Primary care

Use of risk adjustment in setting budgets and measuring performance in primary care I: how it works

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Healthcare systems in countries throughout the developed world are faced with the problem of limiting the growth in spending on health services while ensuring that their populations have access to appropriate care. The United Kingdom is no different in this respect, and the past 20 years have seen the introduction of numerous initiatives aimed at improving the efficiency of the NHS. Approaches adopted by the NHS to help improve efficiency include the introduction of capitation based budgets and increased monitoring of providers' performance. In the United States similar pressures to improve the efficiency of the healthcare system have led to the wide scale adoption of fixed budgets and monitoring of healthcare providers.

Diagnosis based methods for adjusting risk are becoming increasingly common within the US managed healthcare industry. The objective of risk adjustment is to help ensure that budgetary allocations or provider assessments take into account the morbidity of individual patients. In this and a subsequent article, we will describe this still evolving process and discuss its possible implications for the NHS, particularly for the new primary care organisations. There are various methods for carrying out risk adjustment, but we have used the Johns Hopkins adjusted clinical group system to show how risk adjustment works. The system is particularly relevant to primary care and is the most widely used method of measuring population case mix in the United States.

Capitation based budgets in England

Capitation based budgets in England were first introduced for health authorities and then, through the fundholding scheme, for general practices. Capitation based budgets are now being introduced for primary care groups and trusts, the organisations that are replacing health authorities as the main purchasers of health services. Over time, the UK government envisages that primary care groups will move from budgets based on past use of health services to budgets based largely on population size. In addition to this change in their method of funding, primary care trusts and general practices will find that their performance and use of resources are more closely monitored. Similar changes in healthcare systems are taking place in many other developed countries.

Summary points

Primary care groups and general practices will be funded largely through capitation based formulas, and their performance will be monitored more closely

Current methods of funding primary care trusts and general practices, and of monitoring their performance, do not take into account differences in case mix

Risk adjustment methods have been developed in the United States to allow measurement of case mix and morbidity of primary care populations

Risk adjustment methods are now being used to set capitation rates for health services in the United States

Why implement capitation based budgets?

In many countries, general practitioners are the gatekeepers to health services. The decisions taken by general practitioners about the management of individual patients, and in particular whether to perform diagnostic studies, prescribe, or refer patients for specialist care, greatly influence the use of budgets for health services. There is large variation in the way doctors practise, and primary care physicians are no exception to this. For example, prescribing rates,[1] rates of referral for specialist care,[2] and hospital admission rates vary widely between general practices.[3] The underlying explanations for such variations are not always clear, but to funders and managers of healthcare systems, they suggest that health services are being used inappropriately or inefficiently. By giving doctors fixed budgets for health services, based on objective criteria, funders hope to reduce the extent of this variation, help ensure that health services are used appropriately, and thus increase the efficiency and equity with which budgets for health services are allocated and used.

Payers, purchasers, and providers of health services in US and English healthcare systems

	England	United States
Payers	Department of Health	Government (Medicare, Medicaid), employers
Contracting agents	Health authorities, primary care trusts	Health Plans such as health maintenance organisations or preferred provider organisations
Providers	Acute and community trusts, general practices, private sector hospitals	Public and private hospitals, Independent Practice Association networks, medical groups, individual providers

How do capitation based budgets work in England?

Capitation based budgets are designed to allocate funds for health care to primary care groups, largely based on the number of patients registered with their constituent general practices. The budgets are currently calculated by using formulas derived from multifactorial statistical models in which measures such as patients' age, sex, and socioeconomic status (derived from census data) and community rates of chronic illness are used to predict future use of health care.[4] [5] The capitation payments that result from these models have weightings for the number of patients in a primary care group and also for other factors that influence the use of health care. In most cases, these factors usually consist of age and sex along with standardised mortality rates and ecological measures of socioeconomic status. They do not take account of the prevalence or severity of specific diseases.

The lack of information on clinical factors in these formulas is a major limitation. The formulas may not adequately adjust for differences in the need for health care across populations.[6] [7] Consequently, budgets based on capitation formulas may discourage doctors from taking on patients with complex health needs who would be expected to make high use of healthcare services.[8]

In the United States, risk adjustment using computerised clinical data on individual patients is more advanced than in the United Kingdom. The NHS could draw on this experience to develop improved methods of resource allocation, particularly to organisations with relatively small populations such as primary care trusts or general practices.

Why did risk adjustment develop in the United States?

