



International variations in availability and diffusion of alternatives to in-patient care in Europe: the case of day surgery

Madelon W. Kroneman ^{a,*}, Gert P. Westert ^b, Peter P. Groenewegen ^a,
Diana M.J. Delnoij ^c

^a Nivel, PO Box 1568, 3500 BN, Utrecht, The Netherlands

^b RIVM, PO Box 1, 3720 BA Bilthoven, The Netherlands

^c Department of Social Medicine, Academic Medical Centre/University of Amsterdam, PO Box 22660, 1100 DD Amsterdam, The Netherlands

Received 8 July 2001; accepted 8 August 2001

Abstract

Objectives: Technological and medical developments have contributed to the increasing number of surgical procedures carried out as a day-case rather than an inpatient hospital setting. The diffusion of day surgery varies among European countries. This study aims at explaining this variation in healthcare system characteristics. **Methods:** Questionnaires were sent to experts in 12 countries in Northwest Europe. The questionnaire contained questions about the organization and diffusion of day case surgery (at country level and individually for 18 selected procedures), and relevant healthcare system characteristics (financing systems, organization of after care, etc.). **Results:** It is demonstrated that hospital bed supply relates to the diffusion of day surgery. In countries with fewer beds, a higher day surgery rate is found. The financing system of hospitals does not influence the choice of surgical setting. In countries with a fee-for-service financing system for hospital-based physicians, day surgery rates are not higher than in countries with salaried medical specialists. With respect to aftercare, the availability of sufficient home nurses favours day surgery. **Conclusions:** The relative scarcity of hospital beds or large reductions in bed supply has led to the perception of day surgery as an alternative that could meet the growing demand for surgical treatment. It is worthy of note that, although the majority of experts state that financial incentives discourage day surgery, the supply is growing. © 2001 Elsevier Science B.V. All rights reserved.

Keywords: Diffusion of day surgery; Europe; Healthcare systems; International comparison

1. Introduction

Developments in medical technologies such as endoscopy, laser and ultrasound together with shorter and safer anaesthesia have made medical and surgical treatments less invasive. Some procedures are now so minimally invasive, hospital admission is no longer necessary. At the end of the day, after treatment, patients return home. However, day treatment does not always prevail over more traditional inpatient treatments, since it is not yet common practice everywhere. In the Netherlands only about 1/3 of all elective surgery is performed as day surgery, whereas in the US, day

surgery is more common: 2/3 of all elective surgery is day surgery [1]. Obstacles can be found at different levels. First, at the micro level: patients or physicians may not want, or may not be able to use day surgery. For some patients day surgery could be unsuitable because of their health condition (e.g. co-morbidities), social conditions (e.g. no carers at home), or personal preferences [2–4]. On the physician's side there may be problems through lack of experience with new techniques, or doubts concerning the safety of a procedure. For physicians, personal preferences such as a tendency to adopt innovations may also play a part, as may local customs [4–7]. Second, hospital characteristics, such as the organization of hospital care, the number of hospital beds, the size of the hospital, may play a part. Finally, at the macro level, healthcare system characteristics such as financing and insurance influence the

* Corresponding author. Tel.: +31-302729-640; fax: +31-302729-729.

E-mail address: m.kroneman@nivel.nl (M.W. Kroneman).

diffusion of day surgery. It could be argued that obstacles at the micro level are evenly spread over all healthcare systems. Although important, they cannot therefore be considered capable of explaining the differences between countries. The explanation of differences between countries needs to be sought in factors at intermediate and macro levels.

The acute hospital care sector has been subject to change in the last few decades. Two organizational characteristics are highlighted here, namely the decline in hospital bed supply and the changes in hospital financing systems. Day surgery could serve as an alternative to inpatient care in the case of declining bed supply. Most studies concerning the effect of hospital bed supply on hospital bed use fail to include alternatives for inpatient procedures, such as day surgery, or waiting lists [8–11]. The aim of this study is to gain insight into the organizational conditions that favour day surgery as an alternative to inpatient care.

