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CASE-MIX VARIATIONS IN AMBULATORY SURGERY:

RESULTS OF A CROSS-NATIONAL STUDY OF SELECTED COUNTRIES WITHIN THE EUROPEAN REGION

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TARGET 34

Management of planning and resource allocation

Before 1990, Member States should have managerial processes for health development geared to the attainment of health for all, actively involving communities and all sectors relevant to health and, accordingly, ensuring preferential allocation of resources to health development priorities.

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INTRODUCTION

A striking characteristic of the modern health service environment is the expansion in the use of day surgery for the delivery of increasingly sophisticated services. This expansion has been made possible by a number of factors, including advancements in technology and approaches to service delivery and is supported by the widespread recognition that treatment in the inpatient setting should be pursued only as a last resort if other options are available and appropriate.

The fact that, in recent years, there has been a shift in the balance of service delivery between inpatient and day surgery as a result of this expansion is generally recognised. While estimates for the United States indicate that approximately 40 per cent of all surgery is now being done on a day basis, there is very little empirical evidence upon which to base an accurate assessment of the magnitude of the growth in day surgery utilisation in Europe (Guterman, et al., 1988; ProPAC, 1987). In the European context, basic information on service utilisation by site of service is required, together with information on the mix of ambulatory surgical services being delivered. These issues obviously have important implications both for the pattern of delivery of specific types of surgery, together with the financial implications of service utilisation in the areas most affected by any shifts in the site of service delivery.

The importance of the issues raised by such changes in the pattern of health service delivery has been recognised by the Regional Office for Europe (EURO) of the World Health Organisation in a number of ways, including the preparation of a number of important papers in the area and the organisation of two recent meetings on the subject. The first meeting on The Study of Systems of Payment by Type of Service or Patient was held in Leuven (Belgium) in 1987. A number of important recommendations arose out of this meeting, including the following:

" - All countries should investigate the implications of patient classification systems on health service management.

- The use of patient classification systems for ambulatory care, psychiatric care, primary care and long-term and chronic care should be investigated.

- Cost-effectiveness evaluation should cover all aspects of the care system, including outpatients.

- Planning models for health care based on patient classification systems should take account of demographic changes and changes in morbidity, technology and treatment norms."
(Study on Systems of Payment by Type of Service or Patient, 1987, p. 5-6).

Arising out of these recommendations a further meeting was held in Cardiff (Wales) in 1988 with the objective of specifically

addressing the question of The Application of Diagnosis-Related Groups (DRGs) For Hospital Budgeting and Performance Measurement. Issues arising with regard to the development of this area of research and application were further developed at this meeting and amongst the recommendations put forward was the following:

" **- The application of currently available case mix classification technology to non-inpatient care sites is not generally very advanced in the European Region. An experimental project investigating the potential of systems applicable to ambulatory care and long-term care would be worthy of support.**

- Support for the further development of DRG-based performance indicators should be provided with a view to undertaking a study of international comparisons of the results emerging from the application of the measures developed." (The Application of Diagnosis-Related Groups (DRGs) For Hospital Budgeting and Performance Measurement, 1988, p.6).

These recommendations receive further support from a subsequent paper by Leidl (1990) which synthesised the findings of both meetings and advocated that "the use of patient classification systems should be extended to include the entire care process (ambulatory, long-term, psychiatric, chronic and geriatric) with a view to ensuring the integrated evaluation and management of care" (p.7).

The study presented here is a direct response to the recommendations emerging from both of these planning meetings and is directly concerned with the ambulatory care sector. Given limitations of data availability, it was necessary to focus the research on day surgery specifically within this general area. The study has been undertaken in association with the Regional Office for Europe of the World Health Organisation and is based on an analysis of day surgery utilisation data categorised by patient type and collected from participating countries within the European region. In keeping with the recommendations of the two planning meetings, the study has a number of objectives which can be specified as follows:

1. The estimation of day surgery service utilisation in participating centres;

2. The specification of those service types most affected by shifts in site of care delivery;

3. The identification of specific service types which continue to be delivered in the inpatient setting but for which the ambulatory surgery setting may be an appropriate alternative.

The study report which follows will begin with a review of the definition and scope of the ambulatory surgery area and proceed to an overview of changes in the distribution of surgery across sites of care, together with an assessment of the factors influencing the changes observed. The relevance of case mix to the identification of the procedures affected by the shift to

ambulatory surgery is discussed and the results of the data collection effort undertaken in the European region are presented. The discussion proceeds to highlight significant factors arising from the data analysis, with the policy implications being presented in the concluding section.

AMBULATORY SURGERY: DEFINITION AND SCOPE

The use of a specific identifier for day surgery cases is considered preferable to ensure that cases are categorised correctly at the outset. As the growth of the day surgery option is, however, a relatively recent phenomenon in most health care systems, a unique identifier may not be commonly found within national/local data bases. Any attempt at accumulating data must therefore be undertaken on the basis of an agreed definition which will ensure that day surgery cases can be successfully segregated from cases treated in other care sites.

As is frequently the case, there is no universally accepted or agreed definition of what falls within the ambulatory surgery domain. A range of definitions of **ambulatory surgery** found in the literature include the following:

"Scheduled surgical procedures provided to patients who do not remain in hospital over night" (Burns, 1984, p.2)

"Performance of surgical procedures that are more complex than office procedures that are usually done under local anesthesia but are less complex than major procedures that require prolonged postoperative monitoring and hospital care in order to guarantee the patient a safe recovery and a desirable outcome" (Lagoe and Milliren, 1986, p.150)

"Patients admitted electively to a hospital bed during the course of a day with the intention of receiving care or treatment which can be completed in a few hours so that they do not require to remain in hospital overnight and who are discharged as scheduled" (The Audit Commission for Local Authorities and the National Health Service in England and Wales, 1990, p. 20)

A number of key elements emerge from these definitions, including the fact that for day surgery cases it would be expected that procedures would be scheduled in advance and that the patient would not stay in hospital overnight. In the absence of a specific identifier for day surgery in the countries included in this study, a standard definition for a day surgery patient had to be proposed. Given the core elements of the range of definitions found in the literature, the working definition applied in the current study was the following:

"A day surgery patient may be defined as an elective patient who does not occupy a hospital bed overnight and who is discharged alive".

CHANGES IN THE DISTRIBUTION OF SURGERY BETWEEN INPATIENT AND OUTPATIENT SETTINGS

Published information from the European region on shifts in the distribution of surgery between inpatient and outpatient settings is very limited. One study by Merschbrock-Aburle and John (1984) reported that the ambulatory surgical services provided by a group of 1500 Bavarian doctors increased from approximately 19 per cent in 1978 to almost 25 per cent in 1982. In the absence of data on total surgery levels, however, the authors of this study cannot reach any conclusion on whether the increase in ambulatory surgery represents a substitution effect when compared with inpatient surgery levels or an additive effect when compared with surgery levels overall.

The question of the potential substitution effect offered by ambulatory surgery was also addressed in an earlier study by Evans and Robinson (1980) which analysed paediatric operative procedures in Vancouver. This study concluded that, while "we must infer that the main impact of surgical day care in the late 1960s and early 1970s was to expand the total volume of surgical activity", ... "the larger increases in surgical day care since 1976 are associated with both further reductions in inpatient surgery and an increase in all paediatric surgery, which suggests a combination of substitution for inpatient surgery and generation of "new business""(p.878). A more recent Canadian study of paediatric day surgery conducted by Postuma et al (1987) concluded that while the available data did not permit the estimation of the extent to which day surgery had substituted for inpatient surgery, the fact was noted that over the period 1970 to 1985, day surgery in the area under study expanded much faster then inpatient surgery with the net effect being an annual increase in the number of elective patients treated.

The most up-to-date and the most comprehensive data on the distribution of surgery between the inpatient and ambulatory settings comes from the United States. The proportion of all operations conducted in outpatient departments in the US increased from 16 per cent in 1980 to 24 per cent in 1983 and rose to 40 per cent in 1986 (Guterman er al., 1988; Prospective Payment Assessment Commission, 1987). While the proportion of surgical procedures performed on an outpatient basis in the 1980-1983 period grew by 50 per cent, this contrasts with a higher level of growth of 66 per cent found for the sector in the 1983-1986 period. Increases in utilisation levels for ambulatory surgery have been parallelled by increases in expenditures to the point where the $2.5 billion spent on ambulatory surgery in 1985 accounted for over one third of the total outpatient billed charges of $6.5 billion (Lion and Collard., 1988).

