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# THE HOSPITAL MARKET

FINANCIAL INCENTIVES FOR SPECIALIZATION OF HOSPITAL CARE IN  
THE NETHERLANDS

**Abstract**

Regulated competition was introduced to contain the increase in health care costs and to maintain a high quality standard. Competition would raise financial incentives to make the provision of health care more efficient. The organization of health care delivery is changing as health care delivery becomes more concentrated. The extent to which financial incentives define the specialization pattern of hospital care in the Netherlands are examined. Financial incentives for specialization can be: reduced competition, economies of scale & profit margin, learning effects & competencies and economies of scope. The conclusion is that hospitals do not seem to focus on financial incentives for specialization. The specialization decision of hospitals seems to be based on a desire to increase, or maintain a high quality standard

**Keywords**

Specialization, Concentration, Hospital, Netherlands, Financial Incentives, Efficiency, Competition, DBC's

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## 1. Introduction

The government didn't intervene and competition was allowed in the health care sector till around 1850. Doctors were free to set their own prices and they were paid by means of out of pocket payments. During the twentieth century people saw the importance of the accessibility of health care to everyone, irrespective of their income. The development of collective health insurance implied the beginning of government intervention in the health care sector.

Around 1975, a fast increase in health care costs led the government to change its policy to one focused on central price and capacity control. This supply-led system caused the increase in health care costs to slow down but as a consequence waiting lists increased and incentives for innovation and efficiency were missing.

In 2005 the health care system in the Netherlands was reformed by introducing regulated competition to contain the increase in costs but at the same time maintain the high quality standard. The former sickness fund and private health insurance arrangements were integrated in a mandatory national scheme with competition between insurers and freedom of choice for consumers. The challenge of the transform is to make health care more efficient, innovative and patient oriented without compromising the so called public interests of solidarity, universal access, affordability and quality of care (**Maarsse & Paulus 2011**).

During 2004-2008 the growth of health care costs increased to 6,8% in 2008. After this period the growth in health care costs declined to 5,2% in 2009, 3,9% in 2010 and 3,2% in 2011.

(CBS) Even though we see a positive trend, the growth of health care costs is still above the 2,5% agreed on in the 'Bestuurlijk HoofdlijnenAkkoord 2012-2015'.

At the fourth of July 2011 the government (VWS), suppliers of health care (NFU, NVZ, ZKN) and health insurers signed this agreement which was intended to control the fast increase in health care costs and it gives the roles and responsibilities of the three parties with respect to this objective. The settlement states that the organization of health care in the Netherlands will have to change by dispersion and concentration of hospital care where this is desirable with respect to the values quality, efficiency and innovation.

Public hospitals in the Netherland have the duty to treat all incoming patients whose treatment needs they can fulfil. But hospitals still have possibilities to emphasize certain services in which it has a particularly strong expertise or interest or in which demand is strong. (**Caphun & Messner 2012**)

The NVZ did research to the willingness of patients to travel for hospital care. They found that hospitals can focus and specialize more without compromising choice possibilities for consumers of health care.

Currently all hospitals in the Netherlands offer five types of health care: emergency, non emergency, complex/high volume, complex/low volume and chronic care. When, by experiment, all hospitals focus on one, two or three types of health care, the average travel time for consumers will increase with only five to ten minutes. (NVZ 2011)

It is clear that the organization of health care is changing and will change in the future. There will be more specialization of hospital care but how will this happen in the future?

Health care was thought to be too inefficient due to detailed government regulations which impede cost-effective substitution of care (technical efficiency), provision of ‘tailor-made’ care to consumers (allocative efficiency) and quality-improving and cost-reducing innovations in the organization and delivery of care (dynamic efficiency). (Schut 1995) The introduction of competition would raise financial incentives to make the provision of health care more efficient.

The research question is therefore: To what extent do financial incentives for specialization define the pattern of specialization of hospital care in the Netherlands?

In the remainder of this thesis specialization will refer to the relative emphasis that a hospital (or hospital department) puts on certain types of services and is opposed to the idea that a hospital (department) should pay equal attention to all services. (Cahpun & Messner 2012)

The reasons for specialization will be explained from the perspective of the hospital. Why will a hospital choose to give more emphasis to a particular type of service? In what type of care will a hospital choose to specialize?

The remainder of this thesis is organized as follows. First some background information will be given about the structure of the hospital industry in the Netherlands and the system by which health care is financed will be explained. Then the reasons for specialization and the reasons to specialize in a particular type of care will be examined by means of a literature study. Thereafter the extent to which we see hospital concentration in the Netherlands will be researched. For this research hospital data from ‘JaarverslagenZorg’, part of the CBIG, an executive organisation of the ministry of VWS, will be used. Finally a conclusion will be drawn about the extent to which financial incentives for specialization are suitable for the reasons for specialization in the Netherlands.

## 2. The Dutch health care sector

### 2.1 DBC's and A and B segment health care

Before competition was introduced health care was financed by a global budget. In this system hospitals got a yearly budget based on 4 cost components: infrastructure, availability, capacity and production. If actual hospital production exceeded the ex ante negotiated level of output, next year's prices had to be reduced to compensate for the resulting difference between a hospital's revenue and its budget. (**Varkevisser, et al 2010**) Since 2001 this system changed to a system based on pay for performance. In 2005 DBC's (Diagnosis Treatment Combination) were introduced for the registration and reimbursement of hospital and medical specialist care. DBC's were introduced to transfer the former supply-led system to one based on a demand-led system. A DBC consists of the diagnosis, the type of care, the specialisation and the activities of the hospital resulting for the needs of the patient. (**DBC onderhoud 2006**) Hospitals and medical specialists get paid per DBC. The payment is based on the average of activities per DBC. The price of one DBC thus doesn't depend on the profile of one individual patient. Hospitals declare the DBC's they performed at health insurers.

