can lead to adjustments in reimbursement to hospitals and other providers of health care (National Board of Health and Welfare, 2006). Most wrong-coding is not in fact a sign of abuse of the system, but rather a matter of ignorance.

19.4 Cost accounting within hospitals

19.4.1 Regulation

It is not mandatory to implement case-costing databases within a hospital. The incentive for the hospitals to do so is that they will achieve not only a greater degree of cost control within the hospital management, but also an influence over the national DRG weights. National guidelines have been developed for cost-per-case calculations. About 65 per cent of inpatient cases and 36 per cent of outpatient visits were individually calculated in 2009.

Case costing is a costing method that uses a bottom-up approach. All costs, including indirect costs, should be incorporated. There are some exceptions, such as costs for research and teaching, external projects, ambulances, and the counties' politicians and their staff (SALAR, 2011).

19.4.2 Main characteristics of the cost-accounting system

Case costing data have been collected from hospitals with case costing systems since the mid-1990s and added to the National Case Costing Database (Heurgren, et al., 2003; SALAR, 2011). The data are held in a common database for the calculation of Swedish DRG weights, managed by the SALAR. The information in the National Case Costing Database is almost the same as in the NPR, except that the cost data are added and the personal identification numbers are missing.

Case costing model

The case costing model comprises four steps: (1) accurately identifying the total cost of the hospital; (2) allocating indirect costs to the cost centres (that are absorbing the cost); (3) identifying intermediate products and calculating their costs; (4) distributing products and costs to the patients. Figure 19.2 provides more details.

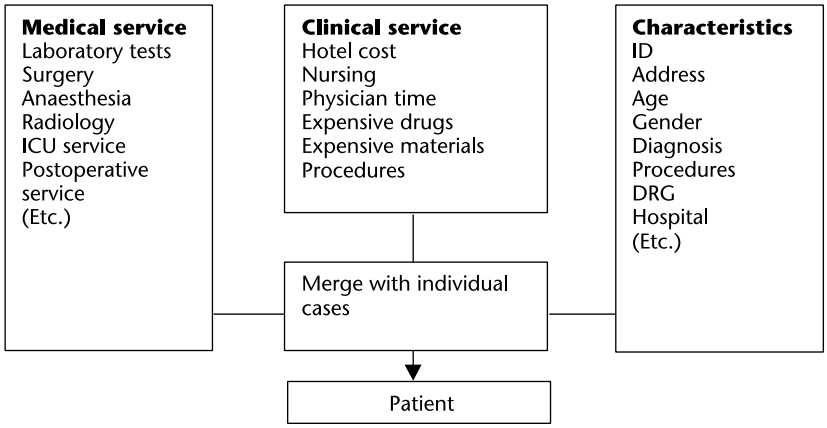

Figure 19.2 The Swedish case costing model

Source: SALAR 2009.

In the case costing process, all costs are distributed to the individual cases by the unique personal identification number. A patient-specific service mix is tied together with patient characteristics. The case costing system provides information about activities such as surgery, laboratory tests, intensive care, and nursing care. Their costs are calculated uniquely for each patient. The system also holds information on diagnoses, procedures, DRG, and so on, for each patient. National guidelines have been implemented to ensure data quality and comparability (SALAR, 2009).

The most common IT-structure for case costing is the integration model, in which data are collected from various databases in the hospital into a 'data warehouse'. The case costing system uses these data to link the relevant case and patient by means of the personal identification number for each patient and the date of their stay or visit (see Figure 19.3). It is also possible to collect data for a case costing system directly from medical records, but in general this does not take place in Sweden (except for a few hospital departments), since current medical records are not designed for this purpose.

The IT structure is important when implementing case costing systems. Access to information must be highly automated, and an important principle to apply is to use existing data as much as possible in order to minimize manual work and obtain higher data quality.

The use of case costing is important from many perspectives. In Sweden, case costing data are used in the following areas:

- management support for hospital departments and hospitals – process management;
- support for buyers of health care;
- benchmarking studies of costs and medical praxis;
- development of the DRG system and calculating prices in health care;
- calculating relative cost weights in the NordDRG system;
- calculating productivity and efficiency.

Intermediate products	**Costs**	**Characteristics**		
Nursing care	11 950	Length of stay	5 days	
				(Hip and femur procedures except major joint, age > 17, without CC)
Physician (ward)	3 540	DRG	211	
Hotel costs	5 700	Clinic	311	
Surgery	6 522	Age	72	
Intensive care	2 911	Gender	Female	
Anaesthesia	10 957	Acute	Yes	
Laboratory tests	1 846	Principal diagnosis	S7240	Fracture on lower part of femur
Imaging exams	2 629	Procedures	NFJ59	Fracture surgery, femur
Other products	4 333		NFJ09	"
			NFJ99	"
Total cost	**SEK 50 388**			

Figure 19.3 An example of a patient in the Swedish National Case Costing Database: femur fracture

Source: SALAR, 2009.