FACTORS INFLUENCING THE DEVELOPMENT OF AMBULATORY SURGERY

The shift in the provision of select surgical services from the inpatient setting to the outpatient setting will result from many influences. In their review of trends and developments in ambulatory surgery in the United States, Burns and Ferber (1984)

identified a number of medical and institutional factors as being particularly influential in contributing to the recent increase in utilisation levels.

The **medical, clinical and technological factors** identified may be considered the "push" factors facilitating the expansion of surgical practice in the ambulatory setting and these include: the availability of short-acting analgesics to treat pain and drugs to manage nausea and vomiting, good medical practice which encourages patients to become ambulatory soon after surgery, and good peri-operative teaching by nurses and physicians resulting in a smoother post-operative recovery period (Burns and Ferber, 1984). The development and application of lasers and fibre-optics have also contributed to the replacement of certain types of major open surgery with less invasive procedures which can be done on a day case basis (The Audit Commission, 1990).

The "pull" factors are found in the **institutional reaction** to such developments as: changing demand for health services, demographic changes, increased competition among providers, changing preferences of third-party payers and regulators and economies of scale and scope (Burns and Ferber, 1984). There are additional quality of care factors arising from the fact that with ambulatory surgery it should be possible to avoid some of the potential risks of hospitalisation, such as in-hospital cross-infection. For paediatric surgery, decreased separation anxiety and reduced disruption of the family unit are additional factors identified as contributing to more wide spread acceptance of the day care option (Evans and Robinson, 1980, Postuma, 1987).

Given the appropriate clinical and institutional environment **cost differentials** for ambulatory relative to inpatient surgery and **reimbursement policies** have become increasingly important influences supporting the move to ambulatory surgery. While ambulatory surgery <u>may</u> cost less then the inpatient alternative, this is not always the case. The cost of ambulatory relative to inpatient surgery (for the same procedure) will be affected by the following factors: (1) the ratio of fixed to variable costs for hospital expenditures in the different service settings and the nature of the relationship of each cost type to the volume of cases treated; (2) the extent to which increased utilisation of ambulatory surgery is associated with a compensatory decrease in the volume of inpatients treated for the same procedure; and (3) the nature of the environment and approach adopted for the treatment of ambulatory surgery patients.

With regard to the cost components affected by site of care shifts, Evans and Robinson (1980) concluded that much of the savings attributable to the use of ambulatory surgery in the short run were due to a reduction in direct patient care expenses and in the overhead associated with the financing and management of hospital beds. In the long run, changes in ward staffing patterns, with the associated closure of inpatient beds, will help to achieve further cost reductions. If the move to the ambulatory setting is considered permanent, then capital costs associated with the provision of space and equipment in the long

run could also be substantially reduced. Net costs savings associated with the shift to ambulatory surgery will ultimately depend on the combined effect of staff reorganisation and the provision of required facilities, together with the extent to which the associated utilisation of inpatient surgery is actually reduced.

Many of the cost advantages of ambulatory surgery rely on the availability of self-contained, compact, dedicated day care units. These units may be situated within the hospital or may be separated from it but make use of the hospital for back-up or emergency services. Self-contained units would operate only during scheduled hours and the beds in the unit would be dedicated to day surgery care. While this approach to the provision of ambulatory surgery services involves higher capital costs initially, greater savings may be incurred because of reduced running costs associated with more efficient scheduling of theatre services and deployment of nursing staff.

The extent to which changes in reimbursement policies may influence site of care shifts is very clearly described by Russell (1989) in her review of the effect of Medicare's new hospital payment system in the US. This author concludes that:

"Prospective payment has changed the way care is given to elderly patients in the United States, causing a large shift away from inpatient hospital care and toward other kinds of care"(p.83).

In her analysis of this transformation, Russell (1989) notes that the hospital industry "is faced with a persistent problem of excess inpatient capacity and the need for further cuts" (p.34). The responses to the new demand for alternatives to inpatient care identified by Russell include the following:

"Major surgical procedures once performed during a hospital admission are now routinely performed on outpatients, either in hospital outpatient departments or freestanding surgery centres" (p.83). "In 1986, 63 per cent had organized outpatient departments, up from 38 per cent in 1982..."(p.34).

Given the findings presented in this overview, we can conclude that the development of ambulatory surgery as a viable alternative for selected procedures is heavily dependent on advancements in medical and clinical expertise and technological support. Utilisation levels for ambulatory surgery, together with shifts in service provision from the inpatient to the day surgery setting will be influenced by the availability and provision of appropriate facilities, the cost differentials between care sites and the incentives operating in prevailing policies for reimbursement of inpatient and ambulatory surgery.

IDENTIFYING THE PROCEDURES AFFECTED BY THE SHIFT TO AMBULATORY SURGERY: THE RELEVANCE OF CASE MIX

Many studies of day surgery, regardless of the particular focus of interest, identify lists of procedures which the authors have

found to be frequently performed or appropriate to the day surgery setting. While the approach adopted by researchers to the compilation of a specific listing of day surgery procedures will be valid for a particular study, when the literature is reviewed we find considerable variation in the approaches which may be applied to the listing of procedures considered appropriate for the day surgery setting.

The range of approaches adopted for the specification of day surgery procedures may be appreciated from a few examples of studies conducted over a ten year period: Evans and Robinson (1980) list surgical procedures performed in a day unit as defined by the Hospital Adaptation of International Classification of Diseases; Lagoe and Milliren (1986) categorise surgical procedures performed on a specialty by specialty basis; and The Audit Commission (1990) list a "basket" of 20 procedures which satisfy a number of pre-determined criteria and are therefore considered appropriate for delivery on a day basis. While the validity of the approach adopted by any individual study is not questioned here, a problem which arises because of the difference of approaches is that results cannot be compared across studies of the same era or over time. In the absence of a standardised framework for categorising surgical procedures performed, or considered suitable for delivery, on a day basis, factors like variations in utilisation levels and resource consumption cannot be confidently assessed for particular centres or over time.

This problem has been recognised by a number of more recent studies which have tested the application of one standardised framework for surgical procedure specification (Carter and Ginsburg (1985), Roos and Freeman (1989)). The framework applied is the Diagnosis Related Group (DRG) case-mix classification scheme which was originally developed and is currently applied most widely in the in-patient setting. Where case mix is defined as "the proportion of cases of each disease and health problem treated in the hospital", the DRG framework is just one approach developed for the purpose of measuring case mix in the acute care setting (Hornbrook, 1985, p.296). A range of other approaches to case-mix measurement have also been developed, including Disease Staging (Gonella, et al., 1984), Computerized Severity Index (Iezonni, et al., 1989), Medisgrps (Brewster, et al., 1985), Patient Management Categories (Young, 1984) and APACHE II (Knaus, et al., 1985). It is not the purpose of this study to assess the relative merits of these different schemes. In pursuing our objective of assessing day surgery utilisation trends in the European region, it was necessary to use that framework for data analysis which was most widely used at the time of data collection. The fact that this turned out to be the DRG framework should not be interpreted as a reflection on the relative merits of the other systems or any indication of preference on the part of the World Health Organisation.

The DRGs constitute a multivariate measure of hospital activity which is based on the patients' diagnoses, surgical procedures performed, age, sex and discharge status. On the basis of these

key variables, the DRG system enables the disaggregation of patients into homogeneous groups which are expected to undergo similar treatment processes and incur similar levels of resource use.[1] Because the DRGs are assumed to provide a more meaningful measure of hospital activity compared with any univariate measure, and the fact that day patients were included in the original data set used for development purposes, this classification scheme may be offered as a useful framework within which to define the mix of surgical procedures which may be most appropriately delivered on a day basis (Fetter et al, 1980).

Within the relevant literature, two distinct approaches to the selection and identification of the mix of patient types undergoing ambulatory surgery emerge. The approach adopted by Carter and Ginsburg for the RAND Corporation (1985) entailed the specification of a list of DRGs based on procedures which are recognised as being suitable for delivery in the outpatient setting. Carter and Ginsburg (p. 24,1985) list the following sources as assisting in the specification of this DRG list: (1) information available from internal HCFA documents; (2) a list given to hospitals by a PRO specifying procedures that should not warrant hospitalisation unless special circumstances apply; and (3) suggestions by a physician-researcher at RAND. The RAND study covers both surgical and medical DRGs, though the study described here is targeted specifically on the use of services within the surgical DRGs[2]. A different approach was adopted by Roos and Freeman (1989) in the pursuit of a similar objective. On the basis of an empirical analysis of hospital discharges from the province of Manitoba in Canada, these authors identified those DRGs which contain a large number of cases performed on an outpatient basis.