DBC's are divided into A and B segment health care. Prices of A segment care are still formed according to the global budget and thus regulated by the government. The NZa decides on prices for A segment care. Prices, quality and volume of B segment care are freely negotiated between health insurers and hospitals. Hospitals are no longer paid in advance but they get paid based on the care they actually performed.

B-segment care grew from about 4% of the total of DBC's in 2006 to 22% in 2010. With respect to revenue, B segment care grew from 9% in 2006 to 30% in 2010 and the intention is to extend this to 70% in 2012. (**NVZ 2011**)

A segment care mainly consists of emergency care, all types of care which are difficult to plan in advance and low volume, complex health care. When looking at the different types of specialization, in 2009 the share of B segment DBC's was biggest for obstetrics and gynaecology (65%), ophthalmology (56%), neurology (44%), urology (43%) and rheumatology (41%). (**NVZ 2011**) The NZa decides on the shift of DBC's from A to B segment care based on four criteria: transparency, market entry, market behaviour of insurers and external effects (e.g. long waiting lists for A segment health care). (**NZa 2008**)

Transparency means that there must be a clear description of DBC's and price and quality of care must be comparable. With respect to market entry, on the one hand there must be enough

suppliers of health care and there must be possibilities for new entrants. When this is not the case, the power of health suppliers will be too big and they might abuse their position by asking prices which are too high. On the other hand consumers of health care must be able to switch to another hospital such that incentives for suppliers of health care to deliver high quality, affordable care are existing.

Market behaviour of insurers refers to insurers having the incentive to buy affordable, high quality care. Volume of B segment care must be high such that purchasing benefit will be high. Furthermore, insurers must be able to give patients the choice to switch to another hospital such that hospitals will have the incentive to deliver high quality affordable care. This means that only non-emergency care is suitable for B segment care.

The implementation of B segment care leads to an increase in competition among hospitals and health insurers. This may influence the pattern of specialization of hospital care in the Netherlands. In section 4, when analysing the reasons for specialization in the Netherlands, it is researched whether competition in B segment health care has an influence on the specialization pattern of hospital care in the Netherlands.

## 2.2 Organization of hospital care

There are 82 general, 55 categorical and 8 academic hospitals in the Netherlands. Figure 1 represents the geographical distribution of general, categorical and academic hospitals. The blue dots represent the general and categorical hospitals and the red dots represent the academic hospitals. Apart from these health care delivery systems there are 201 ZBC's and 102 private hospitals. (NVZ 2011b)

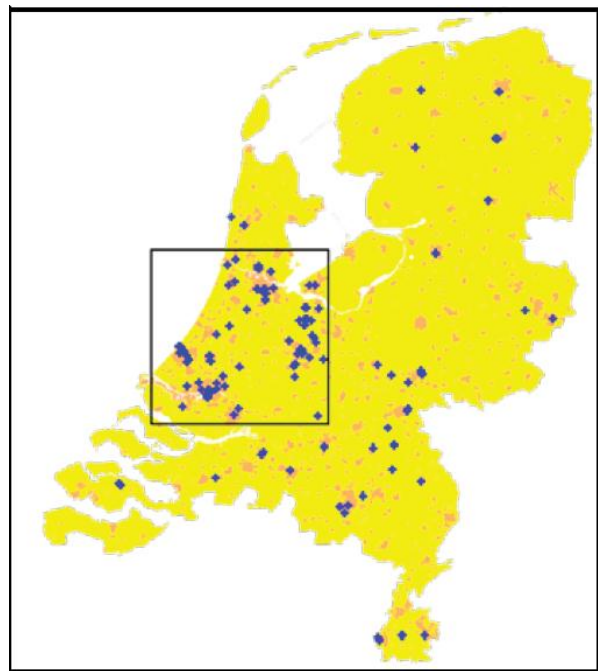
Figure 1: Categorical, general and academic hospitals



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*Source: jaarverslagenzorg.nl*

Figure 2: ZBC's



*Source: NVZ brancherapport 2011 'Zorg op doorreis'.*

A ZBC (Independent Treatment Centre) is a partnership of multiple medical specialists. It is recognized by the government and, in contrast to private hospitals, it offers insured health care. Figure 2 shows that ZBC's are mainly located in the 'Randstad'. ZBC's don't offer emergency or long-lasting care. They mainly focus on the more efficient types of care such as plastic and cosmetic surgery, ophthalmology and orthopaedics.

More than one fourth of ZBC's are linked to hospitals, and almost all medical specialists working in ZBC's are also linked to a hospital.

Both in A and B segment health care hospitals compete with a fast increasing number of ZBC's. The number of ZBC's active in B segment health care grew from 37 in 2005 to 184 in 2010. (NVZ 2011)



### **3 Reasons for specialization**

In **1983 Finkler** argued that arguments to avoid specialization were based on the fact that hospitals wanted to offer a broad product scope to attract more physicians. Nowadays this strategy changed and hospitals are more willing to reduce their scope of operations. In **1776 Smith's** example of the pin factory showed the idea that specialization, or focus, leads to improved performance by reducing complexity and increasing task repetition. Although this argument is based on individual specialization and may not simply translate to a higher level of organization part of it is true for hospital specialization. In this section the different financial incentives for specialization are examined.