In the United States, there has been a gradual shift over the past 30 years away from funding healthcare providers on a fee for service basis to payments based on capitation. This shift was driven largely by the need to control escalating healthcare costs.[9] Under a capitation based system of payment, a health maintenance organisation or another type of private health plan receives a fixed payment (premium) for providing the health care needed by the patient. This payment is received mainly from the ultimate payers of health care, usually an employer or the government (Medicare for people aged 65 years and over and Medicaid for the poor and disabled). The health maintenance organisation or health plan in turn contracts with the healthcare providers, who supply the services used by the patient (table). Some payments are still made on a fee for service basis, but many health maintenance organisations now make some of their payments to primary care physicians on a capitation basis, and all use mechanisms for making their primary care physicians accountable for staying within budget.

Under this system, healthcare providers take responsibility for much of the financial risk that may arise from providing health services to patients.[10] Because the total number of patients enrolled with a healthcare provider may be relatively small, the threat of "adverse selection" (registering patients who use considerably more healthcare resources than covered by their capitation payment) is great. For example, the 10% of Medicaid enrolees who make the most use of resources account for around 70% of all Medicaid payments.[11] Consequently, without some method of risk adjustment of payments, healthcare providers will compete to attract healthy patients who are unlikely to make much use of their services. Sicker patients may find it difficult to find a healthcare provider who is willing to register them.

To overcome this problem, diagnosis based risk adjustment models have been developed to modify the payments made to health maintenance organisations and health plans. For example, the US Federal Medicare Program has recently started to implement a risk adjustment method for paying health maintenance organisations and health plans.[12] Several state agencies also contract on behalf of their Medicaid recipients using diagnosis based risk adjusted payments. In addition, because risk selection can also occur at the healthcare provider level, risk adjusted payments are increasingly being made to healthcare providers.

Profiling of providers by risk adjusted performance is also common in the United States. Within most managed care settings, the use of resources is compared among groups of primary care doctors by using risk adjustment. These adjusted profiling reports are often used to financially reward or penalise providers. Related methods are also used in studies of the quality or outcome of care and to evaluate or categorise individual patient encounters or episodes.[13]

How do US risk adjustment models work?

Because the United States does not have a national health system, several diagnosis based population risk adjustment models, with slightly different objectives, have been developed. One of the first to be developed, and currently the most widely used, is the adjusted clinical group system developed at Johns Hopkins University (box).[14] Other methods of risk adjustment include the diagnostic cost group developed at Boston University,[15] the disability payment system developed at University of California at San Diego,[16] and the clinical

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Johns Hopkins adjusted clinical group system

The John Hopkins adjusted clinical group system measures a patient's health status by using their medical history to place them in one of about 100 different groups through a two stage process. Each diagnosis in the patient's medical history is assigned to one of 32 aggregated diagnostic groups. Diagnoses are clustered based on several criteria, including clinical similarity, the likelihood that the condition will persist or recur, and the likelihood that the patient will return to their physician for treatment or will need a referral to a specialist. Patients are assigned to an aggregated diagnostic group if they have one of more of the group's constituent diagnoses and, hence, can have between 0 and 32 groups. The combination of groups is then used along with information on age and sex to assign the patient to one of about 100 mutually exclusive adjusted clinical groups.

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risk group developed by 3M Health Information Systems.[17]

The measurement approaches used by each system are different, but essentially they all work by clustering diagnoses into clinically meaningful categories and then combining categories for an individual patient to give a composite measure of health status that can help predict the future use of health services. For example, a patient with ischaemic heart disease, diabetes, and heart failure would be placed in a higher category than a patient with ischaemic heart disease alone.

In most risk adjustment systems, individual diseases or conditions are placed into a single morbidity cluster based on five factors (box). The systems generally use ambulatory care diagnoses (what would be termed outpatient, community, and general practice care in the United Kingdom) as well as inpatient hospital diagnoses to derive the measures of case mix. One exception to this is Medicare's principal inpatient diagnostic cost group system, which is being implemented to pay contracting health maintenance organisations. This system is initially using hospital data only until accurate ambulatory care data become available to Medicare.

The methods are similar to those used to assign hospital patients to diagnostic related groups in the United States and health related groups in the United Kingdom but make use of all the diagnoses in the patient's medical history during a specified time and not just the diagnoses from a single episode of hospital care.