The composite list of the surgical DRGs emerging from both of these studies was taken as the starting point for the study of day surgery use in the European context reported here. This listing is included in Appendix I. Taking this starting point, the following questions were asked of participating centres: (1) do the DRGs identified by either/both the RAND and the Manitoba studies account for high volume utilisation of ambulatory surgery in participating European countries and (2) could additional DRGs recording high volume utilisation of ambulatory surgery be identified in the European context which had not been identified by either the RAND or Manitoba studies.

For reference purposes, the "basket" of 20 common procedures identified by the Audit Commission for England and Wales as being suitable for deivery in the day surgery setting are listed in Appendix II. An important point emerging from both of these Appendices is that while the results of the studies by both Carter and Ginsburg (1985) and Roos and Freeman ((1989) can be readily collapsed and brought together within the one framework in Appendix I, the procedure listing in Appendix II from the Audit Commission report (1990) is not directly comparable with this framework. While both sets of information provide useful sources in exploring patterns of day surgery utilisation, the fact that the RAND and Canadian studies both use the same multi-

variate framework means that the results are directly comparable with each other, which is not the case for the uni-variate measure on which the listing in Appendix II is based. This is partly due to the fact that a procedure-based listing which is readily understood in the country of origin may not always be interpreted in the same way in other countries because of differences of language, culture, terminology, coding practices, etc. In attempting to undertake a cross-national study of utilisation of day surgery services within the European region, the fact that the results of the application of the same multi-variate framework used by the RAND and Canadian studies were found to be comparable was an important factor in choosing to apply the same framework in the current study.

The timing of the studies reported here is important, given the continuing technological advancements which facilitate the performance of a greater range of surgical procedures in the ambulatory setting together with the increasing acceptability of ambulatory surgery as a viable alternative for particular procedures. While recognising the very real limitations imposed by data availability on ambulatory surgery utilisation, it is to be expected that the more recent studies will result in the identification of a greater range and volume of procedures being performed in the ambulatory setting. The data collection process will now be described, followed by a presentation of the results for the study.

DATA COLLECTION

Centres within the European region which were known, or likely, to be able to provide the data required were contacted by the Health Economics Unit of the European Regional Office of the World Health Organisation requesting participation in the study. In all, seventeen countries were contacted with the request for information. A response was received from twelve countries. Of the twelve respondents, four countries stated that they were unable to provide any data, while eight countries responded positively that some data could be made available. For these eight countries, data may be provided for individual regions within the country, or at the national level. Data at the national level were made available for just two countries, Ireland and Norway, with the remaining countries providing data at the regional or hospital group level. The data sources therefore determined the framework for analysis. The limitations on national sources meant that it was not possible or meaningful to attempt comparisons or estimates of day surgery caseload at this level. While limiting the focus, the most meaningful analysis facilitated by the data was the distribution of service utilisation between the inpatient and day care delivery sites.

The presentation of results in the following section is differentiated according to high volume and low volume utilisation of day surgery services. Data from six European countries were appropriate for the analysis of the high volume utilisation, while data from eight countries were incorporated in the analysis of low volume utilisation.

The facility to provide the required information grouped on a DRG basis constituted a basic requirement for participation in the study. The data elements requested may be summarised as follows:

1. A composite list of DRGs identified by the RAND and Manitoba studies was provided and prospective participants were asked, where possible, to provide the following data on the distribution of discharges for the DRGs on this composite list[2]: (i) the total number of discharges in each of the DRGs listed; (ii) the proportion of discharges treated as day patients; and (iii) the proportion of discharges with a length of stay of 1-3 days and 4+ days.[3] The circulated listing is attached in Appendix I.

2. A listing of any additional surgical DRGs, where 35 per cent or more of the discharges in the analysis had been shown to be treated on a day basis. The same information as for (1) above was requested for these additional DRGs.

While the use of a specific identifier for day surgery cases would be considered preferable, many of the countries surveyed did not use such an identifier so a standardised definition for a day surgery patient had to be provided. The working definition of day surgery patients presented previously was therefore proposed for the purpose of this data collection effort.

RESULTS

For those countries which were in a position to respond to the request for data, the results for the analyses of ambulatory surgery utilisation are presented here. The Manitoba study (Roos and Freeman, 1989) designated DRGs as having a high potential for inpatient-outpatient substitution if 35 per cent or more of the patients in a DRG were treated on an outpatient basis. To ensure comparability with the results of this study, the same criteria for designating a DRG as having a high potential for inpatient-outpatient substitution was adopted for the analysis of the returns from the six countries in the European region presented in Table 1. In addition, the DRGs identified in the RAND study as being suitable for the ambulatory setting and the DRGs shown by the Manitoba study to have a high potential for inpatient-outpatient substitution are flagged with unique identifiers. Table 2 presents a summary comparison of the designated DRGs from the RAND and Manitoba studies with those DRGs identified by the review of European countries as having a high volume of utilisation ($\geq$35%) of ambulatory surgery. Finally, the fact that the utilisation of day surgery services is still in an expansionary and evolutionary phase is recognised by the inclusion of Table 3 where DRGs with 20-35 per cent of cases treated on a day case basis are listed for participating European countries.

The data available for the European countries is not comprehensive at the national level and may not be comprehensive for all specialties and must therefore be treated with caution.

While accepting this reservation, the results presented in Table

1 reveal some interesting patterns when compared with the findings of the RAND and Manitoba studies. While 34 DRGs were identified by the RAND study as having the potential for outpatient shift and the Manitoba study found that 35 DRGs had a high volume of cases ($\geq$35%) treated on a day surgery basis, there was an overlap of 11 DRGs between both of these North American studies (Roos and Freeman, 1989). Table 1 now shows that of these 11 overlapping DRGs, 10 DRGs from the same list were reported as having $\geq$35 per cent of discharges treated on a day basis in at least one European country.

The 10 DRGs common to all three studies can be more readily identified from Table 2 and include DRGs 6, 40, 61, 228, 232, 262, 266, 268, 270, 342. Of these 10 DRGs, DRG 40 (Extraocular procedures, except orbit, A $\geq$ 18) and DRG 270 (Other skin, subcutaneous tissue and breast OR procedures, A < 70, w/o CC) are reported as being high volume DRGs for day surgery utilisation in four European countries. Four DRGs on this common list are found in two European countries: DRG 6 (Carpel tunnel release), DRG 61 (Myringotomy with tube insertion, A $\geq$ 18), DRG 228 (Ganglion (hand) procedures)); and DRG 268 (Skin, subcutaneous tissue and breast plastic procedures). Each of the four remaining DRGs is reported as having a high volume of day surgery cases in one European country, and these include DRG 232 (Arthroscopy); DRG 262 (Breast biopsy and local excision for nonmalignancy); DRG 266 (Skin grafts and/or debridement, w/o cc); and, finally, DRG 342 (Circumcision A $\geq$ 18). The available empirical evidence therefore provides strong support for the designation of the 10 DRGs found to overlap between the North American and European studies as having a high potential for outpatient substitution.

Further investigation of Table 1 shows that for the review of European countries, the utilisation of day surgery reached the $\geq$35 per cent level in at least one country for 46 DRGs in total. Of these 46 DRGs, 26 DRGS had previously been identified by either the RAND or the Manitoba studies. The remaining 20 DRGs which were exclusive to the European study include DRGs 36, 41, 42, 51, 62, 63, 120, 163, 168, 223, 224, 291, 314, 340, 343, 363, 365, 377, 408, 415. When the findings of the European study are compared with the RAND and Manitoba studies separately, there is a much greater overlap with the results for Manitoba. In addition to the ten DRGs which were common to all three studies, 13 DRGs identified in Manitoba were also found in the European study. In total therefore, 23 of the 35 DRGs identified in the Manitoba study also emerged in Europe as having a high potential for outpatient substitution. By contrast, only three DRGs (187, 229, 362) were shown to be common to RAND and Europe, giving a total of 13 out of a possible 29 surgical DRGs from the RAND study which also make the European list.

In attempting to facilitate a clear understanding of the nature of the overlap between the results from the different studies, Figure 1 is presented as a categorisation of each set of findings. In Figure 1, the day surgery DRGs specific to each of the three studies, together with the DRGs common to each pair of

studies and, finally, to all three studies are categorised separately.

