

Case Mix – For Better or for Worse?

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INTRODUCTION

Escalating healthcare costs has been one of the most hotly debated policy issues in developed countries in recent years. Much of this stems from an increase in hospital expenditure resulting from the accelerated development of expensive new technology, increased range and complexity of treatment modalities, and the epidemiologic and demographic transition in many populations within an urban environment. There has been much debate on how to best contain healthcare costs. Measures such as rationing, waiting lists, resource management, global capping on budgets, and capitation through managed care, have all been utilised. However, these have often resulted in negative publicity for governments and purchasers of healthcare. In the USA, such concerns led to the introduction of a fixed price, prospective payment system, based on the classification of patients into Diagnosis Related Groups (DRGs).

What is case mix?

Casemix is a generic term that describes the mix of patients present within a healthcare setting. It is a system of patient classification that aims for resource homogeneity within each group. Since the 1970s, there have been attempts to conceive the hospital in terms of inputs and outputs. This is related to the notion of funding hospitals for their output, ie. for what they do. If the final diagnosis on the discharge summary form represents the essence of the output of a hospital admission, clearly, there are a number of intermediate steps in the process. One could think of the final output as a result of two phases whereby inputs such as, labour, materials and equipment are converted into intermediate products such as meals, clinical procedures, pharmacy, and radiology. The final products are outputs such as cholecystectomies, dialysis, and vaginal deliveries. The products to be classified are episodes of patient care. Case mix can therefore be looked upon as an information tool directed at understanding and controlling the 'production' of healthcare delivery.

The important features of any case mix classification system are: a) Resource use homogeneity – episodes within the same class should be homogeneous in terms of resource consumption; b) Clinical meaning – the diagnoses found within each class or group should be meaningful to healthcare professionals; c) There should be an optimum number of classes that strike

a balance between comprehensiveness, detail, accuracy and statistical validity.

In short, case mix is a scientific approach to classifying and describing the output of a healthcare provider. The concept of case mix is not new. The first widely used case mix classification system – DRGs – was developed by Fetter and his colleagues in 1974 for acute inpatient episodes. There are several other case mix systems such as Disease Staging and Patient Management Categories, but DRGs are the most well known. Case mix classifications have also been developed for other types of episodes such as ambulatory care, psychiatry, and long-term care.

Purpose of case mix

DRGs were originally developed in the USA for the purpose of facilitating quality assurance programmes⁽¹⁾. Because patients in the same DRG are expected to consume similar amounts of resources, DRGs are able to be used to standardise for differences in the case mix of hospitals and thus allow comparisons of hospital efficiency. Using the case mix concept, in the mid 1980s, the US federal government introduced the fixed price Prospective Payment System (PPS) for reimbursing hospitals on a standard rate per DRG for treating Medicare patients (elderly and disabled). This was the first time that payment for hospital care was managed through the use of a case mix classification system. Since then, there have been case mix classifications developed in the United Kingdom, Belgium, Spain, Portugal, Norway, Sweden, Austria, France and Australia. Despite its initial intent, case mix is now synonymous with funding.

DRGs and funding

Each class within the DRG system describes a cluster of patients with related diagnoses requiring similar investigations and incurring similar treatment costs. These can therefore be regarded as similar products of acute inpatient care. DRGs are the elements of a classification scheme which provides a common language for relating the number and type of patients treated in a hospital to the resources used. The same language enables issues such as quality and performance to be compared between hospitals. At the same time, it can be used as a tool to enable more objective organisational budgeting. DRGs are therefore the means for output based funding of hospital care.

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The grouping into DRGs is made on the basis of the inpatient discharge summary, which uses the International Classification of Diseases 9th edition, Clinical Modification (ICD-9 CM). There are over 10,000 ICD-9 CM diagnoses, most of which have clinical meaning, but are relatively inefficient in terms of identifying resource use. The DRG system, from a few hundred to just over a thousand classes, represents an attempt to reduce the complexity associated with the volume of ICD-9 CM diagnoses, while attempting to directly relate them to resource use. A great deal of effort has been put in to ensure that there is a fair degree of homogeneity within each DRG with respect to resource use and clinical content. Statistical validation has been done to ensure that each DRG is tightly defined without a big spread in resource use. The DRG approach also takes into account variables that may affect the length of stay such as age, complications and comorbidities.

For funding purposes, most agencies have developed DRG cost-weights. This is essentially a reflection of how much each DRG costs and is based on data from patient-based costing exercises. Using this information, the payor or purchaser will be able to determine the amount to be funded or paid to the provider for each DRG.