19.5 DRGs for hospital payment

19.5.1 Range of services and costs included in DRG-based hospital payments

In the public health care sector, the decision to use a DRG for reimbursement is made at the county council level.

Swedish hospitals are traditionally financed via global budgeting. This is due to the fact that Sweden has a tradition of publicly owned hospitals, and therefore cost control has always been an important issue. Moreover, before the introduction of DRGs, there was no general, accepted system in use for describing performance. The counties' knowledge of hospital activity and productivity was poor, and therefore a great need existed to find ways to measure productivity.

The main reasons for introducing the DRG system as a financing tool for hospitals included to improve productivity and efficiency, to increase transparency in the hospital sector, and to create a 'market', with purchaser and providers sharing the financial risk.

In Sweden there are differences in the way DRGs are used for financing in different types of hospitals (regional, teaching hospitals, acute care, psychiatric, rehabilitation, and so on). Until recently, DRGs were used only for somatic care (inpatient and outpatient) in Sweden. In 2010, one county used DRGs for financing psychiatry. Rehabilitation is another new field for DRG use in Sweden, introduced in 2008, but only a few counties have adopted DRGs for financing purposes. Others simply use this part of the DRG system to describe performance.

On the other hand, the use of DRGs has been quite similar within hospitals, regardless of whether they are teaching hospitals or rural hospitals. Both acute and planned care have been included, but the teaching hospitals have

incorporated more exceptions from the DRG list, such as fee-for-service prices for unusual and costly treatments. There are no differences in the way DRGs are used in terms of the legal status of the hospital (that is, whether it is public, private profit-making or non-profit-making).

In Sweden, the cost all health professionals' (for example doctors', nurses') fees are included in the DRG weights and prices. The vast majority of health care professionals are employed by the hospitals/counties. The costs of infrastructure, important medical equipment and installations, communication systems or informatics are also included.

Costs for outliers are not included in the DRG weights. Burn injuries are also not included. In some counties, specific regional care and rehabilitation are excluded. Some unusual and expensive drugs/materials might also be excluded. All these exceptions are reimbursed separately, and the exclusion list varies widely between counties.

The cost of education, and of research and development (R&D) are not covered by DRGs. The majority of R&D costs are covered by grants from the Government. Most counties also offer local grants to their hospitals for R&D activities. Other activities of general interest (such as accreditation, incentives to hospital personnel, participation in social or other projects, and so on) are covered by specially designated project budgets.

The most used model for reimbursement of all areas of the health care sector is a mixed model, with global budgets, prospective payment systems, retrospective payment systems and payment for performance (P4P) in use within the same system.

19.5.2 Calculation of DRG prices/cost weights

There is no 'national price' per DRG in Sweden, but there are reference cost weights. Sums vary by county and by hospital, resulting in different prices per DRG. The county councils are the payers and purchasers of hospital services and the DRG prices are set according to the budget and regulation of the council.

The National Board of Health and Welfare develops and publishes national prospective weights for NordDRGs (both in- and outpatients) on an annual basis. It is not mandatory to use the national weight sets; local weights are also in use in two counties/regions. A goal for the future is that all counties will use the same weights.

The average real cost in the cost database from last year is used to calculate the national weights. The average cost is adjusted by the budgeted cost increases and decreases for the next year and sometimes also by an estimated increase in productivity (about 1 per cent). The most common method variant is that hospitals use the same weight set within and between counties, but that the prices per DRG are different for each hospital/council.

Items that are reimbursed on a 'fee-for-service' basis (rather than by cost weights) represent very unusual and expensive treatments that cannot be properly described in the DRG system, such as burns or special treatments delivered at teaching hospitals.

The national DRG weights are based on individual patient costs, as are the outlier limits. In addition, also outlier limits are also calculated based on length of stay by those hospitals that do not yet calculate individual patient-related costs. Outliers are reimbursed outside the DRG system, with money from the global budget of the county councils.

The cost trim-point is calculated using the quartile (Q) method, given 5 per cent outliers by the following formula: Q3 + cost constant x (Q3 – Q1). The cost constant is chosen to give 5 per cent outliers.

19.5.3 DRGs in actual hospital payment

The councils decide independently how to pay for health care. The reimbursement model is set up in negotiation between purchaser and provider, within the councils. The councils are free to use the DRGs or part of the DRG system, or other models such as capitation or fixed reimbursement.

Over 65 per cent of all discharges from Swedish acute somatic care are reimbursed by NordDRGs to some extent. Outpatient care is reimbursed by the NordDRG system to a more modest degree, and psychiatry and rehabilitation even less so.