Table 3 lists the surgical DRGs which participating European countries reported as having between 20-35 per cent of discharges treated on a day basis. There are a number of reasons why it was considered important to include these data here. Limitations on data availability mean that the volume and mix of day surgery utilisation in European countries may be under-represented if the 35 per cent cut off is exclusively applied. By reviewing the service mix and volume in the 20-35 per cent band it should be possible to identify areas of service provision where utilisation of day surgery might be expected to expand in the future.

A comparison of Tables 1 and 3 shows that eight European countries report DRGs with day surgery cases in the 20-35 per cent range as against six European countries reporting utilisation in this area at, or above, the 35 per cent level. In total, 52 DRGs are reported in Table 3 as having day surgery utilisation levels of between 20 and 35 per cent. There is an overlap of 32 DRGs between the $\geq$35 per cent band reported for the European countries and represented in Table 1 and the 20-35 per cent band represented for the European countries in Table 3. The RAND list of surgical DRGs was developed on a theoretical basis and it is interesting to note that there is an overlap of 14 DRGs between the RAND list and the DRGs identified for the 20-35 per cent utilisation band. This is a substantially greater overlap compared with that found between the RAND list and the DRGs included in the $\geq$35 per cent band. While the day surgery DRG list arising from the Manitoba study is compiled exclusively on the basis of a 35 per cent cut off for DRG inclusion, a similar trend is in evidence as there are 22 DRGs overlapping with the 20-35 per cent band.

DISCUSSION

Any study involving the analysis of cross-national data must accept certain limitations and this study is no exception. For the most part, these limitations will be concentrated in the area of data definition and data availability. The first problem encountered in attempting to address this objective is the definition of a day patient. The definition used in this study was developed on the basis of those factors identified in the literature as being significant descriptors of the day patient population. While this definition was provided to participating centres with the request for data, there is no guarantee that this is the definition used by all centres in preparing data for inclusion in this study. An additional factor which must also be noted is the variation in data coverage and availability between countries. It is clear from the tables attached that some countries provided data on a regional, rather than on a national, basis. While these factors need to be acknowledged as being potentially problematic, there is no evidence arising from the data analysis undertaken to suggest that this is the case. The expectations for a study of this nature must, however, be modified according to the acknowledged limitations. While the

information presented here could not be expected to provide the definitive quantification of day surgery utilisation in all the countries included in the analysis, what can be very effectively assessed from the available data are the service areas which currently account for the greatest volume of ambulatory surgery utilisation and where further growth might be expected in the future.

One of the advantages of the approach adopted here is that a greater level of standardisation is being applied to the investigation of utilisation by service area with the use of a standardised case mix classification system. As a result, the quality of the information which can be drawn from the cross-national comparisons is greatly improved. Prior to the availability of a case-mix measure like the DRG system, a study of day surgery utilisation would have been greatly hampered by the need to adopt a uni-dimensional approach to the assessment of hospital workload by site of care. As a multi-variate measure of hospital workload, the application of the DRG system facilitates cross-site and cross-national assessments of service utilisation within this environment.

While the DRG system is not the only available measure of hospital case mix, it is the system which is the most widely used in the European region (Wiley, 1990). This finding is supported by Leidl (1990) who concludes that "with only minor modifications DRG classification has been adopted in preference to other classification systems of acute hospital patients by most participating countries projects. European standards for comparison of hospital activity seem feasible" (p.6). A number of studies have been undertaken to assess the performance of the DRG system relative to other available case-mix measurement options (ProPAc, April, 1987, Bloomrosen and Kominski, 1988). It is reasonable to conclude from these studies that, while no one case mix system fulfills all objectives, given the data requirements and the current state of development with regard to data availability, the DRG system is the best available option at this time. A comparative assessment of a number of case mix measures undertaken by the Prospective Payment Assessment Commission (ProPAC) in 1988 concluded that "diagnosis-related groups (DRGs) are the most appropriate available measure of hospital case-mix for PPS" (ProPAC, 1988, p.3). It was against this background that the decision was made to base the comparative analysis within the DRG framework and the fact that a relatively large number of European countries were able to respond positively to the request for data provides some support for this perspective.

The use of the DRG framework in this study must not, however, be interpreted, implicitly or explicitly, as indicating any endorsement by the World Health Organisation for this particular approach to case mix measurement. While the WHO position conveyed in the Report of a Planning Meeting on Study on Systems of Payment by Type of Service or Patient (1988) is clearly supportive of "the use of patient classification systems for ambulatory care" (p.6), there is no expressed preference by the

WHO for the use of any particular patient classification system beyond this basic statement of principle.

We have previously identified a range of factors which have been associated with both the increased use of ambulatory surgery and the shift of a growing volume of surgical services from the inpatient to the ambulatory setting. While there is general recognition that both types of developments are important for the acute hospital services in countries within the European region, there is very little quantitative data available for these systems on the utilisation levels being achieved. This is partly due to the nature of the health systems involved, many of which are centrally funded and consequentially have more limited opportunities for extensive data collection efforts at the individual service level.

The data presented in this paper do, however, facilitate an appreciation for utilisation levels of ambulatory relative to inpatient surgery for particular service types. Eight countries within the European region, including Ireland, England, Wales, Spain, Portugal, Italy, Hungary and Norway, were able to provide these data. A number of additional countries, including Sweden and Switzerland, could provide data on service utilisation by DRG but could not, at the time of request, differentiate utilisation by site of care. It would seem reasonable to assume, however, that as the framework for data collection and analysis becomes more standardised across countries, greater differentiation in data availability would be expected to support a broader analysis of ambulatory surgery utilisation at this level in the near future.

The data presented in Tables 1-3 provides an important baseline for the assessment of utilisation levels for ambulatory surgery by service area for the countries covered within the European region. With regard to the high volume service areas ($\geq$35%), it is evident from Table 1 that there are seven distinct specialty areas with a high potential for inpatient-outpatient substitution: MDC 2: Diseases and Disorders of the Eye; MDC 3: Diseases and Disorders of the Ear, Nose and Throat; MDC 6: Diseases and Disorders of the Digestive System; MDC 8: Diseases and Disorders of the Musculoskeletal System and Connective Tissue; MDC 9: Diseases and Disorders of the Skin, Subcutaneous Tissue and Breast; MDC 12: Diseases and Disorders of the Male Reproductive System; and MDC 13: Diseases and Disorders of the Female Reproductive System[4]

With 12 DRGs represented, Diseases and Disorders of the Digestive System (MDC 6) accounts for the greatest number of service types with potential for outpatient substitution. Of these 12 groups, 6 are reported as accounting for a high volume of ambulatory surgery in the European countries covered, while four are exclusive to Manitoba, and two are exclusive to RAND. Table 3 indicates that one of these four Manitoba DRGs has between 20-35 per cent of services delivered on an outpatient basis. Those service areas identified by Manitoba and RAND and not currently the basis of high volume usage of ambulatory surgery in the

European region would therefore be expected to be amongst the growth areas in the future. On the basis of available evidence, it seems reasonable to conclude that MDC 6 (Diseases & Disorders of the Digestive System) will account for a substantial proportion of the expected growth in ambulatory surgery in countries within the European region.

MDC 8 and MDC 9 account, respectively, for 10 and 9 service areas (DRGs). For these MDCs, all but 3 DRGs are found to account for a high volume of ambulatory surgery for selected countries within the European region. A similar pattern to that noted above is also in evidence here, whereby those DRGs which are exclusive to Manitoba/RAND within the high volume band of utilisation (Table 1) may emerge in the 20-35 per cent utilisation band (Table 3) for a number of European countries. For MDC 8, one of the three DRGs exclusive to Manitoba/RAND at the $\geq$35 per cent level, is found at the 20-35 per cent level in one of the European countries. Two of the three DRGs exclusive to Manitoba/RAND at the high volume level for MDC 9, record ambulatory surgery utilisation levels of 20-35 per cent in a number of European countries. Future growth in ambulatory surgery utilisation would also be expected in these MDCs, particularly in the areas currently identified at the 'low' utilisation level for countries within the European region.

Other MDCs accounting for high volume utilisation of day surgery services include MDC 13 (8 DRGs), MDC 12 (7 DRGs), and MDCs 3 and 2, each accounting for 6 DRGs. For MDC 2, all DRGs are represented at the high volume for European countries, for MDCs 3 and 13 all but one of the DRGs are represented at the high/low volume level, while MDC 12 reports four of the seven DRGs represented at the high volume level. While these MDCs would be expected to account for continued growth in the use of ambulatory surgery services, it might be expected that this growth would be more in evidence in increased volumes of service being delivered in the areas identified, rather than necessarily resulting in a greatly increased spread of utilisation across service types.