Although the concept of case mix may appear relatively straightforward, in reality, clinicians, administrators and regulators have attached different meanings to it. For clinicians, case mix refers to a set of interrelated patient attributes, including severity of illness, risk of death, treatment variables, stage of disease, etc. These are related to clinical complexity of the patient (case). Thus, from a clinician's perspective, case mix refers to the condition of the patients treated and the treatment difficulties associated with providing care. On the other hand, administrators usually use the concept of case mix to indicate that the patients treated require different resources which result in differences in the cost of providing care. Thus, from an administrative point of view, case mix refers to the resource intensity demands that patients place on an institution. While the two interpretations of case mix are closely interrelated, they can also be very different, eg. patients with terminal cancer may be severely ill, but require few hospital resources beyond skilled nursing care.

Advantages of case mix

The proponents of case mix argue that DRGs provide some degree of objectivity to the measurement of inpatient activity. It gives a reasonably accurate description of how money is spent in providing care. Questions can then be asked about what is being done in any given hospital, what can be done and most importantly, what should be done. It results in a more equitable system for funding hospitals because they are paid for what they do. It has also resulted in a general improvement of efficiency in work practices through better management of expensive clinical investigations, ambulatory surgery, and the length of stay. DRGs are also relatively easy to understand and use, and provide information which are relatively

inexpensive to obtain, since they do not necessarily demand massive capital investment. DRGs offer a common vocabulary between doctors and administrators for determining what range and volume of care and services the hospital should provide and for monitoring performance against desired organisational goals. Finally, DRGs provide a framework for examining variations in quality and relate them directly to resource use. In this manner, comparisons between different balances of the cost/quality equation can be made.

Disadvantages of case mix

As with any newly developed tool which may threaten the status quo, casemix has received its fair share of criticism. Opponents have argued that DRGs do not adequately account for variations in therapeutic philosophies, taking a simplistic view of variations in patients' needs, including severity of illness and comorbidities. DRGs have been criticised for failing to respond with sufficient speed to the development of new technologies. There is the fear that the DRG funding system stifles innovation and lags behind therapeutic progress. There is also questionable health gain from the use of DRGs in view of the incentive for rapid discharge with little regard for quality of outcome – the 'quicker and sicker' syndrome. There are also inherent problems in casemix classifications. Critics have commented that DRGs do not adequately address the problem of severity of illness. This has led to the development of the All Patient Refined DRGs (APR-DRGs), comprising of some 1560 categories. While this is certainly an improvement in terms of differentiating between patients with differing severity of illness, it is cumbersome and difficult to administer. Lastly, most case mix systems focus on acute inpatient care only, neglecting the effect on ambulatory services and community care. The technical efficiency gains in the acute care sector may cause a negative impact on the quality of care in the community setting.

Many of the above can be considered as secondary problems with DRGs. They do not necessarily mean that DRGs (or a similar form of case mix classification system) should not be used. Rather, they point to ways in which DRGs could be improved, or where care should be taken in interpreting case mix information. Most criticisms do not compare the value of case mix measures with managing healthcare resources without them. Despite the obvious disadvantages and problems with case mix, governments all over the world see the inherent attractiveness of the concept and its use continues to grow.

A case mix system for Singapore?

The question begs to be asked: Is case mix for Singapore? To answer this, there should be certain considerations. The situation in Singapore is different in many respects from that in the USA and Australia. Our healthcare expenditure per capita is comparatively low and the government has successfully contained health care costs without compromising on quality of care through controlling both the supply and

demand sides of the market. Health expenditure has remained fairly stable at 3% of the gross domestic product (GDP), but national health expenditure and overall health expenditure per capita have been rising steadily over the past 10 years. Increasing life expectancy, lowering of infant mortality rate, and an ageing population are all expected to put added pressures on the healthcare system, causing increases in healthcare costs.