Our research questions were formulated as follows:

1. Do European countries differ in the diffusion of day surgery?
2. Can differences in the diffusion and availability of day surgery be accounted for by healthcare system characteristics?

In this study, we have used the following definition of day surgery: “Day case surgery can be defined as elective, minor or intermediate procedures performed under local or general anaesthesia on patients who are admitted and discharged during a single working day” [12].

2. Conditions that influence the use of day surgery

We can divide the conditions that favour day surgery as an alternative to inpatient care into two main categories: organizational characteristics; financial incentives. First, we discuss the possible influence of the characteristics of healthcare organization.

The level of and change in the supply of hospital inpatient beds must be considered. First, it can be expected that hospitals in countries with low bed supply would be more willing than countries with high bed supply to introduce day surgery to relieve pressure on inpatient capacity. For low-supply countries, day surgery might afford the opportunity to reduce waiting lists. In high-supply countries, hospital managers could be expected to prefer sufficient use of the inpatient capacity [13]. Managers may fear bed reductions when working below full capacity. They may also want to see returns on investments made to create the bed capacity (compare Roemer’s Law: *a bed built is a bed filled*). Secondly, hospital-bed reductions in the last decade may have contributed to the diffusion of day surgery. In countries undergoing a sub-

stantial reduction of hospital beds, the need to introduce day surgery (in order to compensate for the loss of in-patient capacity) may have been felt more strongly.

In addition to triggers from hospital bed supply, day surgery also needs a good organization of and communication with home care (community nurses, general practitioners). In countries where the primary care sector has developed strongly, the introduction of day surgery could be expected to be easier than in countries traditionally more oriented towards secondary care. It is also plausible that, in countries where hospitals have attached outpatient departments, the switch to day surgery would lead to a less fundamental organizational change than in countries where hospital care is mainly devoted to inpatient care. Where no outpatient wards exist, not only would the organization of the hospital have to change; constructional changes would also be needed. So, in countries with hospitals without outpatient departments, the conditions for introducing day surgery as an alternative for in-patient care would be less favourable [14,15].

We now turn to the financial conditions. When day surgery is provided within the hospital environment, the financing of inpatient care is important. Where hospitals are paid per diem, it would be financially attractive to keep patients hospitalized for as long as possible. This would not provide a very favourable financial climate in which to switch to day surgery. In a global-budget situation, where the hospital receives a fixed amount, day surgery would be more attractive, since it is cheaper than inpatient care. However, there is the danger of what is known as the efficiency trap. Day surgery may be cheaper per case but, through greater patient throughput, it may be more expensive than inpatient care in a given budget period [3].

Previous research has revealed that day surgery is not always a substitute for inpatient care; it may be supplementary [6,7]. According to Haworth and Balajaran [6], day surgery may only be a substitute for inpatient care where the population is adequately provided, or even over-provided, with inpatient care. In all other cases, day surgery may be used to reduce waiting lists, or compensate for the loss of inpatient bed supply, in which case no reduction of admission rates would be realized.

Hospitals that have invested in special day surgery wards, or the managers of free standing day surgery wards, would be more eager to promote day surgery in order to have returns on their investments than hospitals where day surgery is performed within the inpatient setting. In addition, the remuneration of the physicians performing the surgery is important. Since nowadays both day surgery and inpatient treatment

are often acceptable, physicians have the opportunity to choose between the two options. In addition to medical arguments, financial incentives may play a part. As Westert and Groenewegen [16] have argued, insofar as medical considerations allow, physicians choose an optimum between income and leisure time. Physicians in salaried service may not be willing to increase productivity, since this would increase workload without further financial gain. On the other hand, the decision of physicians paid on a fee-for-service basis may depend on the level of remuneration. With inpatient surgery better paid than day surgery, there would be no financial incentive to adopt new procedures. On the other hand, if more patients could be treated in day surgery, an increase in income within the same working hours may be achievable.