CONCLUSIONS AND POLICY IMPLICATIONS

The available European data would appear to provide strong support for the substitution potential of the 10 DRGs identified as being common to the RAND and Manitoba studies and the European overview. There would also seem to be good grounds for the substitution potential expected for the additional 16 DRGs which overlapped with the European overview and either the RAND or the Manitoba studies. While the more recent data available to the European study would be expected to identify a greater number of DRGs as having high substitution potential, the substitution potential of the 20 DRGs which were shown to be exclusive to the European study should be explored further as more data become available. The specialty areas which currently account for most ambulatory surgery utilisation and which would be expected to have additional potential for outpatient substitution were identified above and include Diseases and Disorders of the Eye, the Ear, Nose and Throat, the Digestive System, the

Musculoskeletal System and Connective Tissue, the Skin, Subcutaneous Tissue and Breast, and the Male and Female Reproductive Systems.

Medical, clinical and technological factors were previously identified as being important in facilitating the expansion of surgical practice in the ambulatory setting. The procedures identified here as being delivered in the ambulatory setting in various European countries obviously fulfill the necessary medical, clinical and technological criteria required for the delivery of these services in this environment. If these factors were the only factors influencing the shift of identified procedures to the ambulatory surgery setting, then substantial expansion in the use of the ambulatory surgery option for the high volume procedures identified in Table 1 would be expected in those countries which are not currently recorded as high users. Some explanation for this phenomenon might be generated from further research which addressed the question of why the day surgery option is not chosen where available and relevant. There would also seem to be scope for a more clinically oriented investigation of the implications of the alternative avenues of service delivery, together with the expected outcomes from the delivery of services in the different care settings.

We have seen from the earlier review that, in addition to clinical and technological developments, factors related to institutional setting, cost differentials and reimbursement policies are important determinants of the pace and magnitude of the shift in surgical service delivery to the outpatient setting. This is borne out clearly from the data presented in this report. The European data source which was most comprehensive and indicated the highest levels of day surgery utilisation over a wide range of service referred to <u>private</u> discharges (Ireland). This would suggest an important financial incentive effect on the utilisation levels for day surgery and the range of service which may be delivered in this setting. As data availability allows, it would be important to devote further study to a more precise analysis of the nature of the effect of financial incentives and reimbursement policies on the substitution potential of ambulatory surgery for countries within the European region.

In addition to being influenced by these macro economic factors, continued growth in the area of ambulatory surgery will also be significantly influenced by perceptions regarding the quality of care prevailing for ambulatory surgery. In this regard, the Royal College of Surgeons of England (1985) conclude that:

"It should be clear to all concerned, the surgeon, the nursing staff, and in particular the patient, that day surgery is in no way inferior to conventional admission for those procedures for which it is appropriate, indeed it is better".

The UK Audit Commission (1990) supports this finding and cites evidence that there are few significant differences between readmission rates of inpatients and day patients and that where differences are significant, the readmission rate was higher for

inpatients. The Commission support the expanded use of ambulatory surgery, where appropriate, in the UK and estimates that if all suitable procedures were carried out on a day basis rather than on an inpatient basis there would be potential to treat an additional 300,000 patients annually at no extra cost (Audit Commission, 1990). This recommendation is, however, offered with the recognition that there may be resistance to such expansion. The Commission recommends a number of measures which could be used to counteract reluctance towards the use of the ambulatory surgery alternative, including the following:

- Regular assessment of outcomes;
- Unsuitable patients filtered out prior to surgery;
- Regular monitoring of patients attitudes and satisfaction;
- In-service training to enable physicians to learn new techniques;

These measures might also be considered for application in other systems where resistance is encountered to the use of the ambulatory surgery option, where available and appropriate.

Information availability on service utilisation levels for ambulatory surgery is, in general, limited and patchy in the European region. For most countries, the information which can be made available tends to relate to specific regions within the country, rather then to national level data. With specific regard to the extent to which the objectives for this study have been achieved, it must be recognised that the absence of national data means that we have been unable to estimate volume levels nationally as originally intended by our first study objective. The availability of region specific data does enable us to specify the types of services being delivered in the ambulatory setting in keeping with our expectations for the second objective. The achievement of the third and final objective regarding the specification of those service types for which the ambulatory setting may be an appropriate alternative was facilitated by the information which was made available through the kind cooperation of participating centres.

In a previous paper for EURO by Leidl (1990), he concluded that:

"Ambulatory surgery has been singled out as being specifically suited to the development and application of patient classification techniques and their use for that particular purpose may serve as an example of how they could be employed for comparisons between interrelated health care sectors".

The findings of this study provide strong support for the conclusion that ambulatory surgery is an appropriate area for both the development and application of patient classification techniques. This application of one particular patient classification system for the analysis of cross-national variations in the substitution potential of ambulatory surgery within the European region has proved to be successful. This experience may constitute a starting point from which to explore how patient classification systems may be employed in the future

to provide a standardised framework for comparative analysis between inter-related health care sectors.

FOOTNOTES

[1]More detailed technical information on the construction of the DRG system may be found in Fetter et al., (1980) and Wiley and Fetter (1990).

[2]Even though DRG 187 (Dental Extractions and Restorations) is categorised as a medical DRG, it is included in the DRG list for both the RAND and European studies.

[3]The presentation of results in this paper will be limited to the data pertaining to day surgery utilisation and will not address the information relating to short stay cases.

[4]MDC: Major Diagnostic Category

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TABLE 1

Diagnosis Related Groups in which Ambulatory Surgery Discharges Represent 35 per cent or more of all Discharges : Selected Countries (a)

Diagnosis Related Group	Ireland[b] Private	England[c]	Wales[d]	Portugal[e]	Hungary[f]		Norway[g]	Canada[h]
	1989-90	1988	1988	1989	1987	1988	1988	1982-84
MDC 1: Nervous System	%	%	%	%	%	%	%	%
** 6 Carpal tunnel release		40	42					60
* 8 Peripheral and cranial and other nervous system procedure, a < 70, W/O CC								40
MDC 2: The Eye								
36 Retinal procedures	68		73					
*38 Primary iris procedures			61				35	54
*39 Lens Procedures								
**40 Extraocular procedures except orbit, A 18 or over	81	52	56		53	64		77
41 Extraocular Procedures except orbit aged 0-17	64			39				
42 Intraocular Procedures except retina, iris * lens	43							
MDC 3: Ear, Nose, throat								
51 Salivary Gland Procedures except Sialoadenectomy	50							
*53 Sinus and mastoid procedures, A 18 or over								
*55 Miscellaneous ear, nose and throat procedures								
**61 Myringotomy with tube insertion, A 18 or over	78	34						64
62 Myringotomy A < 18	91	48						
63 Other ear, nose & throat O.R. Procedures	48							
MDC 5: Circulatory System								
120 Other O.R. procedures on the circulatory system	55							

Diagnosis Related Group	Ireland[b] Private 1989-90 %	England[c] 1988 %	Wales[d] 1988 %	Portugal[e] 1989 %	Hungary[f] 1987 %	Hungary[f] 1988 %	Norway[g] 1988 %	Canada[h] 1982-84 %
MDC 6: Digestive System								
*152 Minor small and large bowel procedures, A 70 or over, and/or CC								36
*153 Minor small and large bowel procedures, A < 70, W/O/ CC								74
*154 Stomach, esophageal, and duodenal procedures, A 70 or over, and/or CC								45
*155 Stomach, Esophageal, and duodenal procedures, A 18-69, W/O CC								74
*157 Anal and stomal procedures, A 70 or over, and/or CC	38							48
*158 Anal and stomal procedures, A < 70, W/O CC	38							54
*161 Inguinal and femoral hernia procedures , A > 70 or over, and /or CC								
*162 Inguinal and femoral hernia procedures, A 18-69, W/O CC								
163 Hernia Proc, A < 18	59							
168 Mouth Procs, A > 69 and/or CC	59							
*169 Procedures on the mouth, A < 70, W/O CC	86							53
* 187 Dental extractions and restorations (i)	80		50		78	86	35	
MDC 8: Musculoskeletal system and Connected Tissue								
*221 Knee procedures, A 70 or over, and/or CC								
*222 Knee procedures, A < 70, W/O CC								
223 Upper Extremity proc exc humerus + hand A>69 and/or CC	35							
224 Upper Extremity proc exc	47							

