Reviewing RAWP

Measuring morbidity for resource allocation

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Abstract

The RAWP (Resource Allocation Working Party) report used population weightings based on standardised mortality ratios (SMRs) as a proxy measure of differences in morbidity (and therefore in the need for health care resources) that existed between geographical areas after allowing for the age and sex structure of their populations. The adequacy of SMRs as a proxy for morbidity has aroused controversy, particularly from RAWP losers in London, and is one of the main themes of the National Health Service Management Board's current review of RAWP. Critics have argued, firstly, that the nature of the relation between morbidity and mortality is unknown; and, secondly, that SMRs are incomplete because they fail to take account of the effect of social deprivation on the need for health care. As a result several alternative proxies for morbidity based on social indicators have been proposed.

One of their principal drawbacks is that their use is justified by their relation to measures of use of services known to be affected by the prevailing level of supply. Furthermore, the evidence suggests that mortality data actually correlate quite well with the available measures of both morbidity and social deprivation. But without access to comprehensive morbidity data the SMR debate is bound to remain inconclusive. As measures of health need, however, SMRs have the twin merits of being (a) independent of supply, and (b) more direct measures of health state than social indicators.

Reviewing RAWP: introduction to the series

In 1976 the Resource Allocation Working Party (RAWP) reported to the then Secretary of State for Social Services. It set out objective methods for the fair geographical distribution of capital and revenue funds for hospital and community health services to regions, areas, and districts in England.¹ RAWP devised population based formulas with the objective of ensuring equal opportunity of access to health care resources in all parts of the country for those at equal risk. This replaced the previous system of incremental budgeting, which perpetuated the existing inequalities. The RAWP formula has been used by the Department of Health and Social Security (DHSS) ever since, both to establish the fair entitlement or "target" share of each region and gradually to move its current allocation towards its target. In turn, the regions have interpreted RAWP's methods in the light of local circumstances and developed their own resource allocation systems within the framework of RAWP's objective of a fair share of financial resources between districts. Similar systems operate in Scotland, Wales, and Northern Ireland.

To pursue geographical equity through RAWP while in real terms the National Health Service budget is nearly static is already imposing considerable strains on districts losing resources and will continue to do so into the future. RAWP represents a major strategic influence on the way health services operate in different parts of the country and can thus be seen indirectly shaping the work of both hospital doctors and general practitioners throughout the National Health Service (NHS).

In spring 1986, after almost 10 years of RAWP, the NHS Management Board within the DHSS set up a steering group of NHS officers and DHSS officials to review the operation of the national RAWP revenue formula in England to improve the way in which the formula measured relative need.² The review particularly invited discussion on the following aspects:

- (a) the measurement of morbidity,
- (b) the implications for health services of social deprivation and other social factors,

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- (c) the treatment of patient flows across regional boundaries,
- (d) the extra service costs associated with medical teaching,
- (e) the special problems of inner cities.

After consultation the steering group produced an initial report on the review in December 1986.³ A final report is planned by the end of 1987.

This paper is the first in a series of six covering the principal issues discussed in the initial report of the RAWP review. The remaining papers will be devoted to the relation between RAWP's objective of equal opportunity of access and spending on general medical services of family practitioner committees (FPCs)⁴; the financial incentives for clinicians of subregional RAWP⁵; the compensation in RAWP for cross boundary flows of patients and cross charging⁶; the allowance in RAWP for the service costs of teaching clinical medical students⁷; and possible implications of variations in admission rates for the equitable allocation of resources.⁸

RAWP, morbidity, and need

The means chosen by the working party¹ in 1976 to measure the level of morbidity of populations in different geographical areas have been a source of controversy ever since. RAWP used mortality data in the shape of standardised mortality ratios (SMRs) to account for variations in morbidity in addition to those explained by the age-sex structure of the population. SMRs have excited much comment, mainly hostile.⁹ Most critics within the health service come from the Thames regions, particularly those inner London districts which stand to lose most from the implementation of RAWP based on SMRs. Alternatives to SMRs have been developed almost exclusively in the Thames regions. Fresh impetus to discussion about SMRs has come with the recommendation in the first report of the RAWP review for carrying out new research into the relative merits of mortality and other possible proxies for need.³

AN EPIDEMIOLOGICAL APPROACH

The working party took an essentially epidemiological approach to measuring the need for health care by assuming that need could be equated with the morbidity in an area. Further, morbidity in turn was assumed to reflect the social and environmental conditions of an area, since adverse conditions were known to increase susceptibility to death and disease. Yet good quality, direct measures of population morbidity did not exist. It was particularly important to find an indicator of morbidity that would be independent of the existing unequal supply of health service resources and of the policies of health professionals in different parts of the country. The working party reviewed and rejected several existing morbidity measures mainly because they were incomplete and not available for every district. Social indicators were also rejected. The decision to use SMRs has led to the main criticism that they do not adequately measure morbidity and also that they fail to encapsulate the greater health care needs that socially deprived areas are said to have.