In summary, we can expect countries with a lower bed supply, a positive financial climate towards day surgery, and pre-existing well developed outpatient and/or primary care to have a higher day surgery rate than countries where these are not in place. In this study, the units of analysis are countries. Although the underlying explanatory mechanisms may operate at intermediate (managerial decision making) or micro levels (clinical decision making), we expect their implications to cluster within countries. The discussion above leads to the following hypotheses:

- Hospital bed supply:
 1. In countries with a high acute care bed supply, day surgery rates are lower than in countries with a low bed supply;
 2. In countries which have experienced a strong reduction of hospital beds, the tendency to look for alternative forms of care is stronger and there is a higher day-surgery rate;
- Aftercare organization:
 3. In countries that are strongly secondary care oriented, the day surgery rate is lower than in countries with a stronger primary care orientation;
 4. In countries where hospitals do not have outpatient departments, the day surgery rate is lower than in countries that do have outpatient departments;
- Financial:
 5. In countries with a global-budget financing system, the day surgery rate is higher than in countries with a *per diem* system;
 6. In countries where physicians are remunerated per case or fee-for-service, the day surgery rate is higher than in countries where physicians receive a (fixed) salary;
 7. In countries where the costs of day surgery are covered by the returns, the day surgery rate is higher than in countries where this is not the case.

3. Data and method

Before the data and method are described, day surgery must first be operationalized. For this study we have used Mascarenhas and Newton's definition as cited above [12]. Unfortunately, this definition does not yield an unambiguous classification of the type of surgery. Confusion with surgical procedures in an outpatient setting is possible. There is not always a clear distinction between a procedure carried out in an outpatient setting, or in day surgery. This lack of precision can even influence national statistics. For instance, in the United Kingdom the Royal College of Surgeons sets targets for day surgery. To achieve these targets, some hospitals shifted some procedures in their registration from outpatient surgery to day surgery [17]. Such lack of transparency is a common problem in health services research [18]. We solved the problem in this study by combining the procedure-specific data for day surgery and outpatient treatment. Moreover, day surgery is known by many different terms: day case treatment and day-care are used in this study as synonyms.

The data came from various sources. First, a questionnaire was sent to day surgery experts in several western European countries. The subset of countries was selected for their comparable level of economic wealth. This is important in order to minimize the disturbing effects of economic constraints on the level of healthcare supply ([19]). In this questionnaire we asked for the organization of day surgery in the country concerned. In addition to these data, we used the OECD health data files of 1999 for data concerning acute care hospital bed supply. Healthcare organization data were obtained via a literature survey carried out in another study dealing with hospital bed reductions [20].

The questionnaire consisted of two parts. The first part contained questions about the diffusion of day surgery (which kind of hospitals, since what date, how many hospitals). For eighteen surgical procedures, we asked to what extent the procedure was performed in inpatient or outpatient/day care. This part of the questionnaire consisted of closed questions. The second part concerned the financing of day surgery; financial, organizational, or medico-technical impediments perceived in the use of day surgery, and the organization of after-care. The questions about after-care and perceived problems were open questions; the remainder of the questions were closed. For countries where more than one expert answered the questionnaire, we combined the answers to obtain one result for that country. When answers differed, we followed the following decision scheme: answers that according to the expert were based on statistical data prevailed over answers based on estimations. When experts clearly contradicted each other, the answers were coded as 'experts contradict

each other' and treated as missing values. Where these rules did not result in a solution, a decision was taken for which the underlying argumentation was documented (to be obtained from the authors on request).