In view of these factors, the government is implementing case mix in Singapore. This was recently announced by the Minister for Health. Casemix will be the basis for subventing or funding public hospitals for acute inpatient care. The existing subvention system has several drawbacks. It is essentially a simplistic system consisting of funding of inpatient activity based on 19 specialties and a per diem (or per day) payment system. This relatively crude system results in inequities in funding due to large variations in resource use within each specialty. Hospitals are also not incentivised to be more efficient. Case mix implementation ensures equity in financing healthcare because it is based on hospital output, instead of input. It enables the use of data for quality improvement activities. It also provides information that enables the hospitals to understand their cost behaviour and reinforces the drive for more cost-efficient services. Case mix information would enable the government to more rationally fund public hospitals because there is a better definition of outputs and funding can be proportional to resource use. The MOH has also announced that case mix would only be used to fund acute inpatient and day surgery activity. Teaching and research components would be funded separately. This would be welcomed by those institutions which have a larger share of undergraduate students and postgraduate trainee doctors.

The Ministry of Health has announced that it is adopting a phased approach to case mix implementation, starting with the public acute care hospitals. It is now in the process of working out the details before the cut-over to case mix based funding. It is likely that case mix will be extended to include the private sector hospitals. However, this will take some time as the Ministry has to first establish a workable framework for case mix in the public sector before it moves on to include the private healthcare sector.

Unresolved issues

While there are many potential benefits that can be gained from case mix, there still remains a range of unresolved issues. The evidence on the effectiveness of case mix in controlling healthcare costs and improving on quality of care remains scanty and inconsistent. Reports from Australia and the USA indicate that case mix has resulted in more efficient hospitals without compromising the quality of care^(2,3). Patient satisfaction has also been reported to be high despite case mix implementation. Despite these reports, there are anecdotal evidence of premature hospital discharges ('quicker and sicker'), higher mortality and greater costs incurred by families and

the community as healthcare is pushed from the acute hospitals to step down facilities such as nursing homes and community hospitals.

Case mix works well in a healthcare system which has a well developed community healthcare delivery network and home healthcare system. However, in the absence of a well defined network of community care facilities, case mix may exacerbate the fragmentation of care because it is episode focused. This was the case in the USA in the 1980s. However, recent trends in the USA, Australia and several European countries have shown that healthcare providers and managed care organisations are merging to form networks, and establishing disease management programmes for their patients. Disease management can be conceived as a population based approach to the total healthcare of a defined number of individuals and is founded on the principles of efficiency in the care delivery process, cost-effectiveness, evidence-based practice, case management and outcomes measurement and management. Such a system of care could have a major impact on healthcare in Singapore as providers strive to create a network of integrated and co-ordinated services that achieves a 'seamless' system of care delivery across the entire continuum.

For a start, the Ministry of Health has decided to adopt the Australian National DRG or AN-DRG system for use in Singapore. In doing so, there is the question of relevance and applicability of the AN-DRG system to local practice patterns, which may differ from Australia. In addition, practice patterns change over time. Casemix classifications may not keep in tandem with advances in medical technology. There have also been claims that the ICD-9 CM classification system is already outdated. To address these issues, a Clinical Classification Committee (CCC) has been formed by the Ministry to review the AN-DRG system. The work of the CCC is crucial towards developing a credible and valid DRG system for Singapore. As clinicians, we should ensure that case mix implementation is clinician driven and focused instead of payor focused. Clinicians must therefore take the lead in developing clinical pathways, guidelines and practise evidence-based medicine. The local practice patterns can then drive the development of case mix based on rational and cost-effective clinical practice rather than purely financial considerations.

Ultimately, the result will depend on whether the benefits of setting up the new funding system would outweigh the administrative and opportunity costs. The main argument for case mix implementation is that it is a significant improvement over the current funding system, which has inherent inequities and disincentives towards improving efficiency. On the other hand, there are many unresolved policies and operational issues that need to be addressed. There should be continuing dialogue between the government and healthcare providers so that the system is fair, effective and workable.

Role of doctors in casemix

One of the favourable side effects of case mix is the

need for doctors to keep adequate and accurate clinical records. This is because the output-based funding system inherent in case mix depends on the accuracy and completeness of the clinical records. The case mix system requires the salient information from the medical records to be transcribed and coded into a DRG software which then assigns the final DRG according to the principal diagnosis, secondary conditions, complications, comorbidities, investigations and treatment. With more reliable clinical records, clinicians can carry out retrospective clinical audits and utilisation review. Case mix also incentivises doctors and providers to carry out proactive discharge planning, an activity that is still sporadic among our hospitals today.

Case mix and DRGs are inevitable. However, as clinicians, we have to learn from the experiences in other countries and seize this opportunity to take the lead in determining how our healthcare system should be organised and managed. If viewed positively, case mix empowers clinicians to determine resource use

and gives doctors and managers greater autonomy in determining how healthcare resources could be managed.

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