#### **3.1 Competition**

The pattern of specialization of hospital care is partly influenced by the desire of hospitals to reduce the competitive pressure they enforce upon each other. Hospitals compete to attract patients and they might decide to specialize to improve their competitive positioning. Where specialization leads to scale economies, more efficient provision of services, learning effects and an increase in quality, hospitals are able to position themselves stronger in a market with competing hospitals and they will be able to increase their bargaining position against insurance companies.

**Calem & Rizzo 1995** conclude that competing hospitals differentiate their specialities either too much or too little relative to the social optimum. They analysed the service mix of two hospitals in a duopoly and found that hospitals choose service mixes which are either too similar or too disparate. They compared the duopoly situation with a two-plant monopoly (merger) and found that as these hospitals don't need to consider the impact of service mix on market share, the degree of specialization will be socially optimal.

Due to the fact that prices in the hospital industry are primarily determined by third-party payers, service mix and quality of care are the dominant instruments of competition in this industry. With respect to competition two conflicting incentives play a role. On the one hand each hospital is drawn to the service mix which fulfils the needs of the median consumer to be able to attract as many patients as possible. But on the other hand hospitals want to distinguish themselves by means of specialization to relax quality competition. Quality competition is costly and is reduced by focussing on differentiation. The draw towards greater differentiation is stronger when quality rivalry is more intense.

But a drawback from increased differentiation or specialization is that it can lead to mismatches between a hospital's proficiencies and an individual patient's needs and this leads

to costs for the hospital. It will damage the reputation of the hospital, worsen its competitive position, and incentives to mitigate this problem will in turn also lead to costs.

Specialization can thus help to improve a hospital's competitive position but only to a certain extent.

**Calem and Rizo 1995** thus state that competition will not lead to the optimal level of specialization. They either specialize too little because they want to increase their market share or they specialize too much because they want to reduce quality competition.

**Lee et al. 2008** do research about the role of small and middle-sized hospitals in the health care delivery system as they compete with larger hospitals to attract patients from the market. They state that small hospitals will increase their competitiveness by converting into specialized hospitals. When they focus on specialized services within a particular hospital, the skill and service levels in that area will be comparable to those of general hospitals.

### **3.2 Economies of scale and profit margin**

The focus of existing literature is mainly on the economies of scale associated with large hospitals, resulting for example from hospital mergers. (**Dranove 1998, Neuman et al 1978**) This of course differs from specialization where hospitals give more emphasis to a particular department within their hospital and where hospitals may even reduce their service mix when they close a particular department. There is literature about the economies of scale of speciality hospitals in the US. This is an extreme form of specialization where hospitals offer a very narrow set of for example surgical procedures. **Schneider et al. 2008** find no evidence for bigger economies of scale in speciality hospitals compared to general hospitals. But they state that for many surgical procedures the volume of specific services performed in speciality hospitals exceed those of general hospitals within the same market. We can then say that to the extent that economies of scale exist for these specific procedures they are more likely to exist in speciality hospitals.

There is evidence showing that more specialized hospitals are more likely to be efficient.

**Daidode & D'amico 2009** show that inefficiency is negatively associated with specialization, specialization thus increases efficiency and **Lee et al 2007** found that more specialized hospitals were more likely to be efficient.

Sources of economies of scale can be the more efficient use of excess capacity (**Lynk 1995**), the spreading of fixed capital<sup>1</sup> and more available resources of capital financing or lower costs of capital due to pecuniary economies. (**Neuman et al 1978**) Apart from real economies of scale, pecuniary economies result from market power and don't correspond to economies in the use of real resources. When specialized hospitals attract more consumers because of for example increased quality, this will strengthen their bargaining position against suppliers of health care, health insurers.

Related to an increase in efficiency is the profit margin hospitals earn on certain procedures. A positive/high profit margin for a particular specialization may be a reason for hospitals to specialize in this type of specialization. **Brickley and Van Horn 2002** for example find a significant positive relation between the chance to be fired and the financial performance of a hospital manager.

### **3.3 Competencies and learning effects**

One could say that hospitals decide to specialize in those types of specializations for which they have developed core competencies. Core competencies refer to the firms' existing stock of knowledge, assets, skills and resources. (**Schneider et al. 2008**) Hospitals should drop product lines which are better served by competitors and focus on 'what I can do best'.

(**Eastaugh 2001**) This way hospitals are able to increase quality. Eastaugh mainly refers to American hospitals that are not the sole provider in their community and for which specialization might be the optimal strategy. As hospital density in the Netherlands is high, a hospital in the Netherlands will almost never be a sole provider in its community and specialization might thus be a optimal strategy for hospitals in the Netherlands.

**Dranove 1987**, finds that there are strong incentives for hospitals to specialize in those types of DRG's<sup>2</sup> for which they have a comparative advantage.<sup>3</sup> Costs will not be same for every hospital, one hospital can be more efficient than another, such that specialization decisions may vary as well. Prices for B segment care will also not be the same for every hospital, since prices for this segment are negotiated between health insurers and hospitals.

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<sup>1</sup> Spreading of fixed capital refers to for example the more efficient use of a MRI scan due to scale economies. But economies of scale are not infinite as, in this example, the number of patients needing a MRI scan can be that high such that one would need a second MRI scan.