In 1996–1997, the questionnaires were sent to 25 experts in 12 countries. The experts were people who were well informed about the development of day surgery within their own countries. The experts consisted of people who worked at national hospital institutes, innovative hospital physicians who had promoted day surgery at a national level, and researchers who had published on the subject. Before answering the questionnaire, respondents were asked to judge whether they considered themselves to be a suitable expert. In a few cases the recipient of the questionnaire proposed another person who was considered to have more expertise. The response was 72% (18 questionnaires), resulting in at least one completed questionnaire for each of these 12 countries. The experts from France and Italy were not able to provide national statistics on places where procedures were carried out, leaving data from ten countries available for analysis of the procedure settings: Austria, Belgium, Denmark, Finland, Germany, The Netherlands, Norway, Sweden, Switzerland, and the United Kingdom. The data for Switzerland were based on one canton (Zurich). Questions about organization, financing, and perceived problems were answered by all 12 countries.

The degree of day surgery in a country was computed as follows. A subset of 18 procedures was selected and presented to the experts. In addition to frequency of performance, the basis on which the procedures were selected was to ensure that sufficient variation would be available in the conversion of the procedure to day surgery. The procedures range from easily convertible (such as cyst excision) towards procedures difficult to carry out in day surgery (such as prostate surgery). For each of the 18 procedures, the country experts were asked to indicate whether the procedure was carried out as an inpatient, day surgery, or outpatient procedure. The following categories could be chosen: always as a day case/outpatient (more than 90%); mostly as a day case/outpatient (50–90%); mostly as an inpatient (50–90%); always as an inpatient (more than 90%). The categories were coded 1–4, respectively. For all the procedures, all the scores were added and divided by the number of procedures. This process resulted in a score between, and including, 1 and 4: 1 indicates a complete orientation towards inpatient care; 4 indicates a complete orientation towards day case/outpatient care. The validity of this scale was tested with the data collected by De Lathouwer and Poullier [21] who investigated the diffusion of day surgery in 29 OECD countries. In their survey, they aimed at giving the percentage carried out in day surgery for each procedure. They were successful for 13

countries, eight of which were European countries. Six countries participated in both studies. De Lathouwer and Poullier [21] also failed to obtain statistical data from France or Italy. For the seven procedures common to both studies, we recoded these percentages into our categories and compared the rankings of the procedures (the average of all 6 common countries) and country scores in both studies. The procedure rankings were similar. For the ranking in countries, Denmark was an outlier. Apart from this country, the ranking again was similar. The substantial similarity between De Lathouwer and Poullier's findings and our own indicates that the statistical data and estimates were quite reliable within certain boundaries. The only outlier was Denmark. According to De Lathouwer and Poullier's data, Denmark is more inpatient oriented.

To test the hypotheses, we computed Spearman rank-correlations. We chose this method because most of the data were categorical and therefore required a non-parametric method.

4. Results

In half of the western European countries in our study, day surgery had already been performed on a routine basis since before 1980 (Austria, Denmark, Italy, Norway, Switzerland, the United Kingdom). In Belgium and the Netherlands, day surgery was introduced on a large scale between 1980 and 1985. In Finland and Sweden, this type of surgery became common between 1985 and 1990; France and Germany were the last to introduce day surgery on a routine basis. If day surgery is performed in a country, this care is provided to the same extent by all types of hospitals (academic, public, private for profit, private non-profit). Although our experts in Italy and Austria indicated that day surgery had already been performed routinely in their country before 1980, this introduction is not yet countrywide, since this type of procedure is only performed in some hospitals. For Belgium, Finland, the Netherlands and Sweden day case procedures started after 1980, but as in most of the countries that started earlier, the experts reported that day surgery was performed in most or all hospitals. So the period of starting day surgery appears to bear no relationship with its current diffusion.

An important problem concerning the diffusion of day surgery is the lack of financial incentives. In seven of the 12 countries the experts indicated that there was either no financial incentive, or even a negative incentive in the sense that real costs were barely covered, or inpatient procedures were more profitable. On the one hand, two countries (the Netherlands and Denmark) reported an insufficient inpatient bed supply as an incentive to switch to day surgery. On the other hand,

Table 1
Disciplines involved in aftercare ($n = 12$)

Discipline	Involved in number of countries
Hospital	4
GPs	8
Home/community nurses	7

the expert for Austria indicated that the oversupply of inpatient beds had led to a preference for inpatient care.