humerus + hand A<70 W/O CC

Diagnosis Related Group	Ireland[b] Private 1989-90 %	England[c] 1988 %	Wales[d] 1988 %	Portugal[e] 1989 %	Hungary[f] 1987 %	Hungary[f] 1988 %	Norway[g] 1988 %	Canada[h] 1982-84 %
+225 Foot procedures								
+*228 Ganglion (hand) procedures	76						54	88
+227 Soft tissue procedures, A < 70, W/O CC	36							44
+229 Hand procedures except ganglion		38						
+231 Local excision and removal of internal fixation devices except hip and femur	42							42
+*232 Arthroscopy	43							68
MDC 9: Skin, Subcutaneous Tissue and Breast								
+259 Subtotal mastectomy for malignancy, A > 70, and/ or CC								58
+260 Subtotal mastectomy for malignancy, A < 70, W/O CC	41							74
+261 Breast procedures for nonmalignancy except biopsy and local excision								
+*262 Breast biopsy and local excision for nonmalignancy	67							65
+*266 Skin grafts and/or debridement, except for skin ulcer or cellulitis, W/O CC	55							51
+267 Perianal and pilonidal procedures								
+*268 Skin, subcutaneous tissue, and breast plastic procedures	49	43						47
+269 Other skin, subcutaneous tissue, and breast OR procedures, A > 70, and/or CC	91							91
+*270 Other skin, subcutaneous	97	46		40	37	45		95

Diagnosis Related Group	Ireland[b] Private 1989-90 %	England[c] 1988 %	Wales[d] 1988 %	Portugal[e] 1989 %	Hungary[f] 1987 %	Hungary[f] 1988 %	Norway[g] 1988 %	Canada[h] 1982-84 %
tissue, and breast OR procedures, A < 70, W/O CC								
MDC 10: Endocrine, Nutritional and Metabolic								
291 Thyroglossal PR	42							
*293 Other endocrine, nutritional, and metabolic OR procedures, A < 70, W/O CC	41	55	71					55
MDC 11: Kidney and Urinary Track								
+310 Transurethral procedures, A 70 or over, and/or CC								
++311 Transurethral procedures, A < 70, W/O CC								36
*313 Urethral procedures, A 18-69, W/O CC								54
314 Urethral Procs A < 18	56							
MDC 12: Male Reproductive system								
+336 Transurethral prostatectomy, A 70 or over, and/or CC								
+337 Transurethral prostatectomy, A < 70, W/O CC								
340 Tests Procedures, non-malignant A < 18	44							
++342 Circumcision, A 18 or over							37	39
343 Circumcision, A < 18	71			40				
*344 Other male reproductive system OR procedures for malignancy								35
MDC 13: Female Reproductive System								
*345 Other male reproductive system OR procedures, except for malignancy	35							40
+359 Tubal interruption for nonmalignancy								
*360 Vagina, Cervix and vulva	51	40		60				38

procedures

Diagnosis Related Group	Ireland Private 1989-90 %	England[d] 1988 %	Wales[c] 1988 %	Portugal 1989 %	Hungary[g] 1987 %	Hungary[g] 1988 %	Norway 1988 %	Canada 1982-84 %
+361 Laparoscopy and endoscopy (female), except tubal interruption								
+362 Laparoscopic tubal interruption				38				
363 D & C, Conization + Radio-implant, for malignancy				50				
+364 Dilation and curettage, except for malignancy	50			50				39
365 Other Female reproductive system O.R. procedures	77	45						
MDC 14: Pregnancy, Childbirth, and Puerperium								
377 Postpartum Diagnoses with O.R. procedures	46							
MDC 16: Blood and Immunological								
+394 Other OR procedures of the blood and blood-forming organs	47							39
MDC 17: Myeloproliferative, Poorly Differentiated Neoplasms								
+401 Lymphoma or leukaemia with other OR procedure, A 70 or over, and/or CC								35
+402 Lymphoma or leukaemia with other or procedures, A < 70, W/O CC								59
408 Myeloprolif disord or poorly diff neopl with minor O.R. proc.	78							
MDC 18: Infectious and Parasitic Diseases								
415 O.R. procedure for infectious + parasitic diseases	41							

MDC 23: Factors influencing health Status

Diagnosis Related Group	Ireland Private	England[d]	Wales[c]	Portugal	Hungary[g]		Norway	Canada
	1989-90	1988	1988	1989	1987	1988	1988	1982-84
	%	%	%	%	%	%	%	%
*461 OR procedures with diagnoses of other contacts with health services								37

A: Age
CC: Complications or comorbidities
MDC: Major Diagnostic category

* Manitoba Procedures
+ Rand Procedures

(a) For this study of day surgery utilisation in European countries, a day patient was defined as "an elective patient who does not occupy a hospital bed overnight and who is discharged alive".
(b) Ireland:all Private Hospitals
(c) England: eight regions
(d) Wales: region
(e) Portugal: Public Hospitals
(f) Hungary: DRG Definition may not be directly comparable
(g) Norway: national
(h) Canada: Manitoba.
(i) Medical DRG

TABLE 2

DRGs Accounting for High Volume (› 35%) and Low Volume (20-35%) Utilisation of Ambulatory Surgery Services: Comparison of Study Results

Diagnosis Related Group	NORTH AMERICA		EUROPE	
	RAND (a)	MANITOBA (b)	No. of Countries › 35%	No. of Countries 20-35%
6. Carpal tunnel release	X	X	2	1
7. Perip + Cranial nerve + Other nerv syst proc A›69 +/or C.C.	-	-	-	1
8. Peripheral and cranial and other nervous system procedure, a ‹ 70. W/O CC	-	X	-	-
36. Retinal procedures	-	-	2	-
38. Primary iris procedures	-	X	2	1
39. Lens procedures	X	-	-	-
40. Extraocular procedures except orbit, A › 18 or over	X	X	4	2
41. Extraocular procedures except orbit aged 0-17	-	-	2	1
42. Intraocular Procedures except retina, iris + lens	-	-	1	-
51. Salivary Gland procedures except Sialoadenectomy	-	-	1	-
53. Sinus and mastoid procedures, A 18 or over	X	-	-	-
55. Miscellaneous ear, nose and throat procedures	X	-	-	1
57. T & A proc except tonsillectomy +/or adenoidectomy only, A › 17	-	-	-	1
58. T & A proc except tonsillectomy +/or adenoidectomy only, A ‹ 18	-	-	-	2
60. Tonsillectomy and/or adenoidectomy only, A ‹ 18	-	-	-	1

Diagnosis Related Group	NORTH AMERICA		EUROPE	
	RAND (a)	MANITOBA (b)	No. of Countries > 35%	No. of Countries 20-35%
61. Myringotomy with tube insertion, A > 18	X	X	2	4
62. Myringotomy, A < 18	-	-	2	2
63. Other ear, nose & throat O.R. procedures	-	-	1	-
104. Cardiac valve procedure with pump + with cardiac cath.	-	-	-	1
109. Cardiothoracic procedures w/o pump	-	-	-	1
119. Vein Ligation + Stripping	-	-	-	2
120. Other O.R. procedures on the circulatory system	-	-	1	-
152. Minor small and large bowel procedures, A 70 or over, and/or CC	-	X	-	-
153. Minor small and large bowel procedures, A < 70, w/o CC	-	X	-	1
154. Stomach, esophageal, and duodenal procedures, A 70 or over, and/or CC	-	X	-	-
155. Stomach, esophageal, and duodenal procedures, A 18-69, w/o CC	-	X	-	-
157. Anal and stomal procedures, A 70 or over, and/or CC	-	X	1	-
158. Anal and stomal procedures, A < 70, w/o CC	-	X	1	-
161. Inguinal and femoral hernia procedures, A 70 or over, and/or CC	X	-	-	-
162. Inguinal and femoral hernia procedures, A 18-69, w/o CC	X	-	-	-
163. Hernia Proc, A < 18	-	-	1	1
168. Mouth Procs, A > 69 and/or CC	-	-	1	-
169. Procedures on the mouth, A < 70, w/o CC	-	X	1	3