The working party was aware of the evidence of an association between the social characteristics of populations and their demand for health care. But it was concerned about the legitimacy of using proxies for morbidity that were even more indirect than mortality data. Evidence presented to the working party showed a high geographical correlation between SMRs and indicators normally associated with social deprivation and lower social class areas—these indicators tended to have high values in northern metropolitan areas. On the basis of these data the working party felt justified in not including social and environmental population weightings in the formula: "Except in the sense that they all have an impact on the morbidity of populations, we cannot take them into account. They are the province of other social programmes."¹

Despite the criticisms that have been voiced since 1976, the working party's justification for the use of SMRs remains valid since a better proxy for morbidity has not yet been developed.

Indeed, it may be argued that instead of devoting the necessary resources to generating better direct measures of morbidity the NHS has moved towards more indirect and complex surrogates for morbidity that rest on shaky theoretical foundations.¹⁰

Criticisms of the SMR as an indicator of morbidity

Since the RAWP report several studies have concluded that mortality data are an inadequate proxy for morbidity because they do not correlate with a variety of available measures of morbidity, a conclusion now accepted as the orthodoxy. However, the results of these studies are often less clearcut than their conclusions. For example, although Forster (whose work is often cited to support criticisms of SMRs) showed that at regional level there was no significant correlation between SMRs and general household survey measures of acute sickness or bed sickness, he showed a statistically significant correlation with general household survey chronic sickness (defined as a state of longstanding illness, disability, or infirmity).¹¹ Forster concluded that it was doubtful whether mortality could be considered a valid indicator of morbidity. Yet, on the contrary, it may be argued that acute and off work sickness not correlated with SMRs will include minor episodes of illness not necessarily requiring health service help. By contrast, chronic sickness may include severe, longstanding illnesses warranting health service intervention. Others argued that there was even less correlation of SMRs with general household survey data subregionally.^{12,13} Yet in one of the largest such studies Brennan and Clare found strong correlations below area health authority level between mortality and two measures of sickness from the national census.¹⁴ So they concluded that overall mortality could justifiably be used even subregionally as a proxy for morbidity in resource allocation.

Recent research carried out in the Northern region by Professor Peter Townsend of Bristol University has shown a similar high correlation at ward level between SMRs and the proportion of people who classed themselves as permanently sick or disabled at the 1981 census, the proportion of live births below 2800 g, and a composite "health index."¹⁵ These results run counter to the conventional criticisms of using SMRs in RAWP.

A further general point is that the lack of correlation between a particular measure of morbidity and SMRs does not necessarily invalidate their use since no available measures of morbidity are as comprehensive as mortality data. Each measure describes only a part of the morbidity present in a population. So it is not surprising that overall measures of mortality do not always correlate with specific morbidity measures.

Several studies have criticised RAWP's choice of SMRs by pointing out the discrepancy between chronic conditions likely to generate a high use of health services and those likely to result in large numbers of deaths.¹⁶⁻¹⁸ So perhaps a low SMR could indicate a greater need for health care than a high one. Yet studies comparing deaths with service use cannot amount to a convincing attack on RAWP's use of SMRs since statistics on the use of health services are known to be dominated by the supply of health service resources and thus measure neither morbidity nor need. The existing pattern of health service use may have little to do with the actual needs of populations. It seems perverse to criticise a measure chosen expressly because it is independent of the existing supply using data derived from use of that same supply.

The working party is commonly held to have made unjustifiable assumptions about the relation between mortality and morbidity in choosing to use SMRs since the precise nature of this relation is unknown. If it were known, however, this would imply the existence of adequate morbidity data, so there would be no need to debate the merits of proxy measures of morbidity such as SMRs.