The importance of the primary care sector can be illustrated by the fact that most respondents indicated that general practitioners (GPs) were the most important people involved in aftercare (in eight countries, Table 1). In Denmark, the aftercare for the first 24 h is provided by the hospital; afterwards, GPs and home nurses take over. In UK, the large day centres provide their own aftercare; the smaller centres depend on community-based aftercare. The expert in Norway reported that the hospital-based doctors saw to the aftercare without mentioning the part played by other aftercare providers. In seven countries, the home nurse was also involved. Only one country (Austria) indicated that relatives were involved in aftercare. In Austria the communication between hospitals and GPs was reported to be problematic, so that the quality of aftercare may be endangered.

From Table 1, we can conclude that day surgery has both secondary and primary care elements. For the 18 distinctive procedures, we asked to what extent each

Table 2
Classification of procedures towards setting of surgery ($n = 10$)

Almost always in day surgery	Both in day surgery and inpatient surgery	Almost always in inpatient surgery
Excision of a sebaceous cyst	Cystoscopy	Laparoscopic cholecystectomy
Excision of a nevus or lipoma	Dilatation and curettage	Radicular disc replacement
Termination of pregnancy	Adenoidectomy	Prostate surgery
	Cervical cerclage and cone biopsy	Laparoscopic appendectomy
	Cataract surgery	
	Haemorrhoidectomy	
	Hysteroscopic surgery	
	Knee or meniscus operation	
	Inguinal hernia repair in children	
	Tonsillectomy	
	Inguinal hernia repair in adults	

No data available for Italy and France. The data for Switzerland are based on one Canton (Zurich).

procedure was implemented in day surgery. In Table 2, we present the procedures according to the setting in which they are most commonly performed.

From Table 2, it appears that procedures that require penetration of the skin before performing the procedure and concern for the abdominal space are preferably performed in an inpatient setting. Procedures that concern the skin surface, extremities, or abdominal organs that can be reached without skin penetration are more often performed in day surgery.

On the basis of the answers given concerning the setting of surgery for the selected procedures in each country, a rough classification was made of the degree in the various countries to which day surgery is performed (Table 3).

Table 3 reveals a geographic gradient in the diffusion of day surgery. Broadly, we can state that the more northern a country, the greater the extent of day surgery.

The influence of hospital bed supply on the use of day surgery is now discussed. Hospital bed supply was operationalized as acute care hospital beds per 1000 inhabitants. The data were obtained from the OECD health data files. Change in hospital bed supply was operationalized as the percentage change in beds between 1986 and 1996. The change in hospital beds in absolute terms (in beds per 1000 inhabitants) does not show much variation between countries. However, since the countries vary significantly in the number of beds per 1000 inhabitants, the percentage change also varies considerably (from 1.5% change in Austria to almost 40% in Sweden). Countries with a large supply of acute care beds were more oriented towards inpatient procedures, while countries with a low supply had a higher day case rate (Spearman's $\rho = 0.78$, $P = 0.01$). Countries that experienced substantial reductions in hospital beds also have a higher day case rate (Spearman's $\rho = 0.83$, $P = 0.03$). We conclude that hypotheses 1 and 2, stating that a relative shortage of beds and a substantial reduction of hospital beds are favourable factors for the application of day surgery, are both confirmed by these data.

The orientation towards primary care was operationalized in several ways. First, we used the number of GPs per 1000 inhabitants (more GPs represents a stronger orientation towards primary care); second, we used the percentage of GPs per specialist (a higher percentage indicates a stronger orientation towards primary care). Both data were derived from the OECD health data files. Figures for 1994 were used. A third indicator of orientation towards primary care was the supply of home nurses. Here we used the ranking used in Westert [19]. Neither the number of GPs (Spearman's $\rho = 0.40$, $P = 0.25$) nor the percentage of GPs per specialist (Spearman's $\rho = 0.18$, $P = 0.63$) influence day case orientation. The supply of home nurses corre-

Table 3
Classification of countries towards setting of surgery ($n = 10$)

Mainly day surgery	More day surgery than in-patient surgery	More inpatient surgery than day surgery	Mainly inpatient surgery
Norway	Denmark Sweden Finland	Netherlands United Kingdom Switzerland ^a	Belgium Austria Germany

For Italy and France, no data are available on place of surgery.