<sup>2</sup> Under a system of hospital reimbursement for Medicare patients in the US, hospitals receive a prospectively determined price that varies according to the Diagnosis Related Groups (DRG) to which the patient is assigned.

<sup>3</sup> The comparative advantage theory was first described by David Ricardo and refers to the ability of a person, country, firm, organisation etc. to produce a particular good or service at a lower marginal or opportunity cost over another.

By diversifying and expanding into activities that are related to core competencies and capabilities firms are typically able to take advantage of the learning process and improve managerial efficiency. **(Danneels 2002)** Learning effects may have led hospitals to develop core competencies and after specialization learning effects will make them even stronger in that particular type of care.

Several studies showed that due to an increase in volume, the quality performance (as measure by for example mortality rates) of nurses and physicians improved significantly.

**(Huckman & Pisano 2006, Luft et al 1987, Porter & Teisberg 2004)**

Bigger volume due to specialization allows nurses and physicians to develop more expertise with respect to a specific category of patients which results in better outcomes, and ultimately, lower costs. Arguments in favour of this explanation are based on evidence of learning curves in other industries whereby production becomes more efficient with greater experience.

### **3.4 Economies of scope due to specialization in related types of care**

To what extent should hospitals specialize in the Netherlands? Should there be specialized hospitals focusing on only one or two types of treatments? Or should hospitals offer a wider set of treatments? As **Tiwari & Heese 2009** point out, specialized facilities within a hospital network may lead to the loss of sales from services it no longer offers. Specializing one of its facilities will lead to the costs of losing those patients who will only consume a particular service if the other supporting services are also available.

**Shortell, Morrison & Hughes 1989** performed a three year case study among eight large hospital systems. They found that the best performing hospitals were the ones that avoided diversification into ‘unrelated activities’ thereby maximizing economies of scope and efficiencies associated with learning.

**Clark & Huckman 2011** write about the tension between focussed operations and broader operational scope. While the benefits of focussed operations arise from reduced complexity, lower uncertainty and the development of specialized expertise, broader operational scope benefits from economies of scope achieved by sharing common resources. They find that hospitals with greater levels of specialization in related business segments experience a higher marginal benefit to specialization in a focal segment. They thus find that complementarities exist from specializing in related segments. Hospitals should not focus on one single specialisation but they should build capabilities in complementary areas.

## 4.Specialization of hospital care in the Netherlands

Figure 3 Geographical distribution specializations



Cardiac surgery



Clinical genetics



Thoracic surgery



Radiotherapy

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*Source: Jaarverslagzorg.nl*

Every year health care institutions have to hand in an accountability report consisting of three elements: a social report, a yearly account and some quantitative data to support the social report. ‘JaarverslagenZorg’ which is part of the CBIG, an executive organisation of the ministry of VWS, collects all the data.

In this report ZBC’s, general, academic and categorical hospitals have to report which types of specializations they offer. One can distinguish 35 different types of specializations such as ophthalmology, gynaecology, dermatology etc. (Appendix 1)

As already mentioned in the introduction specialization refers to hospitals offering a more limited amount of services such that the distribution of health care delivery becomes more concentrated. When looking at the amount of health care institutions offering a particular specialization one can see the extent to which that particular type of specialization is concentrated. In appendix 1, an overview is given of all specializations and the percentage healthcare institutions (general, academic and categorical hospitals) offering those specializations. From this overview one can conclude that cardiac surgery, thoracic surgery, radiotherapy and clinical genetics are the ones which are most concentrated. Internal medicine, neurology and anaesthesiology are offered by almost all health care institutions and are thus relatively dispersed.

In figure 3 one can see the geographical distribution of the most concentrated specializations. Cardiac surgery, thoracic surgery and radiotherapy seem to be relatively well distributed among the Netherlands although most of the hospitals are situated in the Randstad. Institutions offering clinical genetics are mainly situated in the Randstad and Limburg and not that much in the North-Eastern provinces.

In the next part the extent to which competition, economies of scale & profit margin, competencies & learning effects and economies of scope can explain the specialization pattern of hospital care in the Netherlands will be examined.

#### **4.1 Competition**

As specialization leads to scale economies, more efficient provision of services, learning effects and an increase in quality, hospitals are able to position themselves stronger in a market with competing hospitals and they will be able to increase their bargaining position against insurance companies. When hospitals decide to specialize to reduce competition one would see a specialization pattern which is characterized by a more dispersed organization of health care delivery systems. Or one could say that

$P(\text{hospital A has cardiac surgery} \mid \text{hospital B has cardiac surgery}) < P(\text{hospital A has cardiac surgery})$

given that hospital A and B are two competing hospitals.

One would than expect that the more competition a hospital faces the more likely that we would see specialization. But one first needs to find a definition of the market of a hospital to define the degree of competition a hospital faces.

There are different methods to define the market of a hospital. **Varkevisser 2010** uses the travel time of patients. As consumers of health care don't pay directly for the costs of health care, one could say that the only costs patients incur is the time they have to travel to get treatment at a hospital. **Burgess et al 2004** discuss the two most common approaches to defining markets for hospitals. The simple approach assumes that a hospital's relevant geographical market consists of a fixed area around the hospital's geographic location. This technique then defines a hospital's competitors as all hospitals within this fixed radius. The shortcomings of this method are that the fixed distance is arbitrary and will overstate the true market size of some hospitals and understate the size of others. Furthermore distance does not tell us everything about the travel time of patients as a 5 km drive within a big city will probably take more time compared to a 5 km drive in rural areas.