Various methods are used in different counties for keeping within the budget. The county's purchases and their volume are set, in negotiation with the hospitals. In some counties a ceiling is in place for expenditures and the hospital faces making a loss if it treats too many patients. In other counties, this could be a gradual shift of responsibility, with a shared risk for when the negotiated volume is exceeded.

19.5.4 Quality-related adjustments

The counties use quality indicators to describe performance and to some extent for reimbursement purposes, in addition to the use of DRGs. Most hospitals contribute to the national quality registers and also report to the national waiting-time database.[1] Sanctions are decided upon in each individual county.

There is no quality assurance tool attached to the DRG-based health care production in Sweden. Every county must decide themselves how to monitor quality. Most counties use the national quality indicators, among other tools.

19.5.5 Main incentives for hospitals

Following the introduction of DRGs in Swedish health care, there has been a significant increase in coding diagnoses; in 1998, there were 1.8 diagnoses per case and in 2009 there were 2.7 diagnoses coded per case in inpatient care (Serdén at al., 2003). Quality has been improved to some extent in the national registers, by educating the medical secretaries who input diagnosis and procedure codes into the administrated systems.

19.6 New/innovative technologies

19.6.1 Steps required prior to introduction in hospitals

County councils and hospitals should take the initiative to develop health care by introducing new technologies. The adoption of innovations into the DRG system is decided in the updating process, which itself is published in reports. At national level, the DRG system is administrated and developed by the National Board of Health and Welfare. Within the updating process, innovations are discussed at Nordic level in the NordDRG expert group(s) and finally in a steering group in which decisions are made.

19.6.2 Payment mechanisms

During the first two years, new and innovative technologies are funded either separately, outside of the DRG system, or via the DRG system (through additional payments for high-cost outliers), depending on the regulations in each county council. Most hospitals negotiate with the county regarding separate prices for new technologies. When the innovations are adopted into the DRG system, their funding is embraced within the DRGs.

19.6.3 Incentives for hospitals to use new/innovative technologies

There is a delay in the process, from the decision to use new technologies until those technologies are incorporated into the reimbursement system. The whole process usually takes about two years.

19.7 Evaluation of the DRG system in Sweden

19.7.1 Official evaluation(s)

County councils are responsible for the primary coding of and registration of DRGs at the hospital. The councils are also responsible for evaluating the DRG results. Unfortunately, only a few counties carry out audits to check the DRG results. As already mentioned, Sweden does not have a significant problem in terms of up-coding, but a problem does exist relating to too few diagnoses and procedures being coded (in some counties). In counties in which this is a problem, it is characteristic for them to only use DRGs to a minor extent.

19.7.2 Authors' assessment

The original goals that were set out before the introduction of the DRG system have been reached: a rise in productivity and transparency in hospital

activities, creating a common 'language' between professionals and administrators, resulting in a financing system focused on hospital activities instead of organization, along with better describing performance, and a tool for benchmarking and productivity calculation.

In the early 1990s, many physicians were opposed to DRGs. To start with there was very little knowledge relating to DRGs, in terms of how they worked and how the system could be utilized. This lack of knowledge was a problem. Many actors had also unrealistic expectations of the benefits of the system; for example, that it would save a lot of money and solve the issue of quality monitoring. In addition, many politicians disliked activity-based funding. This has now changed, and most are in favour of activity-based funding to some degree.

As time passed, users learnt more and the expectations became more realistic, along with the ability to see the good and bad aspects of the system. In addition, the introduction and use of cost-outliers achieved better acceptance levels – today, most professionals accept the system. Extending the system to encompass both outpatient care and psychiatry has also been a positive development. In psychiatry, DRGs were not accepted until 2005, when 26 new groups for psychiatry were incorporated. There is just one county using DRGs for financing in psychiatric care; predominantly, it is used as a tool to describe performance (in eight counties).

There were not many technical problems in implementing the grouper system. The period of time needed for technical implementation of the system was different in each hospital. The cost of developing and implementing DRGs (for the Government, hospitals, taxpayers, and so on) remained fairly low and did not exceed expected levels.

The DRG impact

After introducing DRGs in Sweden, there was an increase in productivity and service delivery increased. At the start, the Stockholm County Council had a problem with the use of DRGs to control total costs; when the system was introduced, the increase in volume resulted in the costs exceeding the global budget. Within a few years, this could be controlled. In general, the hospitals that are using DRGs have better control (with some exceptions) over their activities and have a lower cost per DRG point than hospitals that do not use the system.

In terms of the impact on the patient, the introduction of the DRG system has shortened waiting times, due to the increase in productivity (more services carried out) (Charpentier & Samuelson, 1998).