^a The ranking of Switzerland is based on the data of only one Canton (Zurich).

lates positively with orientation towards day care (Spearman's $\rho = 0.72$, $P = 0.02$). Two countries in the sample do not have outpatient departments: Denmark and Germany. However, these two countries react quite differently towards day surgery. While in Denmark day surgery is already quite a common alternative to inpatient care, Germany is still mainly oriented towards inpatient care. Overall, we conclude that hypotheses 3 and 4, stating that well developed primary care and the existence of outpatient care favour day surgery, cannot be confirmed by the data. Only the supply of home nurses seems to be related to day surgery positively.

To test the influence of financing systems, the country averages of surgery setting were divided into three categories. In Table 4 an overview is presented on hospital and physician financing systems for each country and the place of surgery.

The hospital financing system seems to have no relationship with surgery setting. The countries within each financing system are evenly distributed over the categories of place of surgery (Table 4). The effect of physician remuneration system transpired to be as follows. Countries where physicians received a salary were more oriented towards day surgery. Neither of the fee-for-service countries scored in the category mainly day surgery. Whether the financial incentives encouraged or discouraged hospitals and physicians, as judged by the experts, seems to be of no importance for the diffusion of day surgery. Countries with negatively and positively evaluated incentives are spread evenly over the categories for the orientation towards day surgery. We conclude that hospitals' financial incentives are unrelated to the availability of surgery in a day setting (rejecting hypotheses 5 and 7). The effect predicted in hypothesis 6, stating that in countries with physicians paid on a fee-for-service basis procedures are more frequently performed in day-case surgery, is contradicted by the results. Only two countries have a fee-for-service system for hospital-based physicians (Netherlands and Belgium). In neither of them is day surgery the dominant setting for the selected surgical procedures.

5. Conclusions and discussion

There are differences in the diffusion of day surgery among the countries of northwest Europe. In the Scandinavian countries, day surgery has become fairly common practice, whereas in the more southern countries inpatient care is still the most favoured type of care. So, the first research question—whether there are differences in the diffusion of day surgery in the European countries—can be answered affirmatively for the countries that participated in our study.

It appears that the supply and substantial changes in supply of hospital beds favour day care surgery. As a result of the relative scarcity of hospital beds in low-supply countries and the large changes in some other countries, day surgery is now perceived as an alternative that can be used to meet the growing demand for healthcare. The ageing of the northwest European population is one of the factors leading to an increasing demand for healthcare, resulting in a growth of admission rates. Since demand is increasing and inpatient capacity is decreasing, day surgery may serve as an alternative to prevent waiting lists from growing excessively. Of course, there is the question of causality. Does bed-supply decrease through the availability of alternatives such as day surgery, or new technologies that shorten length of stay, or is day surgery welcomed as a solution for decreasing inpatient capacity? We consider that day surgery acts as an alternative to decreasing supply, leading to causality running from bed supply to day-surgery, since countries have differed in bed supply for a long time, even before day surgery became more commonplace. So the fact that low supply countries tend to be more enthusiastic in applying day surgery can be seen as an attempt to meet unmet demand. In addition, the hospital bed reductions in northwestern Europe often result from cost containment measures, with Roemer's Law as background: a bed built is a bed filled. No methods are available as yet for the sound estimation of sufficient inpatient care capacity for a given population.