Diagnosis Related Group	NORTH AMERICA		EUROPE	
	RAND (a)	MANITOBA (b)	No. of Countries > 35%	20-35%
171. Other digestive system procedures, A < 70, w/o CC	-	-	-	1
*187. Dental extractions and restorations	X	-	4	1
213. Amputations for musculoskeletal system + Conn. tissue disorders	-	-	-	1
221. Knee procedures, A 70 or over, and/or CC	X	-	-	-
222. Knee procedures, A < 70, w/o CC	X	-	-	1
223. Upper extremity proc. exc. humerus + hand A > 69 and/or CC	-	-	1	-
224. Upper extremity proc. exc. humerus + hand A < 70 w/o CC	-	-	1	-
225. Foot procedures	X	-	-	-
226. Soft tissue procedures, A > 69 and/or CC	-	-	-	1
227. Soft tissue procedures, A < 70 w/o CC	-	X	1	1
228. Ganglion (hand) procedures	X	X	2	-
229. Hand procedures except ganglion	X	-	1	3
231. Local excision and removal of internal fixation devices except hip and femur	-	X	1	-
232. Arthroscopy	X	X	1	2
234 Other Musculoskelet sys + Conn tiss O.R. proc A < 70 w/o CC	-	-	-	1
259. Subtotal mastectomy for malignancy, A > 70, and/or CC	-	X	-	2
260. Subtotal mastectomy for malignancy, A < 70, w/o CC	-	X	1	-
261. Breast procedures for non-malignancy except biopsy and local excision	X	-	-	-

Diagnosis Related Group	NORTH AMERICA		EUROPE	
	RAND (a)	MANITOBA (b)	No. of Counntries > 35%	20-35%
262. Breat biopsy and local excision for non-malignancy	X	X	1	2
264. Skin Grafts for skin ulcer or Cellulitis A < 70 w/o CC	-	-	-	1
265. Skin Grafts except for skin ulcer or cellulitis with CC	-	-	-	1
266. Skin Grafts and/or debridement, except for skin ulcer or cellulitis w/o CC	X	X	1	1
267. Perianal and pilonidal procedures	X	-	-	1
268. Skin, subcutaneous tissue, and breast plastic procedures	X	X	2	1
269. Other skin, subcutaneous tissue, and breast OR procedures, A > 70, and/or CC	-	X	1	-
270. Other skin, subcutaneous tissue, and breast OR procedures, A < 70, w/o CC	X	X	4	2
291. Thyroglossal PR	-	-	1	-
293. Other endocrine, nutritional and metabolic OR procedures, A < 70, w/o CC	-	X	3	-
310. Transurethral procedures, A 70 or over, and/or CC	X	-	-	-
311. Transurethral procedures, A < 70, w/o CC	X	X	-	2
313. Urethral procedures, A 18-69, w/o CC	-	X	-	1
314. Urethral procedures, A < 18	-	-	1	1
336. Transurethral prostatectomy, A 70 or over, and/or CC	X	-	-	-
337. Transurethral prostatectomy, A < 70, w/o CC	X	-	-	-

Diagnosis Related Group	NORTH AMERICA		EUROPE	
	RAND (a)	MANITOBA (b)	No. of Countries > 35%	20-35%
340. Tests procedures, non-malignant A < 18	-	-	1	-
341. Penis procedures	-	-	-	2
342. Circumcision, A 18 or over	X	X	1	4
343. Circumcision, A < 18	-	-	2	2
344. Other male reproductive system OR procedures for malignancy	-	X	-	-
345. Other male reproductive system OR procedures, except for malignancy	-	X	1	-
359. Tubal interruption for non-malignancy	X	-	-	-
360. Vagina, Cervix and Vulva procedures	-	X	3	1
361. Laparoscopy and endoscopy (female), except tubal interruption	X	-	-	1
362. Laparoscopic tubal interruption	X	-	1	1
363. D & C, Conization + Radio-implant, for malignancy	-	-	1	1
364. Dilation and curettage, except for malignancy	-	X	2	3
365. Other female reproductive system OR procedures	-	-	2	-
377. Postpartum Diagnoses with OR procedures	-	-	1	1
394. Other OR procedures of the blood and blood-forming organs	-	X	1	1
401. Lymphoma or leukaemia with other OR procedure, A 70 or over, and/or CC	-	X	-	1
402. Lymphoma or leukaemia with other OR procedures, A < 70, w/o CC	-	X	-	1
408. Myeloprolif disord. or poorly diff. neopl. with minor OR proc.	-	-	1	-
415. OR procedure for infectious + parasitic diseases	-	-	1	-

Diagnosis Related Group	NORTH AMERICA		EUROPE	
	RAND (a)	MANITOBA (b)	No. of Countries > 35%	20-35%
439. Skin Grafts, Injr.	-	-	-	1
441. Hand proc., injury	-	-	-	2
461. OR procedures with diagnoses of other contacts with health services	-	X	-	2

(a) CARTER, G. M. and P. B. GINSBERG. *The Medical Case Mix Index Increase: Medical Practice Changes, Aging, and DRG Creep*, No. R-3292-HCFA, Santa Monica, California, The RAND Corporation, 1985.

(b) ROOS, N. P. and J. L. FREEMAN, "The Potential for Inpatient-Outpatient Substitution with Diagnosis-Related Groups", *Health Care Financing Review*, Summer 1989, Volume 10, Number 4.

A: Age
CC: Complications or comorbidities
PR: Operating Room Procedure
* Medical DRG

TABLE 3

Diagnosis Related Groups in which Ambulatory Surgary Discharges Represent between 20 per cent and 35 per cent of all Discharges: Selected Countries (a)

Diagnosis Related Group	Ireland			England[b]	Wales[c]	Spain[d]	Portugal[e]	Italy[f]	Hungary[g]	Norway[h]
	National		Private							
	1987	1988	1990	1988	1988	1986	1989	1988	1987	1988
	%	%	%	%	%	%	%	%	%	%
MDC 1: Nervous System										
+ 6 Carpal tunnel release							32			
7 Perip + Cranial nerve + Other nerv syst proc A>69 +/or C.C.			27							
MDC 2: The Eye										
38 Primary iris procedures			25							
+40 Extraocular procedures except orbit, A > 18 or over							23			22
41 Extraocular Procedures except orbit aged 0-17				28						
MDC 3: Ear, Nose, Throat										
+55 Miscellaneous ear, nose and throat procedures			20							
57 T & A proc except tonsillectomy +/or adenoidectomy only, A>17			25							
58 T & A proc except tonsillectomy +/or adenoidectomy only, A<18			21				27			
60 Tonsillectomy and/or adenoidectomy only A<18							29			
+61 Myringotomy with tube insertion, A > 18	21			34	22		23			
62 Myringotomy A < 18	33						23			
MDC 5: Circulatory System										
104 Cardiac valve procedure with pump + with Cardiac cath.		25								
109 Cardiothoracic procedures w/o pump		24								

Diagnosis Related Group	Ireland			England[b]	Wales[c]	Spain[d]	Portugal[e]	Italy[f]	Hungary[g]		Norway[h]
	National		Private								
	1987	1988	1990	1988	1988	1986	1989	1988	1987	1988	1988
	%	%	%	%	%	%	%	%	%	%	%
119 Vein Ligation + Stripping			32	22							
MDC 6: Digestive System											
153 Minor small and large bowel procedures, A < 70, W/O/ CC			22								
163 Hernia Proc, A < 18	20										
169 Procedures on the mouth, A < 70, W/O CC				23			24	20			
171 Other digestive System procedures A<70 w/o c.c.			20								
+187 Dental extractions and restorations (i)							33				
MDC 8: Musculoskeletal System and Connective Tissue											
213 Amputations for musculoskeletal system + Conn. tissue disorders			20								
+222 Knee procedures, A < 70, W/O CC			21								
226 Soft tissue procedures A>69 and/or c.c.			33								
+227 Soft tissue procedures, A < 70, W/O CC							20				
+229 Hand procedures except ganglion			34		27		26				
232 Arthroscopy				31			20				
234 Other Musculoskelet sys + Conn tiss O.R. proc A<70 w/o c.c.			20								
MDC 10: Skin, Subcutaneous Tissue and Breast											
259 Subtotal mastectomy for malignancy, A > 70, and/or CC			21								20
+262 Breast biopsy and local							21				23