Another reason why this may not be the best approach to measure the competition a hospital faces is that the radius doesn't depend on the determinants of demand for hospital services in a geographic area. It for example doesn't take into account the population to be served by the hospital. The smaller the population for a given hospital the larger the potential amount of competition a hospital faces. It also doesn't take into account the differences in low/high volume or simple/complex health care. Competitive pressure will be higher for simple/ low volume health care.

But before defining the market of a hospital to be able to define the competitive pressure a hospital faces, one could already say something about where we expect competition to be high and test whether we see more specialization in this segment.

As prices are freely negotiable in B segment health care, hospitals active in this segment, might want to improve their competitive positioning to be able to negotiate a better price with health insurers. Specialization/concentration will improve their competitive positioning. One would thus expect to see more competition and more specialization in B segment health care compared to the regulated A segment health care.

In appendix 2 one can see the percentage of A and B segment DBC's per specialization. Obstetrics & gynaecology, ophthalmology and orthopaedics merely consist of B segment DBC's.

Table 1 shows that specialization/ concentration of health care mainly occurs in A segment health care and not in B segment health care which is contrary to what we expected.

**Table 1**

<b>Specialization</b>	<b>Percentage B segment</b>	<b>Percentage A segment</b>	<b>Percentage hospitals offering specialization</b>
Obstetrics & gynaecology	65%	35%	79%
Ophthalmology	56%	44%	80%
Orthopaedics	51%	49%	81%
Cardiac surgery	0%	100%	15%
Thoracic surgery	21%???	79%	23%
Clinical genetics	0%	100%	24%
Radiotherapy	0%	100%	22%

As competition is high in B segment health care but we see specialization of health care mainly in A segment health care, the argument that hospitals choose to specialize to reduce the competitive pressure they enforce on each other thus does not seem to hold. The NZa decides on the shift of DBC's from A to B segment care based on the criteria transparency, market entry, market behaviour of insurers and external effects. These criteria seem to be intended in such a way that competition remains high in B segment health care and that there are no possibilities for hospitals to obtain market power<sup>4</sup> by means of specialization. This may explain why hospitals do not specialize in competitive B segment health care.

#### **4.2 Economies of scale and profit margin**

When hospitals decide to specialize based on this reason one would expect to see specialization there where economies of scale/ profit margins are high. But hospitals than have to know where economies of scale exist and to know this hospitals must be able to calculate the cost price of their products.

Before the introduction of regulated competition, hospitals were sure of financial resources as hospitals were financed by means of a global budget. After the introduction of regulated competition, in 2005, this system changed to one based on pay for performance where hospitals now have a financial incentive to improve their functioning.

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<sup>4</sup> Where market power refers to the ability of firms to raise price above some competitive level, the benchmark price, in a profitable way. (Motta 2004)



Hospitals must be able to calculate the cost price of their products not only to know where economies of scale exist but also to be able to negotiate with insurers about the price of B segment DBC's. **Asselman 2008** describes why defining cost prices for hospital care is complex. Cost prices contain detailed information about the organization of a hospital and about the functioning of departments and individual staff members. That is why some employees are afraid that it will damage their position or status as professional physician. Furthermore, defining cost prices for DBC's is complex and extensive because they consist of many different treatments and products. Because of its complexity it is expensive for hospitals to calculate cost prices and in many circumstances the benefits do not outweigh the costs. In 2005, several hospitals started defining cost prices for their products for the first time.

**(Asselman 2008)**

**Hendriks 2011** researches whether top clinical hospitals in the Netherlands focus more on profitable B segment DBC's since the implementation of the DBC system. There was no positive, significant relation between the number of treatments in 2005, 2006 and 2007 and the profit made by the hospitals being researched. Shortcomings of this study are that they only researched three hospitals and years used for research were only very shortly after the introduction of DBC's.

Until recently hospitals weren't allowed to pay out dividend to private investors. The main goal of hospitals was, and still is, not to make profit but to be an all-round, high quality hospital. **(NVZ 2011)**

In contrast to the big general, academic and categorical hospitals, ZBC's and private hospitals offer a limited amount of service and focus on the low-complex, more efficient types of health care. Some accuse these institutions of 'cherry-picking' as they only treat the most efficient patients and refuse expensive patients such as the elderly and obese. **(NZa 2007)**

Big hospitals use low-complex profitable specializations to cross-finance loss-making specializations such as cardiac surgery. Due to the fast increase in the number of ZBC's and private hospitals, the volume of patients for low-complex, efficient specializations, declines in the bigger hospitals. Therefore they are less able to cross-finance loss-making specializations and health care costs rise in these bigger hospitals.

One can conclude that hospitals don't specialize in specializations which are more efficient due to for example economies of scale. First of all they do not always know the cost price of their products. Secondly, the main goal of hospitals is not to make profit but to be an all-round high quality hospital.