Our hypotheses, that a strong primary care organi-

Table 4
The coherence between financing systems and place of surgery ($n = 10$ countries)

Setting of surgery	Hospital financing			Physician remuneration	
	Global budget	Per diem	Other	Salary	Fee-for-service
Mainly day surgery	1	1	2	4	
Both day surgery and in-patient	1	2		2	1
Mainly in-patient	1	2		2	1

The average scores on setting for surgery for the 18 procedures for each country rank between 1 (over 90% in day surgery) and 4 (over 90% in in-patient setting). The countries were divided into three categories. The first category (average score <2.5), consisted of Norway, Denmark, Sweden, and Finland. The second category ($2.5 < \text{average score} < 3$) consisted of the Netherlands, United Kingdom, and Switzerland. The third category (all others) consisted of Belgium, Germany and Austria.

zation and the existence of outpatient departments attached to hospitals would favour day surgery, were not confirmed. Only the supply of home nurses seems to affect day surgery. Since many of the countries indicated that home nurses also played a part in aftercare, we can state that countries with a poor organization of home care may face problems in implementing day surgery.

A striking result is that financial incentives for hospitals do not appear to influence the choice for day surgery. A possible explanation for this is that the physicians decide the type of treatment and it may be difficult for the hospital management to influence them. Also for physicians, the remuneration system plays a different part than that expected. Countries with salaried hospital physicians more often apply day surgery. This may be related to the experience of negative financial incentives as, for instance, occurs in the Netherlands. There, a surgeon carrying out inguinal hernia repair receives three times as much for it in inpatient care as would be the case in day surgery [1]. Despite this financial incentive for inpatient treatment, the percentage of inguinal hernia repairs in day surgery in the Netherlands is rising. One explanation may be that the surgeon can do more than three day-case treatments in the time that would be needed for one inpatient treatment. Another possible explanation is that physicians opt for day surgery because of a shortage of inpatient capacity. A third possible explanation is that applying the modern techniques of day surgery may add to the status of the surgeon and the hospital. These possible explanations however need to be tested with the country level data used for this study. A fourth explanation may be that the global budget systems as applied in the countries of northwestern Europe are assessed not only on the basis of objective capitation criteria, but also according to hospital production characteristics. For instance, in the Netherlands formula for hospital budgets, the same procedure in day case treatment would result in a lower budget than for inpatient treatment.

Hypothesis 4, concerned with the effect of the exist-

tence of outpatient departments, could not be confirmed in our study. When using De Lathouwer and Poullier's data, a different conclusion may be drawn. Since neither Denmark nor Germany have outpatient departments and since both countries, according to De Lathouwer and Poullier, are inpatient oriented, the conclusion may be drawn that the absence of outpatient departments may indeed slow down the introduction of day surgery. Why the two studies differ in their ranking for Denmark is not clear. The low rate of day surgery in Germany may be explained by the legal constitution. Until recently, hospitals in Germany were not allowed to see patients in an outpatient setting. Since 1992, it has been possible for hospitals to treat patients in day surgery. However, hospitals need constructional and organizational changes to facilitate these changes [15]; this will take time.

This study was carried out at country level and this unavoidably brings with it some imperfections. We were not able to study within-country variations. The use of day surgery within countries varies considerably. This variation may result from specific hospital or physician characteristics that cannot be studied at country level. Since in many countries, healthcare policy is still a national matter, and reforms often affect the whole country, it is necessarily useful to identify the effect of national healthcare organization characteristics and their effect on national level.

In summary we conclude that, of the healthcare system characteristics used in this study, physician remuneration and acute-care hospital bed supply have the strongest relationship with the diffusion of day surgery.

References

- [1] Ankoné A. Dagbehandeling: efficiënt en veilig (Day surgery: efficient and safe). *Medisch Contact (Med Contact)* 1999;54(38):1276–9.
- [2] Stocking B. *Medical advances: the future shape of acute services*. London: King's Fund Centre, 1992.
- [3] Morgan M, Beech R. Variations in lengths of stay and rates of day case surgery: implications for the efficiency of surgical management. *J Epidemiol Commun Hlth* 1990;44(2):90–105.