Social indicators as measures of morbidity

The available, direct morbidity measures that might replace SMRs tend to be incomplete, geographically patchy, inaccurate,

and poorly developed and require substantial funds for improvement—for example, local disease registers and disease notification data. Those dissatisfied with SMRs within the NHS have therefore focused their attention on using easily available social indicators in subregional variants of RAWP, either as proxies for morbidity or for measuring need in broader terms, on the now familiar grounds that the SMR is an incomplete proxy of the need for health care resources. Often SMRs are criticised for not taking adequate account of the extra burden placed on local health services by the social, economic, and environmental conditions in socially deprived areas. The arguments about social deprivation and the need for health care resources tend to be vague, but two distinct criticisms of SMRs can be identified: firstly, SMRs do not reflect the level of chronic morbidity in deprived areas; and, secondly, for any given level of morbidity the needs of a deprived area are greater than those of a non-deprived one since social factors place extra demand on services.¹⁹

EXTRA DEMANDS FROM THE DEPRIVED

The first criticism is merely a variation of the argument that patterns of mortality do not mirror patterns of morbidity closely enough to be used for resource allocation. It assumes that the relation between mortality and morbidity differs between socially deprived areas and other areas. But evidence for this is scanty while a growing number of studies now show consistent associations between social conditions, mortality, and morbidity.^{14 15 20 21} The second criticism is more interesting. It seeks to extend the scope of RAWP's definition of the need for health care beyond criteria of morbidity to include the socioeconomic characteristics of people or the areas in which they live, and how these features affect the resources required to meet their needs. Outreach programmes, health education, and interpreting schemes are examples of the kind of provision that might have to be made in socially deprived areas. It is often argued that hospital stays tend to be longer and admission thresholds lower in deprived areas, resulting in higher costs, and that patients cannot be discharged as soon as clinically indicated because of poor housing or the lack of adequate home support. From this view the NHS is seen to compensate for deficiencies in the social and environmental conditions prevailing in an area.

The debate about RAWP and social deprivation has a strong political dimension, with inner city health professionals, particularly in London, pointing to the evidence of a high demand for services in deprived areas and the unique features of social deprivation in the capital. Unfortunately, there is very little research which looks specifically at the likely extra needs above those accounted for in morbidity proxies encountered by the NHS in socially deprived areas compared with other parts of the country. Correlation studies tend to show that deprived people experience poorer health and make more use of health services than the non-deprived, features also reflected in their greater mortality and morbidity. Brennan and Lancashire, for example, demonstrated strong positive correlations between child mortality, lower social class, housing deprivation, and unemployment in former county boroughs of England and Wales.²⁰ So this would support RAWP's choice of SMRs.

RELATION BETWEEN DEPRIVATION AND HIGH RESOURCE LEVELS

These sorts of considerations have not, however, stopped a number of NHS regions from seeking a "better" overall indicator of the need for health care for use in subregional resource allocations. The Thames regions in particular have been under pressure from the "losers" to find ways of reducing the amount of money that has to be distributed to achieve a RAWP definition of equity, which may well have affected the way the evidence about the adequacy, or not, of SMRs has been interpreted.

In collecting data a major conceptual and methodological problem must be faced to justify the use of social indicators as alternatives to SMRs. Areas regarded as being most socially deprived and with the poorest primary care in the Thames regions

tend also to be the areas with the most beds and health care personnel. Disentangling cause and effect is therefore difficult.

The north Thames regions' census of inpatient bed use represents the most ambitious attempt to identify empirically the "best" surrogate measure of need for health care (over and above the age and sex structure of a population) from a range of social indicators as well as conventional RAWP SMRs. Age-sex standardised bed use rates were computed for people with a range of social characteristics living in areas with differing levels of health service resources.²²⁻²⁴ The socioeconomic group structure of a population was found to be the strongest statistical predictor of its level of use, stronger even than the relation of SMRs to use. The relative level of use associated with each socioeconomic group was broadly similar in both inner and outer London and in the remainder of the home counties despite their different levels of provision. Thus the north Thames researchers concluded that socioeconomic groups had an effect on the use of health care independent of the existing supply of beds. The superiority of these groups as proxies for need was further reinforced by the finding that when group bed use weights were calculated for the 16 districts in the North East Thames region they correlated remarkably highly with the data from the national census on the proportion of people recorded as "ill" (correlation coefficient 0.94). Thus the socioeconomic group structure of a population appeared to be a good proxy for its morbidity. Group bed use weights are now used in subregional RAWP in the two north Thames regions instead of SMRs. It is interesting to note that the gradient of hospital use by socioeconomic groups appeared to be broadly the same between inner London, outer London, and the remainder of the north Thames regions. This seems to indicate that the known higher prevalence of social deprivation in inner London (predominantly concentrated in the lower socioeconomic groups) was *not* leading to a higher use of services over and above that which morbidity levels would have predicted. Thus socioeconomic grouping emerges from the north Thames study as a proxy for morbidity rather than as a measure of morbidity plus the influence on need of social deprivation.

CRITICISMS OF SOCIOECONOMIC GROUPS

The north Thames inpatient census has, however, several major limitations. In effect, it has identified one indirect proxy for morbidity (socioeconomic groups) by reference to its degree of correlation with another highly indirect measure of need for health care which is contaminated by supply (hospital use). Despite the similarity of the relation between use and socioeconomic groups in inner London, outer London, and the home counties, attempting to control for supply factors is no substitute for the direct collection of population morbidity data independent of the configuration of local health services.