### 4.3 Competencies & learning effects

Where reasons for specialization based on economies of scale are mainly driven by a desire to become more efficient or to increase the profit margin, learning effects may also lead to an increase in efficiency but this is mainly due to an increase in quality. Because of its complexity, learning effects for hospital care will be high. It is important that physicians perform a particular treatment a minimum number of times a year to keep quality standards high and to minimize the number of complications

In January 2011, the Dutch Association for Medical Science imposed volume norms for surgeries. (NVvH 2012) These norms are divided in 4 categories which are based on low/high complex and low/high volume surgeries. Every category is evaluated based on a quality standards and a minimum number of surgeries per team per year. Examples are a minimum of 50 breast cancer surgeries, 50 intestine cancer surgeries and 20 lung cancer surgeries per hospital per year. Hospitals which don't meet these standards must refer patients to other hospitals or they can collaborate with other hospitals.

Hospitals which do meet the standards could be hospitals which have developed core competencies for a particular type of specialization. A hospital can develop this experience by for example historically having many fte's of a particular specialization.

In this case one would expect to see that specialization/ concentration of care occurs in those hospitals which have developed a lot of experience for that type of care.

One could test this by looking at data of a couple of years ago and check whether the hospitals now specializing in for example cardiac surgery also had relatively a lot of fte's for cardiac surgery a couple of years ago. But there is no data publicly available stating the number of fte's per hospital per specialization.

Indirectly related to the number of fte's or medical specialists is the number of inhabitants in the market a hospital faces. At the supply side, one would expect that a hospital situated in a dense populated area faces a bigger pool of medical specialists who are willing to work in that particular hospital. At the demand side, a dense populated area also means that there are relatively many patients who need treatment at that particular hospital such that the volume per treatment is high and hospitals can benefit from learning effects. Cardiac surgery, for example is concentrated in big cities such as Amsterdam, Den Haag, Rotterdam, Nijmegen, Utrecht etc.

As a consequence of the volume norms the MCA in Alkmaar is the only hospital in the Northern part of Noord-Holland which is allowed to perform complex thorax and lung

surgeries. The Gemini hospital in Den Helder and the Rode Kruis hospital in Beverwijk did not meet the volume standards and decided to collaborate with the MCA in Alkmaar.

The MCA is situated in an area with relatively more inhabitants compared to the Gemini hospital in Den Helder and the Rode Kruis hospital in Beverwijk. The MCA was therefore able to reach a high volume of complex thorax and lung surgeries.

#### **4.4 Economies of Scope due to specialization in related types care**

As complementarities exist hospitals should specialize in related segments. Segments can be related because one needs common resources for both segments (such as a MRI scan) or because of patient profiles. A heavy smoker is likely to have vascular diseases but is also likely to suffer from an affection of the lungs. An obese person will probably get diabetes and will therefore probably also get eye problems and the chance to develop kidney failure is relatively big.

Categorical hospitals focus on specific groups of patients and can thus benefit from economies of scope. Examples of categorical hospitals are centres for rehabilitation, cancer and epilepsy. In general and academic hospitals there are departments within the hospital focussing on particular chronic illnesses. There is an increase in patients with chronic diseases over the last couple of years. These diseases exceed multiple specializations which makes collaboration between these specializations necessary. Examples of such hospital departments focussing on chronic diseases are departments for diabetes, COPD, depression, heart failure, stroke and breast cancer. These illnesses have in common that when cooperation within the hospital is optimal these departments can be profitable. **(RIVM 2008)**

This type of cooperation is called disease management (DiM) where medical specialists collaborate and agree about the best procedure for specific patients. There is evidence proving an increase in efficiency with respect to departments for oncology and diabetes. **(Bloem et al. 2011)**

The diversification in related activities, specializations which are all involved with the treatment of a particular chronic illness, can lead to economic efficiency associated with learning. A hospital can develop expertise with respect to a particular illness and thereby it can attract more patients. Collaboration between different medical physicians will also improve efficiency. It can for example be the case that one physician asks for a MRI scan without knowing that another physician asked for the same test. When collaboration is optimal these inefficiencies can be prevented.

Examples of specialization one would expect to be related are:

1. Cardiac surgery – Thoracic surgery – Vascular surgery
2. Oncology – Plastic surgery - Radiotherapy
3. Renal diseases – Urology – Internal medicine

For these specializations one could test something similar to section 4.1

$P(\text{hospital A has specialization Z} | \text{hospital A has specialization Y}) > P(\text{hospital A has specialization Z})$

given that specialization Z and Y are related.

In appendix three the probabilities for related segments 1, 2 and 3 are given. The conditional probabilities compared to the simpler probabilities are bigger for 1, 2 and 3. The conditional probability of a hospital specializing in cardiac surgery given that it also specializes in related specializations thoracic and vascular surgery is for example bigger than the simple probability that the same hospital specializes in cardiac surgery. There are of course more specializations which are related but I not have the medical expertise nor the time to draw any conclusions about these specializations.

## **5. Specialization of hospital care in the future**

The specialization pattern of hospital care in the Netherlands is mainly influenced by a desire of hospitals to keep the quality standard of health care high. Financial incentives do not seem to have an influence on the decision of hospitals to focus on a particular type of specialization. Specialization is not used to reduce the competitive pressure hospitals enforce upon each other. Hospitals do not focus on the more efficient types of care but volume norms influence the specialization pattern as complex, low volume, health care is concentrated in hospitals which meet these standards.

The question is whether it is maybe too early after the introduction of regulated competition in 2005 to conclude about the extent to which financial incentives have an influence on the specialization decision of hospitals. The competition from an increasing number of ZBC's and private hospitals will probably force hospitals to focus more on financial incentives.