- [4] Banta HD, Schersten T, Jonsson E. Implications of minimally invasive therapy. *Hlth Pol* 1993;23:167–78.
- [5] Wasowicz DK, Schmitz RF, Borghans HJ, De Groot RRM, Go PMNYH. Toename van chirurgische dagverpleging in Nederland (Increase in day care surgery in The Netherlands). *Ned Tijdschr Geneeskunde (Netherlands J Med)* 1998;142(28):1612–5.
- [6] Haworth EA, Balarajan R. Day surgery: does it add to or replace inpatient surgery? *Br Med J* 1987;294:133–5.
- [7] Henderson J, Goldacre MJ, Griffith M, Simmons HM. Day case surgery: geographical variation, trends and readmission rates. *J Epidemiol Commun Hlth* 1989;43:301–5.
- [8] Van Doorslaer EKA, Van Vliet RCJ. 'A built bed is a filled bed?' An empirical re-examination. *Social Sci Med* 1989;28:155–64.
- [9] Van Noordt M, Van der Zee J, Groenewegen PP. Regional variation in hospital admission rates in the Netherlands, Belgium, Northern France and Nordrhein-Westfalen. *Das Gesundheitswesen* 1992;54(4):173–8.
- [10] Westert GP. Variation in use of hospital care. Assen/Maastricht: Van Gorcum, 1992.
- [11] Wiley MM, Tomas R, Casas M. A cross-national, casemix analysis of hospital length of stay for selected pathologies. *Eur J Pub Hlth* 1999;9:86–92.
- [12] Mascarenhas L, Newton J. A comparative review of gynaecological day case surgery between England and Wales, France and Germany. *Obstet Gynecol Surv* 1994;49(7):498–504.
- [13] Väänänen IS, Härö AS, Vauhkonen O, Mattila A. The level of hospital utilization and the selection of patients in the Finnish regional hospital system. *Med Care* 1967;5(5):279–93.
- [14] Van der Zee J, Arnold M, Litsch M, Schwarz FW, editors *Krankenhaus-Report'99, Schwerpunkt: Versorgung chronisch Kranker (Hospital Report'99, Theme: care for the chronic ill)*. Stuttgart, New York: Schattauer; 2000; 13, Deutschland-Niederlande 2:1 bei den Krankenhausaufnahmen-ist der Grund dazu im niederländische Hausärztesystem zu suchen? (Germany-Netherlands 2:1 in hospital admission rates-can this be explained from the Dutch GP system?), p. 203–12.
- [15] Sorgatz H. Ambulantes Operieren und Tageschirurgie im Krankenhaus; Das Gesundheitsstrukturgesetz als gesundheitspolitische Vorgabe für ambulantes und tageschirurgisches operieren (Ambulatory treatment and day surgery in hospitals; The Health Care Structure law as health policy issue for ambulatory and day surgery). *Zentralblatt für Chirurgie* 1994;119(7):455–9.
- [16] Westert GP, Groenewegen PP. Medical practice variations: changing the theoretical approach. *Scand J Pub Hlth* 1999;27:173–80.
- [17] Raftery J, Stevens A. Daycase surgery trends in England: the influences of target settings and of general practitioner fundholding. *J Hlth Serv Res Pol* 1998;3(3):149–52.
- [18] Kroneman MW, Van der Zee J. Health policy as a fuzzy concept: methodological problems encountered when evaluating health policy reforms in an international perspective. *Hlth Pol* 1997;40:139–55.
- [19] Westert GP. State control and the delivery of health care: a preliminary study in eleven European countries. *Environ Planning C: Government Pol* 1997;15:219–28.
- [20] Kroneman M, Siegers JJ. The effect of hospital bed reduction on the use of beds: a comparative study of ten European countries. Forthcoming 2000.
- [21] De Lathouwer C, Poullier J-P. Ambulatory surgery in 1994–1995: the state of the art in 29 OECD countries. *Ambulat Surg* 1998;6:43–55.