Sweden has had a major reduction in length of stay since the early 2000s – for a number of reasons, but partly because of the use of DRGs. Counties that use DRGs tend to have shorter lengths of stay than others. Whether the present length of stay is too short or not is a matter for debate, but most will agree that it is good for the patients if the length of stay is short. A short length of stay shows that the process works and that the patient is well informed. The argument against short lengths of stay is mainly that elderly people are sent back to their homes too early in the health care process, but there is no evidence

of an increased level of readmission when introducing DRG-based reimbursement systems.

The introduction of the DRG system has not had a direct impact on the way inpatient and outpatient care is organized on a daily basis, although it may have had an indirect effect. The DRG system has exerted no influence on hospital organization as a whole.

DRGs are not a 'miracle cure'

The most important experience gained from working with DRGs for reimbursement is that the introduction of payment systems does not solve all the problems that health care systems are facing (Lindqvist, 2008). When DRGs for reimbursement were introduced in some counties in the early 1990s, there was a strong notion that this was a 'miracle cure'. The few that were opposed to the transformation, on the other hand, saw the change as the end of the Swedish health care model as we know it. Both of these expectations have been proven wrong. Other political decisions and changes, economic conditions and the general public's expectations have had more of an impact on health care than the introduction of DRG-based payment systems.

One of the most significant problems with using DRGs for reimbursement, at least from a Swedish perspective, has been the mechanisms of cost control. In the case of Stockholm County, productivity rose quite dramatically during the years following its introduction, but the increased production also led to higher total expenditures. To secure cost control, budget ceilings were introduced – which led to a reduction in the increased rate of productivity. Finding a balance between the desire to increase productivity and the need to control cost (given limited resources) has been the biggest challenge in the introduction of payment systems.

A casemix reimbursement system improves productivity

It is quite simple – when a funding system based on recorded activity is introduced, the activity increases – or, to be more precise, the recorded activity increases (Lindqvist, 2008). The first problem is to determine whether the increase is an effect of better or changed recording, or of an actual increase in volume. The experience in Sweden, especially in the outpatient care setting (where there was no tradition of good recording), is that the initial increase seen following the introduction of DRG-based payment systems was to a great extent due to changes in recording. However, the number of inpatient admissions also increased, and this effect is better documented, since the medical recording of admissions was of good quality in Sweden.

Good information systems and good data are crucial

When shifting to a system in which clinical data are the basis for reimbursement, the increasing need for data and information system is of great importance (Lindqvist, 2008). In Sweden, the tradition of collecting clinical data and the

use of a personal identification number have been beneficial, but a new information system for follow-up and analysis needed to be developed. This development was regrettably slow in terms of tools for analysing production at hospital and department levels. This was quite ironic, considering that the responsibility for the hospitals' economy was to a large extent moved to the department heads.

The data quality must also be considered. In spite of a long tradition of data collection, the quality of data was poorly analysed in Sweden. This necessitated efforts to improve the quality of basic clinical data. There is a trend towards 'going back to the basic data quality'. More efforts are being directed towards correct registration and regular revisions of coding. One key question concerns access to and quality of data. Working with prospective payment systems based on DRGs means dealing with core health care data, and the performance of the systems is heavily dependent on the quality of the basic data. To implement the systems, access to individual patient data is required – to both reimburse and assess performance more accurately.

19.8 Outlook: Future developments and reform

19.8.1 Trends in hospital service (or general health care) delivery

The National Board of Health and Welfare has received a government commission to improve the reimbursement system in primary care; specifically, a system promoting health care activities and results. Uniform classification of diagnoses and procedures in primary care is necessary when creating high-quality squared systems to describe performance, which form the basis of reimbursement and high-quality follow-up in primary care. Uniform classification systems are also necessary to compare health care within primary care. It is beneficial if the classification is comparable to other settings.

A Swedish classification system for *diagnoses* exists for Swedish primary care, but it is not generally used and, when it is, it is not used properly. Since there is no classification system for *procedures* in primary care, the need exists to develop such a system or to improve existing classification relating to procedures. There is much to be done before a new secondary patient classification system in primary care can be established.

19.8.2 Trends in DRG application/coverage

An extensive amount of work in exchanging and improving the system has taken place during the 2000s. Sweden has just finished the development of a new grouper, which will be available in Sweden from 2012. The purpose of this grouping system is to divide DRGs into three severity sub-group levels. The role model is the grouper of the Centers for Medicare & Medicaid Services (CMS) in the United States (3M, 2011).

19.9 Notes

1 More information is available at the relevant web site of the Swedish Association of Local Authorities and Regions (www.vantetider.se, accessed 1 August 2011).
2 More details available at the National Board of Health and Welfare web site (http://www.socialstyrelsen.se/klassificeringochkoder/norddrg/logikenidrg, accessed 1 August 2011).

19.10 References

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