Several institutions did research about the future of the hospital market. Views about the extent to which economic incentives define the specialization of hospitals differ. Health care will become more concentrated in the future but some state that reasons for specialization are

mainly driven by a desire to increase quality. (**Regieraad kwaliteit van zorg 2012**) The Council for Public Health and Care state that quality norms will shape the pattern of hospital care in the future. (**Raad voor Volksgezondheid en Zorg 2011**) The assumption is that an increase in quality will reduce complications and, as complications are very expensive, this will reduce health care expenditures.

KPMG points to an increase in the concentration of hospital care due to mergers and collaboration between hospitals. (**KPMG 2012**) An increase in the number of hospital chains is expected, where hospital chains refer to regional, national or trans-national organizations with one management unit. These chains will benefit from economies of scale when negotiating with health insurers. One could wonder what the effect will be of this extensive form of hospital collaboration on the competition between hospitals. Incentives to innovate or to increase quality could be reduced and because of the stronger bargaining position of hospitals with health insurers, hospitals will be able to negotiate higher prices for B segment DBC's. The bargaining position of partnerships of medical physicians is also likely to increase but further analysis is beyond the scope of this thesis.

The NVZ published a report about the future of hospital care in which they underline that three core values will form the new organization of health care in the Netherlands: specialization, an increase in scale and funding. (**NVZ ???**) In their view financial incentives will play a bigger role. In a market where competition among hospitals is increasing, partly due to the increasing number of ZBC's and private clinics, hospitals can distinguish themselves by means of specialization in high complex health care. Furthermore hospitals will make use of outsourcing as they will outsource loss-making activities and use the expertise of regional, national or even international specialised clinics.

According to BS health consultants, cheaper, low-complex health care will no longer be exercised in hospitals but will move to first line care (such as general practitioners) and ZBC's. (**BS health consultancy 2009**) High complex care should be concentrated in core hospitals. A problem with this organization of health care is how hospitals will be able to finance their expenditures as they only have high complex, loss making specializations.

Hospitals should be able and willing to calculate cost prices of DBC's in the future. It is important for hospitals to have insight in their cost prices to know where economies of scale exist. It is also important that there is transparency with respect to cost prices to be able negotiate with health insurers about the price of B segment DBC's. The NVZ expects an increase in funding from private investors who will have an influence on the management of

hospitals. The NVZ thus expects that hospitals will be more efficient, that they will be able to make profit to attract private investors.

## 6. Conclusion

Regulated competition was introduced to contain the increase in health care costs and to maintain a high quality standard. Competition would raise financial incentives to make the provision of health care more efficient. The organization of health care delivery is changing as health care delivery becomes more concentrated. The extent to which financial incentives define the specialization pattern of hospital care in the Netherlands were examined in this paper.

Hospitals do not seem to focus on financial incentives for specialization. Hospitals do not specialize in efficient specializations. This is because hospitals do not always know the cost prices of their products and the main goal of hospitals is not to make profit but to be a high quality all-round hospital. Hospitals do not specialize to reduce the competitive pressure they enforce up on each other. Specialization of care is relatively low in the highly competitive B segment care and high in A segment care. As the criteria used by the NZa to decide on the shift of A segment DBC's to B segment DBC's are developed in such a way that competition remains high in B segment health care, there are no possibilities for hospitals to obtain market power by means of specialization. This may explain why hospitals do not specialize in competitive B segment health care.

The specialization decision of hospitals seems to be based on a desire to increase, or maintain a high quality standard. The assumption is that an increase in quality will reduce complications and, as complications are very expensive, this will reduce health care expenditures. Learning effects can explain the specialization of health care in A segment health care. As learning effect arise with an increase in the volume of the specialized type of care, the Dutch Association for Medical Science imposed volume standards for low volume, complex health care to maintain a high quality standard. These volume standards explain why the specialization pattern is characterized by a concentration of complex, mainly A segment health care. There furthermore seems to be an indication of specialization in related specializations.

The future of hospital care specialization will be characterized by a further increase of concentration of low volume, high complex health care to keep quality standards high. But there are indications that financial incentives will play a bigger role in the future.

## **7. Abbreviations**

- CIBG Centraal Informatiepunt Beroepen Gezondheidszorg (Central Informationpoint OccupationsHealth Care)
- DBC Diagnosis Behandel Combinatie (Diagnosis Treatment Combination)
- NFU Nederlandse Federatie van Universitair Medisch Centra (Dutch Federation for Academic Hospitals)
- NVZ Nederlandse Vereniging van Ziekenhuizen ( Dutch Hospital Association)
- VWS Ministerie van Volksgezondheid Welzijn en Sport (government for public health, well-being and sports)
- ZBC Zelfstandig Behandel Centrum (Independent Treatment centre)
- ZKN Zelfstandige Klinieken Nederland (Independent Treatment Centra Netherlands)