Reducing the number of diagnostic categories

The large number of diagnostic categories generated by risk adjustment programs can sometimes result in their outputs being unwieldy to use when carrying out further analyses. For example, the Johns Hopkins system generates up to 32 aggregated diagnostic groups per person and then places patients into one of around 100 mutually exclusive adjusted clinical groups (see box for examples). However, for analysis the outputs of many risk adjustment programs can be collapsed into fewer categories. With the Johns Hopkins program, the aggregated diagnostic groups produced can be classified as minor or major and two summary measures derived: the total number of groups per person and the total number of major groups per person. These summary measures give a useful measure of case mix for a population. The 100 or so adjusted clinical groups can also be collapsed down further, into

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Examples of aggregated diagnostic groups and adjusted clinical group case mix categories

Minor aggregated diagnostic groups
ADG 2   Time limited: infection
ADG 26   Symptoms and signs: minor
ADG 31   Preventive and administrative

Major aggregated diagnostic groups
ADG 11   Chronic medical: unstable
ADG 16   Chronic specialty unstable: orthopaedic
ADG 22   Injuries and adverse effects: major

Adjusted clinical group case mix categories
ACG 0300   Acute minor, age <16 years
ACG 2200   Acute minor and likely to recur, age
           >5 years, no allergy
ACG 3800   2-3 diagnostic group combinations, age
           >34 years

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resource utilisation bands based on the expected use of resources by each group. These resource utilisation bands can be used to produce rates of use of health care that are directly standardised for case mix.

Conclusions

The use of diagnosis based risk adjustment is increasing rapidly in the US managed healthcare sector, and, as with many American innovations, it may eventually be adopted in the United Kingdom and elsewhere. In our second article, we will discuss the uses of risk adjustment in the United States, its benefits and limitations, and its potential value in the United Kingdom.

Criteria used to place diseases or conditions into morbidity clusters

Duration of the condition—Is the condition acute, recurrent, or chronic? How long will resources be required for management of the condition?
Severity of the condition—For example, is the condition minor and stable or major and unstable? How intensively will healthcare resources be used to manage the condition?
Diagnostic certainty—Will further investigations be needed or can the condition be treated immediately?
Aetiology—For example, infectious or accidental.
Need for specialist care—To what extent will specialist services be required?

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Use of risk adjustment in setting budgets and measuring performance in primary care II: advantages, disadvantages, and practicalities

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Risk adjustment could help to improve decisions about budgets as well as help measure the performance of doctors. In the first of these two articles we discussed why risk adjustment could become more important in the United Kingdom and how it works in the United States.[1] In this article we consider the benefits and problems of risk adjustment and assess how one US system would perform in the United Kingdom.

What are the uses of risk adjustment?

In the United States, risk adjustment is starting to be used to adjust capitation or other types of payments to healthcare providers such as family practices, multi-specialty medical groups, or consortiums of physicians and hospitals (integrated delivery systems).[2] For large populations (such as that of a broad geographical area), age, sex, and ecological measures may be adequate for this purpose. But for smaller populations, such as those managed by one family practice or a small consortium of physicians, risk adjustment helps ensure that providers who manage patients with more complex medical problems have their budgets adjusted to take this into account (box). The use of risk adjustment systems has also given doctors and health maintenance organisations a powerful incentive to provide more accurate and complete diagnostic data.[1] The second important use of risk adjustment is to adjust for case mix when comparing practice patterns across providers.[3] For example, the NHS plan states that it "promises better performance and accountability systems to reduce variations in service across England."[4] The performance indicators published by the Department of Health show wide variation in performance among doctors in both primary and secondary care.[5] However, as they do not take into account

differences in case mix, we do not know how valid such indicators are as measures of clinical efficiency and efficacy. Risk adjustment can help correct such variations for underlying differences in population case mix and thus could lead to fairer and more accurate performance measures for providers.

Another use of risk adjustment is to measure the health of a population.[6] The traditional way of doing this has been to use death rates or self reported measures of chronic illness derived from censuses or

Summary points

Use of risk adjustment in the United Kingdom could help ensure that general practices and primary care trusts are not penalised for taking on patients with complex health needs

Risk adjustment methods may also help ensure that computerised clinical records in primary care are complete and accurate

Risk adjustment could add to the administrative complexity of healthcare systems

It may draw attention away from the overall level of healthcare spending

There is no gold standard method of risk adjustment

Use of risk adjustment in setting budgets and monitoring performance should be explored further

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BMJ 2001;323:607–10