In the absence of good quality morbidity data, the mortality data used in RAWP had the advantage of being independent of the existing unequal supply of health service resources, a consideration that does not appear to have carried much weight in the two north Thames regions. This is all the more odd when the north Thames researchers have themselves shown that SMRs also correlate highly with measures of sickness from the national census and with use, although the degree of correlation in this (correlation coefficient of 0.81) was not as great as that between socioeconomic groups and the national census. But since both SMRs and socioeconomic groups were found to be highly correlated, the choice of which indicator to use ought to have hinged on factors such as which was nearer to being a direct measure of population health status, more comprehensive, more independent of supply, and so on. There is a suspicion that the attractiveness of socioeconomic groups over SMRs lies less in their intrinsic merits than in their effect on district RAWP targets, and therefore their political acceptability to influential "losers." A recent letter to the *Health Service Journal* justifying the use of socioeconomic groups in subregional RAWP stated:

Perhaps of more importance than the exact level of correlation in the

variables [SMRs, socioeconomic groups (SEGs), morbidity, and use of services], is the range in the bed day weights produced from either method. The range of the SEG resource weights is more constrained about the norm than those of SMRs. In practice this means that districts or regions which "lose" because of their low SMR value tend to lose less when SEGs are used in their place. Likewise, gaining districts or regions tend to gain less with the use of SEGs than with the use of SMRs.²⁵

This pragmatic reasoning reveals the extent to which modifications to the "needs" elements in the RAWP formula are conditioned by internal NHS politics. It is clearly in the interests of regions to minimise the extent of redistribution required by RAWP since this spells friction.

ACORN

The most recent contender to replace SMRs in RAWP has been ACORN (A classification of residential neighbourhoods), a market research tool that identifies 11 ACORN groups representing neighbourhoods with specific demographic and social characteristics associated with particular lifestyles and consumer behaviour.²⁶ South East Thames Regional Health Authority carried out statistical analyses that associated proxy measures of population need based on use with the characteristics of the population area as measured by ACORN. The objective is to use ACORN weights to replace SMRs in the regional health authority's variant of subregional RAWP.²⁷ But this approach suffers the same drawbacks as the north Thames socioeconomic group analysis. It is difficult to interpret differences in demand for inpatient services between areas as differences in morbidity or need since districts with a high level of provision tend to have the highest rates of use, and the different ACORN groups are not distributed evenly across the region.

Conclusion

SMRs were included in RAWP as the only routinely available proxy for that part of morbidity not accounted for by the size, age, and sex structure of the population alone. The validity of the use of mortality data in this way can be judged only by collecting comparable morbidity data through laborious community surveys, etc. These data are still not available, and data derived from the use of services cannot be used either to measure morbidity or to question the choice of SMRs. Meanwhile, studies are continuing to accumulate that show a high degree of statistical association between mortality, morbidity, and social conditions.¹⁵ It therefore seems perverse to choose to use social indicators, which are far more indirect measures of morbidity than mortality data. If suspicions still remain that the health service in specific deprived areas faces special problems requiring extra resources, these additional burdens could be shown (or not) by studies with specific hypotheses, such as: "Do patients in socially deprived areas stay in hospital longer for the same case mix than in non-deprived areas?" or "Is it more difficult (and therefore more costly) to achieve a particular level of compliance with an immunisation campaign in an inner city area than elsewhere?" If social deprivation were found to cause resource problems in specific ways there might well be a case for allocating extra resources to specific districts. And these should be earmarked for schemes likely to improve the access to care and ultimately the health state of the socially deprived, rather than as an addition to general district funds.

The unthinking inclusion of social deprivation weights in RAWP

confuses the need to account for morbidity (adequately dealt with by mortality data) with that to account for the additional impact of social factors over and above morbidity. Many of the social factors that health authorities argue should be considered in the calculation of their RAWP target originate far outside the NHS and are most unlikely to be remedied by the NHS. Carstairs states helpfully that "Health need, not deprivation, should provide the basis for determining health service delivery,"²⁸ a useful dictum to take into the SMR debate. Also many of the so called social deprivation effects observed in inner cities, especially London, that lead to an apparently high level of need for hospital services may be related to the poor quality of primary care rather than to social factors in themselves. As the report by the NHS Management Board argued, it is better to tackle poor quality primary care directly rather than fund hospital services to deal with the symptoms of its neglect.³ The relation of spending on services provided by general practitioners to RAWP's objective is the subject of the next paper.⁴

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