## 8. Appendix

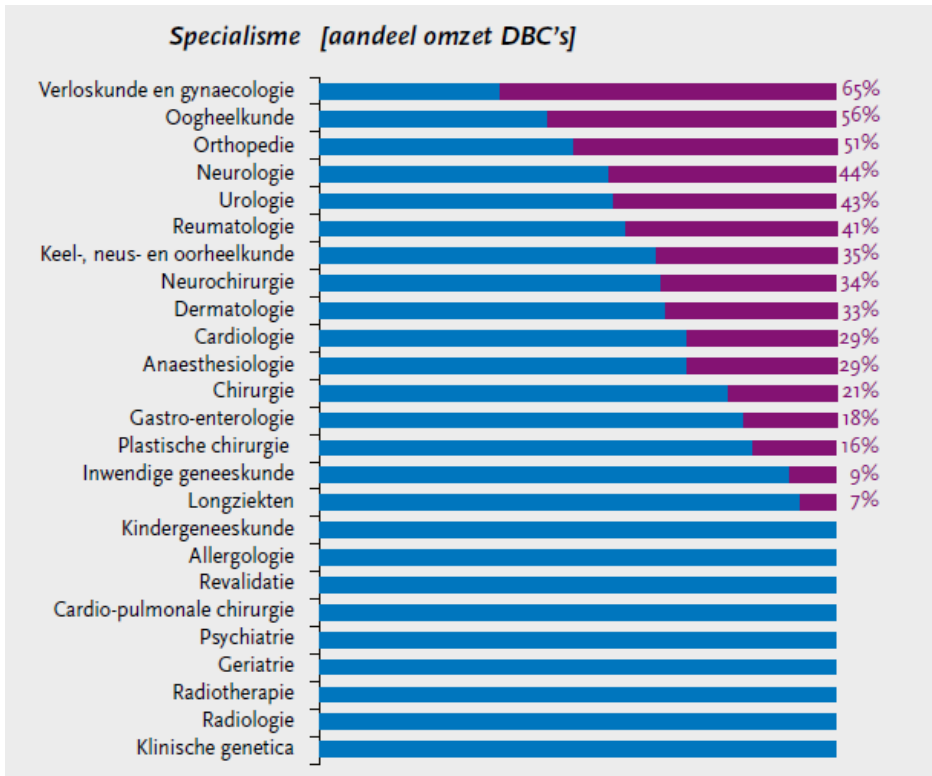
1. The percentage of general, categorical and academic hospitals offering a particular specialization.

Specialization		Specialization	
Anesthesiologie	83%	Neurologie/ neurology	83%
Algemene heekunde	80%	Neurochirurgie	63%
Cardiochirurgie	14%	Nierziekten	58%
Cardiologie	79%	Nucleaire geneeskunde	58%
Dermatologie	80%	Oogheekunde	80%
Gynaecologie	80%	Orthopedie	81%
Hematologie	51%	Plastische chirurgie	70%
Interne geneeskunde	84%	Pulmonologie	75%
Kaakchirurgie	74%	Psychiatrie	63%
Keel-, Neus en Oorheekunde	80%	Radiodiagnostiek	82%
Kindergeneeskunde	81%	Radiotherapie	22%
Klinische chemie	79%	Reumatologie	75%
Klinische genetica	24%	Revalidatie	73%
Klinische oncologie	64%	Thoraxchirurgie	22%
Klinische pathologie	67%	Urologie	80%
Maag- darm, leverziekten	72%	Vaatchirurgie	75%
Medische microbiologie	72%	Verloskunde	78%
Mondziekten	58%	Overig	46%

Source: Jaarverslagenzorg.nl

2. Percentage A and B segment DBC's per specialization in 2009.

(blue = A segment, purple = B segment)



Source: NVZ brancherapport 2011 'Zorg op doorreis'.

3.

**Cardiac surgery – thoracic surgery – vascular surgery**

	# Hospitals	Cardiac surgery	Thoracic surgery	Vascular surgery	
<b>Cardiac surgery</b>	16	X	15	16	# hospitals T & V given C= 15
<b>Thoracic surgery</b>	26	15	X	25	# hospitals C & V given T = 15
<b>Vascular surgery</b>	87	16	25	X	# hospitals C & T given V= 15

$$\Pr(C | T \& V) = 15/25 = 0,6 > \Pr(C) = 16/116 = 0,13$$

$$\Pr(T | C \& V) = 15/16 = 0,94 > \Pr(T) = 26/116 = 0,22$$

$$\Pr(V | C \& T) = 15/16 = 0,94 > \Pr(V) = 87/116 = 0,75$$

**Oncology – plastic surgery - radiotherapy**

	# Hospitals	Oncology	Plastic Surgery	Radiotherapy	
<b>Oncology</b>	73	X	65	19	# hospitals P & R given O = 19
<b>Plastic surgery</b>	99	65	X	19	# hospitals O & R given P = 19
<b>Radiotherapy</b>	24	19	19	X	# hospitals O & P given R = 19

$$\Pr(O | P \& Ra) = 19/19 = 1 > \Pr(O) = 73/116 = 0,63$$

$$\Pr(P | O \& Ra) = 19/19 = 1 > \Pr(P) = 99/116 = 0,85$$

$$\Pr(Ra | O \& P) = 19/65 = 0,29 > \Pr(Ra) = 24/116 = 0,21$$

**Renal diseases – urology – internal medicine**

	# Hospitals	Renal diseases	Urology	Internal Medicine	
<b>Renal diseases</b>	64	X	59	64	# hospitals U & I given R = 59
<b>Urology</b>	96	59	X	93	# hospitals R & I given U = 58
<b>Internal Medicine</b>	104	64	93	X	# hospitals R & U & V given I = 59

$$\Pr(Re | U \& I) = 59/93 = 0,63 > \Pr(Re) = 64/116 = 0,55$$

$$\Pr(U | (Re \& I)) = 58/64 = 0,91 > \Pr(U) = 96/116 = 0,83$$

$$\Pr(I | Re \& U) = 59/59 = 1,0 > \Pr(I) = 104/116 = 0,90$$

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