Diagnosis Related Group	Ireland National 1987 %	Ireland National 1988 %	Ireland Private 1990 %	England[b] 1988 %	Wales[c] 1988 %	Spain[d] 1986 %	Portugal[e] 1989 %	Italy[f] 1988 %	Hungary[g] 1987 %	Hungary[g] 1988 %	Norway[h] 1988 %
excision for nonmalignancy											
264 Skin Grafts for skin ulcer or Cellulitis A<70 w/o c.c.			25								
265 Skin Grafts except for skin ulcer or cellulitis with c.c.			27								
*266 Skin grafts and/or debridement, except for skin ulcer or cellulitis, W/O CC							24				
*267 Perianal and pilonidal procedures			24								
268 Skin, Subcutaneous tissue + Breast plastic procedures					24						
*270 Other skin, subcutaneous tissue, and breast OR procedures, A 70, W/O CC	24										29
MDC 11: Kidney and Urinary Tract											
311 Transurethral procedures, A < 70, W/O CC			28	21							
313 Urethral procedures, A 18-69, W/O CC			28								
314 Urethral Procs < 18		31									
MDC 12: Male Reproductive System											
* 341 Penis Procs			27	24							
*342 Circumcision, A > 18			20	20		20	33				
343 Circumcsion, A < 18	22			34							
MDC 13: Female Reproductive system											
*360 Vagina, Cervix and vulva procedures											23

Diagnosis Related Group	Ireland National 1987 %	Ireland National 1988 %	Ireland Private 1990 %	England[b] 1988 %	Wales[c] 1988 %	Spain[d] 1986 %	Portugal[e] 1989 %	Italy[f] 1988 %	Hungary[g] 1987 %	Hungary[g] 1988 %	Norway[h] 1988 %
*361 Laparoscopy and endoscopy (female), except tubal interruption			33								
*362 Laparoscopic tubal interruption											31
363 D + C, Conization + Radio - implant, for Malignancy.			27								
364 Dilation and curettage, except for malignancy				26					24	25	30
MDC 14: Pregnancy, Childbirth and Puerperium											
377 Postpartum Diagnoses with O.R. Procedure							23				
MDC: Blood and Immunological											
394 Other OR procedures of the blood and blood-forming organs				20							
MDC 17: Myeloproliferative, Poorly Differentiated Neoplasms											
401 Lymphoma or leukaemia with other OR procedure, A > 70 and/or CC									20		
402 Lymphoma or leukaemia with other O.R. procedures, A < 70, W/O CC			30								
MDC 21: Injury, Poisoning and toxic effect of drugs											
439 Skin Grafts, Injr.	24										
441 Hand Proc, Injury		20					29				
MDC 23: Factors Influencing health status											

461	OR procedures with diagnoses of other contacts with health services	23	27

A: Age
CC: Complications or comorbidities
MDC: Major Diagnostic Category
+ Rand Procedures

(a) For this study of day surgery utilisation in European countries, a day patient was defined as "an elective patient who does not occupy a hospital bed overnight and who is discharged alive".
(b) England: eight regions
(c) Wales: region
(d) Spain: Barcelona
(e) Portugal: Public Hospitals
(f) Italy: region
(g) Hungary: DRG Definiton may not be directly comparable
(h) Norway: nation
(i) Medical DRG.

Figure 1

DRGs Accounting for High Volume (>35%) Utilisation of Ambulatory Surgery Services: Categorisation of Study Results

Rand only	Rand and Manitoba	Manitoba only
39 53 55 161 162 221 222 225 261 267 310 336 337 359 361	311	8 152 153 154 155 259 313 344 401 402 461
Rand and Europe	**All Three**	**Manitoba and Europe**
187 229 362	6 40 61 228 232 262 266 268 270 342	38 157 158 169 227 231 260 269 293 345 360 364 394
Europe only		
2 41 42 51 62 63 120 163 168 223 224 291 314 340 343 363 365 377 408 415		

APPENDIX I

Distribution of Discharges by Length of Stay for Selected Surgical DRGs

Country: **Year:**

Diagnosis Related Group		Distribution of Discharges			
		Day* %	1-3 Day %	4+ Days %	Total N
6	Carpel tunnel release				
8	Peripheral and cranial and other nervous system procedures, A < 70, W/O CC				
38	Primary iris procedures				
39	Lens Procedures				
40	Extraocular procedures except orbit, A 18 or over				
53	Sinus and mastoid procedures, A 18 or over				
55	Miscellaneous ear, nose and throat procedures				
61	Myringotomy with tube insertion, A 18 or over				
152	Minor small and large bowel procedures, A 70 or over, and/or CC				
153	Minor small and large bowel procedures, A < 70, W/O/ CC				
154	Stomach, esophageal, and duodenal procedures, A 70 or over, and/or CC				
155	Stomach, Esophageal, and duodenal procedures, A 18-69, W/O CC				
157	Anal and stomal procedures, A 70 or over, and/or CC				

Diagnosis Related Group		Distribution of Discharges			
		Day* %	1-3 Day %	4+ Days %	Total N
158	Anal and stomal procedures, A < 70, W/O CC				
161	Inguinal and femoral hernia procedures, A 70 or over, and/or CC				
162	Inguinal and femoral hernia procedures, A 18-69, W/O CC				
169	Procedures on the mouth, A < 70, W/O CC				
187	Dental extractions and restorations				
221	Knee procedures, A 70 or over, and/or CC				
222	Knee procedures, A < 70, W/O CC				
225	Foot procedures				
227	Soft tissue procedures, A < 70, W/O CC				
228	Ganglion (hand) procedures				
229	Hand procedures except ganglion				
231	Local excision and removal of internal fixation devices except hip and femur				
232	Arthroscopy				
259	Subtotal mastectomy for malignancy, A > 70, and/or CC				
260	Subtotal mastectomy for malignancy, A <70, W/O CC				
261	Breast procedures for nonmalignancy except biopsy and local excision				
262	Breast biopsy and local excision for nonmalignancy				
266	Skin grafts and/or debridement, except for skin ulcer or cellulitis, W/O CC				

Diagnosis Related Group	Distribution of Discharges			
	Day* %	1-3 Day %	4+ Days %	Total N
267 Perianal and pilonidal procedures				
268 Skin, subcutaneous tissue, and breast plastic procedures				
269 Other skin, subcutaneous tissue, and breast OR procedures, A < 70, and/or CC				
270 Other skin, subcutaneous tissue, and breast OR procedures, A < 70, W/O CC				
293 Other endocrine, nutritional, and metabolic OR procedures, A < 70, W/O CC				
310 Transurethral procedures, A 70 or over, and/or CC				
311 Transurethral procedures, A < 70, W/O CC				
313 Urethral procedures, A 18-69, W/O/ CC				
336 Transurethral prostatectomy, A 70 or over, and/or CC				
337 Transurethral prostatectomy, A < 70, W/O CC				
342 Circumcision, A 18 or over				
344 Other male reproductive system OR procedures for malignancy				
345 Other male reproductive system OR procedures, except for malignancy				
359 Tubal interruption for nonmalignancy				
360 Vagina, Cervix and vulva procedures				

Diagnosis Related Group		Distribution of Discharges			
		Day* %	1-3 Day %	4+ Days %	Total N
361	Laparoscopy and endoscopy (female), except tubal interruption				
362	Laparoscopic tubal interruption				
364	Dilation and curettage, except for malignancy				
394	Other OR procedures of the blood and blood-forming organs				
401	Lymphoma or leukemia with other OR procedure, A 70 or over, and/or CC				
402	Lymphoma or leukemia with other OR procedures, A < 70, W/O CC				
461	OR procedures with diagnoses of other contacts with health services				

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* For the purpose of this study, a **day patient** may be defined as an elective patient who does not occupy a hospital bed overnight and who is discharged alive.

A : Age

CC: Complications or comorbidities

APPENDIX II

THE AUDIT COMMISSION'S "BASKET" OF PROCEDURES

1. Inguinal hernia repair
2. Excision of breast lump
3. Anal fissure dilation or excision
4. Varicose vein stripping or ligation
5. Cystoscopy, diagnostic and operative
6. Circumcision
7. Excision of Dupuytren's contracture
8. Carpel tunnel decompression
9. Arthrosccopy, diagnostic and operative
10. Excision of ganglion
11. Orchidopexy
12. Cataract extraction, with or without implant
13. Correction of squint
14. Myringotomy, with or without insertion of grommets
15. Sub mucous resection
16. Reduction of nasal fracture
17. Operation for bat ears
18. Dilation and curettage
19. Laparoscopy, with or without sterilisation
20. Termination of pregnancy

Source: Audit Commission A Short Cut to Better Services: Day Surgery in England and Wales, The Audit Commission for Local Authorities and the National Health Service in England and Wales, 1990, (p. 32).

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